

MPhil Research Thesis

**RELATIONSHIP BETWEEN HEALTH EXPENDITURES AND LIFE
EXPECTANCY IN PAKISTAN**



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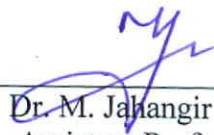


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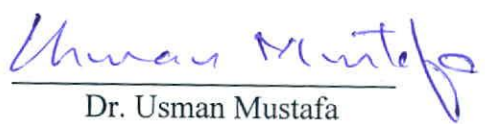
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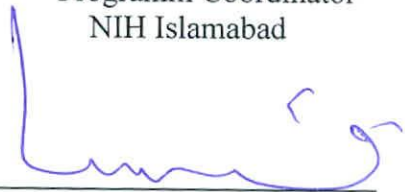
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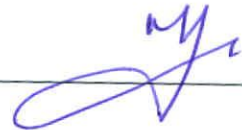
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Declaration

I, Ejaz Ahmed, declare that this thesis, which I submit to department of health economics PIDE for examination in consideration of the award of a higher degree MPhil Health economics is my own personal effort. Where any of the content presented is the result of input or data from a related collaborative research programmed this is duly acknowledged in the text such that it is possible to ascertain how much of the work is my own. Furthermore, I took reasonable care to ensure that the work is original, and, to the best of my knowledge, does not breach copyright law, and has not been taken from other sources except where such work has been cited and acknowledged within the text.

Dedication

This thesis is dedicated to my Beloved Parents and my family. My father and mother always support to me in my life. Although they are no longer of this world, their memories continue to regulate my life. Though your life was short, I will make sure your memory lives on as long as I shall live. I love you all and miss you all beyond words. May Allah (SWT) grant you Jannat ul-Firdous.

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ABSTRACT

This study examine an empirical evidence of the specific impact of public health expenditures on life expectancy in Pakistan using time series data span between 1980 and 2016. This study made use of the recent bound testing co-integration approach developed within the frame work of the autoregressive distributed lag (ARDL) procedure to determine the long run relationship between public health spending and life expectancy in Pakistan. Empirical finding suggest that a long run relationship between health expenditure, life expectancy, literacy rate exist in Pakistan. The results show that GDP and mortality rate insignificant and indirectly influence the rate of life expectancy of Pakistan. On the other hand GDP and mortality rate was found to be insignificant in both short run and long run contrary to economic theory. Therefore, based on the finding of this study recommends that government should increase and restructure the public health expenditures allocation to the health sector.

CHAPTER 1

INTRODUCTION

life expectancy of child birth determine to what extent by and large an young child can aim to live, if current death rates don't change. In any case, the real age-direct death rate of a specific birth unit can't be known previously. The normal time frame that an individual may hope to live is life expectancy. life expectancy is proportion of the normal time of individuals is required to live dependent on the time of its introduction to the world. Its present age and other statistic factor including sex. The most generally utilized proportion of future is during childbirth. Which can distinguish two way chose reasons for health and public dynamic for Pakistan including future by age and history. Health expenditures per capita uses are characterized based on their essential or transcendent motivation behind improving health care. Despite essential capacity or action of element giving or paying to the related health administrations (OECD, 2019).

life expectancy of childbirth, generally utilized as a overall and large improvement of a nation, has expanded in the course of the most recent ten years in the greater part of the nations of the world. This has a specific sign for the creating scene since they are try genuinely for fulfill financial advancement through contributing fundamentally on social parts like health, training, sanitation, climate, administration and controllable, and social security nets. Per capita income of the developing nations has expanded and converted into larger amount of use on healthy meditation and composite products. Enhancements in rate of poverty, food, education, access to safe drinking water, importance of diseases, and sanitation have likewise been exceptional throughout the years that would have affected absolute to life expectancy (Kabir, 2008).

life expectancy is influenced by numerous elements, for example, financial status, including work, income, education and monetary prosperity; the nature of the healthcare framework and the capacity of individuals to get it. Health practices, for example, tobacco and unnecessary liquor utilization, poor food and absence of activity, social components, genetic variables and atmosphere elements including stuffed homes, absence of clean drinking water and sufficient sanitation (Health.gov.au, 2019). The commonness of illness inside a people affects the normal life expectancy. poverty additionally block access to safe drinking water and sanitation. Education is another factor that adds to a more lengthy life expectancy. Less individuals are passing on from

infection and diarrheal problems in Pakistan, as indicated by another, thorough examination of pattern information from 188 develop countries. Mortality from infections dropped 93% somewhere in the range of 1990 and 2013. In the meantime, various illness, including endless kidney sickness and diabetes, guaranteed a bigger number of lives in Pakistan in 2013 than in 1990. Life expectancy improved for the both genders in Pakistan, at a normal of 3.4 years picked up since 1990. All inclusive, various diseases that have gain less consideration in respect to others are probably the greatest reasons for sudden death rate, especially medication use issue, diabetes, constant kidney sickness, and cirrhosis. The gender gaps in death rates for grown-ups between the ages of 20 to 44 is enlarging, and HIV/AIDS, relational despise, street injuries, and maternal mortality are a portion of the key conditions to awareness. For youngsters under 5, diarrheal sicknesses, pneumonia, neonatal disarranges, and malaria fever are still among the main sources of death (Aku.edu, 2019).

Over the past few years the determinants of health expenditure have been an attractive topic for health economists. Inspiring by the numerous studies in this circumstances this paper attempts to examine the effects of productive and population indicators on health expenditure for the emerging country Pakistan. In Pakistan health care is one of the most important issues of the country, but unfortunately the percentage of GDP invested in this particular problem is alarming. The special attention should be given to financing system of Pakistan towards health sector. Out of the five methods of financing the health care system, Pakistan only utilizes general expense income and out of pocket installments. According to WHO Pakistan ranks at high number among the highest out of pocket use as level of private use on health care. The Total health consumption as level of GDP in India, Bangladesh and Malaysia recorded by WHO are 4.1, 3.4 and 4.4 in 2007 respectively and Pakistan has the minimum of all i.e. 2.7 percent in the same year (Yaqoob *et al.*, 2018).

Life expectancy in Pakistan for both male is 65.7 year and for female is 67.4 year, total life expectancy 66.5 years (2018). According to WHO Pakistan life expectancy ranking is 133 number. Health care consumptions outperformed the spending allocation of Rs273.34 billion set for the financial year 2016-17 while as far as GDP these expanded to 0.91pc from 0.77 recorded in the monetary year 2015-16. health expenditures per capita in Pakistan is 36.15 (2014). GDP per capita 1547.85 USD (2017) of Pakistan. infant mortality in Pakistan 50.40 per 1000 births

(2018). literacy rate is very low in Pakistan as compared to other countries Pakistan literacy rate has declined from 60% to 58 % (Alvi, 2019).

Life expectancy rate can be resolved from unprocessed birth rate which is normal births per 1000 out of a year and rough death rate is normal deaths per 1000 out of a year. life expectancy is the normal number of years an individual life from the day of his start to the world. The time of a person's life can be expanded and can be improved off by giving better drug and by giving better vaccination to secure the person against illness. in OECD nations, life expectancy at age 65 has expanded fundamentally for the both gender people during the previous 50 years. A portion of the elements clarifying the additions in life expectancy at age 65 incorporate advances in medicinal consideration joined with more prominent access to medicinal services, more important ways of life and improved living conditions when individuals achieve age 65. A developing offer of the people is presently age 65 and more seasoned. Longer life expectancy is joined by great health care among maturing population has significant outcome for healthy life and long trail health care frameworks. The connection between health expenditures uses and life expectancy. Expanded life expectancy at age 65 does not really imply that the additional years lived are better health. In Europe, a arrow of restriction free life expectancy known as solid life years has as of behind been created and is determined consistently, in light of a general inquiry concerning inability in the European Survey of Income and Living Conditions (EU-SILC). Given that this pointer has as of late been grown, long time arrangement are not yet accessible (Sghari *et al.*, 2016).

One proportion of a nation's way of life is per capita (GDP), and concentrates reliably show it is identified with future. More unfortunate nations clearly have less to spend on preventive instruction and human services than wealthier nations. That may clarify why normal life span is a lot shorter in poor nations. Is there additionally a measurably significant connection between pay distribution and life expectancy (Scully, 2000).

However, the proof for a causal connection between social insurance consumption and health care results stays tricky as issues rise up out of 'the trouble of confining the commitment of the health administration "contribution" as a determinant of health status "yield" which confuse try to measure the general adequacy and effectiveness of health care (Nixon & Ulmann, 2006).

Health systems are financed either through taxes, in the case of healthcare services owned by the state (national health services) or through income-related social contributions social security systems (Elola *et al.*, 1995).

1.1 Foreign Aids for Health Care

Many developed nations give healthy help with state of outside guide to developing nations. The connection between health assist, government going through and in time on earth anticipation is certain on the grounds that when help from the developed nations increments as the developing nations are not independent they can't grow up without the help of solid economies or strong forces.

1.2 Current Health Expenditures in Pakistan

In Pakistan Healthcare spending is low but over the time it's raising. The country is spending 0.5 to 0.8 percent of its GDP on health over the last 10 years for public sector. These percentages are less than the WHO benchmark of at least 6 percent of GDP required to provide basic and lifesaving services. During 2015-16, total expenditure increased by 13 percent over 2014-15, and during current fiscal year (July-March) 2016-17, the expenditure remains at 145.97 billion showing an increase of 9 percent over the same period of last year. According to the world Bank latest report, currently, Pakistan's per capita health spending is US \$ 36.2 which is below than the WHO'S low-income countries benchmark of US\$ 86 (Basharat, 2019).

1.3 Out of Pockets Health Expenditures

Health care expenditure accrues on the basis of health care services utilization and illness. According to WHO, Out of pocket payments are those payments which are paid by the household directly to the doctors, pharmaceuticals and other medical personals. The basic aim of the Out of pocket Payments health payments is seeking health care at the time of need and restore the household health.

In Pakistan, as compared to 2007-2008 out of pocket installments from complete social health insurance consumption decrease by 5% in 2009-2010, but in the form of monetary term, Out of pocket Payments increased from Rs 227,316 to Rs 271,757 demonstrating the decline in the GDP contribution to health care system. Out of Pocket installments as a level of private expenditures has also declined from 88.2% in 2009 to 86.3% in 2011. These Out of payments put families in the risk of vulnerability and also they have no access to the health care facilities (bajwa & cheema, 2019).

1.4 Statement of Problems

According to WHO life expectancy of Pakistan is 66.77 in fiscal year 2018, which is a low ratio of life expectancy as related to other developed countries. The life expectancy is affected by health expenditures directly. Life expectancy in Pakistan is average 66.77 for both male and female. The problem statement revolves around the issue of what determines the expenditures on health and how these are related to the life expectancy. It is intended to explore the relationship between these variables in case of Pakistan and their impacts on the life expectancy of the people of Pakistan, which calls for the existence of a unique relationship based on the available literature and theories. These health problems can be solved by better allocation of health expenditure. Many of the considerable inequalities in life expectancy and health care, when compared with the health outcome, mostly people of Pakistan are living below the poverty line; they have low income to consume health facilities. Per capita income is also a minimum of people; they are not living healthy and improved lifestyle.

1.5 Research Questions

There are questions about the study of association between health expenditure and life expectancy:

It tends to be determined:

- I. What is the correlation between life expectancy & health expenditures in Pakistan?
- II. How is an increase in health expenditures likely to gain welfare for health outcomes?

1.6 Objective of study

The aim of the existing study is to find a connection between health expenditure and life expectancy in Pakistan:

Further, especially, it tends to be determined:

- I. To identify the relationship between health expenditure and life expectancy.
- II. To increase health expenditures to attain welfare for life expectancy.

1.7 Significance of Study

Government knows that sufficient, responsive and proficient health financing is the foundation of a nation's well-working health institutions. The spending on health will be pushed as "speculation" with the line services, fund divisions and universal advancement accomplice. Needs for health assignments will be returned to, and a higher offer for fundamental health administration conveyance, preventive projects, correspondence, limit working of cutting edge health laborers, and administration will be guaranteed. This research will be interest to Ministries of Health, Ministry of Planning commission and Development, Pakistan Bureau of Statistics, Development Partners, Health Financing Practitioners, and Researcher; the Secretariat in the Parliament and Sustainable Development Goals SDGs (Ministry of Health, 2019). This study finding the gap by providing assessment of health expenditures on life expectancy. This research is help to support better design of health policies that aim to increase health expenditures for health care. The study will help policy maker to allocate resources equitable and efficiently.

1.8 Organization of Study

Organization of study is chapter # 1 is about introduction of research. In chapter # 2 which is literature review and literature gap. chapter # 3 is about theoretical framework and study is clarify the data and methodology of research and chapter # 4 is about result and discussion & chapter # 5 is conclusion and policy implication and lastly, are references.

CHAPTER 2

LITERATURE REVIEW

2.1 literature Review

Relationship between health expenditures and life expectancy is major factor for development of any country. In pervious literature show, there is some connection between health expenditure and life expectancy. In developed and developing countries there is lot difference in many condition. Develop countries health system and health care expenditures are more efficient according to country GDP and some other variables of development. But in most developing countries are many issues about their healthcare system and health expenditures to allocate a better health facilities and delivery.

According to Sghari and Hammami (2016) The relationship between life span and health care spending. the connection between health care consuming per capita and time on earth life span of individual in the OECD. A significant exercise from crafted by McKeown is that it can't be naturally accepted that progressively restorative consideration dependably prompts an expansion in future. Since the 1950s reasons for death have changed from primarily attractive sicknesses to constant illness, and medicinal consideration has changed because of this epidemiological progress.

Jaba *et al.* (2014) The relationship between life expectancy at birth and health expenditures assessed by a cross-country and time-arrangement investigation. to dissect the connection between the elements of the information sources and the yields of human services frameworks. The assets of health care frameworks are estimated by a few pointers, for example, health consumptions (all out uses on health expenditures per capita, health expenditures use as level of GDP, level of open use in all out health expenditures use), number of doctors, number of emergency clinic beds, number of processed tomography scanners .The marker considered in this examination for estimating the health expenditures info is all out health expenditures uses per capita. The yield of the health care frameworks is communicated either by life span pointers, for example, (future during childbirth, future at 65 years, solid future) for all out populace and by sexual orientation, or by mortality markers (death rate, newborn child death rate, potential long stretches of life lost). These markers are viewed as great intermediaries for estimating the health status of a populace.

Sanya and Yemisi (2017)) Health Expenditure Distribution and Life Expectancy in Nigeria. the connection between life expenditures and Government Expenditure in Nigeria somewhere in the range of 1980 and 2015. The examination utilized a Feder-Ram Approach as estimation strategy. Discoveries from the examination demonstrated that the connection between Government Health Expenditure and Economic Growth was certain during the investigation time frame. That is, when government use on wellbeing improves monetary development improves.

Besley and Kudamatsu (2006) The additionally contend that higher health care spending and increasingly predominant human services strategy are related with better health results, however their contention expresses that the impact of these polices experiences the political framework and it is more grounded in majority rule government. Put essentially, health strategy mediations are predominant in popular governments, which thusly results in better health results.

Nikoloski and Amendah (2011) Does a nation's more noteworthy human services spending lead to better health results for its populace?. This report means to decide if health expenditures use has expanded for the most part and whether this expansion, assuming any, prompted improved health pointers in Africa. Clear, and multivariate examinations were led with health markers as reliant factors on one hand and open and private health spending uses as the fundamental free factors. Future during childbirth was the needy variable with salary per capita, absence of education rate, sustenance accessibility, proportion of health care consumption to GDP, urbanization rate and carbon dioxide outflow per laborer being the illustrative factors. The exact outcomes proposed that an expansion in salary for each capita, a reduction in absence of education rate, and increment in sustenance accessibility were related with progress in future during childbirth. health expenditures use had a negative association with future during childbirth, nonetheless, this outcome may have been because of the technique received. At long last and most as of late, utilizing a board information examination from 1995 to 2010 covering 44 nations additionally demonstrated a relationship between expanded human services use from one viewpoint and decreased neonatal death rates and expanded future during childbirth on the other.

Brown (2015) The momentum focal point of beneficial research on expanding the amount, as opposed to the quality, of life is harming our health care and hurting the economy. Should medicinal research be centered around expanding the amount or personal satisfaction? For an assortment of reasons, past research has concentrated more on amount of life, yet the resultant life

expansion, without lessening maturing, has expanded the degree of maturing and age-related illness, in addition to annuity, and social and medicinal expenses, in an unsustainable way. I contend here that therapeutic research desperately should be refocused far from disease and cardiovascular research, and onto diminishing maturing and age-related bleakness, in this manner expanding both our health and our economy.

Scully (2000) Does the Distribution of Income Affect Life Expectancy? The evidence suggests that the level of national income is important to longevity but that how it is distributed among the population does not matter, at least in high-income countries. To analyze this question, I examined the relationship between average life expectancy and income distribution in 1995, using a statistical technique called regression analysis. I also examined the relationship between average life expectancy and per capita GDP. to focus on the distribution of income without the confounding effect of living in an impoverished society. According to protagonists, one effect of unequal income distribution is reduced life expectancy. They point to selected examples in which people in countries with a more equal income distribution have longer average life expectancies than do those in countries with a wider income gap between rich and poor. However, a casual look at life expectancy statistics reveals no obvious pattern. On the one hand, Sweden, the Netherlands and Belgium all have very high life expectancies and are also considered very egalitarian. By comparison, Japan is less egalitarian but has a higher life expectancy.

Jensen and Romo (2015) The Education Composition's Effect on Life Expectancy. This examination means to evaluate the effect that the changing education arrangement has on the life expectancy hole between the genders from today until 2050 for Denmark. Females' stay in front of guys regarding future; the distinction can be credited to sociological contrasts, yet additionally to various natural attributes, that are likewise found in numerous mammalian species. These organic contrasts, similar to the defensive impacts of estrogen and females' better safe framework helps with clarifying the life expectancy hole between the genders.

Sunday and Adeleye (2017) General health consumption comprises of repetitive and capital spending from government(central and neighborhood) spending plans, outer borrowings and grants(including gifts from universal offices and non-government associations) and social(or necessary) medical coverage reserves. While general government use on health contains the direct expenses reserved for the upgrade of the health status of the populace and the appropriation of

restorative consideration merchandise and enterprises among populace by the accompanying financing specialists focal, administrative, state, common, provincial, and neighborhood, civil experts; additional budgetary offices, standardized savings plans and parastatals. All can be financed through residential assets or through outer assets.

Deshpande *et al.* (2014) The consequence of National Healthcare Expenditure on Life Expectancy. examination tries to analyze whether there is a connection between social insurance consumption and national future so as to increase point of view on the best way to effectively expand the nature of health in a state. The connection among consumption and medicinal services quality can be tried for in a few different ways. In another examination, the connection between avoidable mortality and social insurance spending in 14 western nations was analyzed. Utilizing changes in national health care expenditures uses as an info measure, or free factor, they quantified the progressions in avoidable mortality, which they characterized as a circumstance wherein opportune and viable human services could anticipate mortality even after the condition had created. What the investigation found is that there is a negative connection between human services spending and avoidable mortality, even after variables, for example, joblessness, training, and time fluctuating determinants were controlled for when all is said in done, nations with a better than expected increment in health spending encountered a better than expected decrease in avoidable mortality. Anyway the investigation likewise noticed that in spite of the fact that there is surely a negative connection between the two variables, there are a few points of confinement with respect to how to decipher the discoveries. For instance, expanded spending may have made other welfare picks up that were not represented in the examination. This may have additionally affected mortality, and hence, the exact productivity of the human services framework isn't given by the investigation. To put it plainly, even subsequent to representing frustrating elements, the investigation finished up there is a negative connection between social insurance spending and avoidable mortality. There is little space to extrapolate additionally dependent on these discoveries alone, in any case, the examination indicates a few different regions that could be looked into further.

Musgrove *et al.* (2002) Fundamental examples in national wellbeing and health expenditures use. Examined in this paper are national health records gauges for 191 WHO Member States for 1997, utilizing straightforward correlations and direct relapses to depict spending on health and how it is financed. Open use on health expenditures can be low a direct result of low all out open use, or in light of the fact that a low offer of open consumption is given to health, or both. The proportion

of open spending on health to add up to general government consumption surpasses 20% and is underneath 10% for most nations, including practically the majority of the African and the Eastern Mediterranean Regions. The offer increments as pay rises, around from 5% to 10%, with a pay coefficient of 0.0159 for all nations together and 0.0161 for nations with increasingly solid information. Variety around the mean offer remains genuinely steady over the four salary gatherings, the standard deviation changing from 0.038 to 0.045. IMF evaluations of this relationship compute complete focal government use with respect to GDP, and the offers for health, instruction, guard and intrigue installments. These assessments don't coordinate the national health record numbers assessed by WHO, when much consumption goes through sub national governments, as in Brazil, China, and India. The normal offer of GDP spent by focal governments increments just somewhat (from 24% to 29%) from low-to center pay nations, with a further increment to 32% among high-salary nations.

Auerbach *et al.* (2017) How the developing hole in life expectancy may influence retirement advantages and changes. how developing imbalance in life expectancy influences lifetime profits by Social Security, Medicare, and different projects and how this marvel interfaces with conceivable program changes. We first task that future at age 50 for guys in the two most noteworthy pay quantiles will ascend by 7 to 8 years between the 1930 and 1960 birth partners, however that the two least pay quintiles will encounter practically zero increment over that time span. This disparity in future will cause the hole between normal lifetime program advantages gotten by men in the most astounding and least quintiles to extend by \$130,000 (in \$2009) over this period. At long last we reenact the impact of Social Security changes, for example, raising the ordinary retirement age and changing the advantage equation to see whether they moderate or upgrade the diminished progressiveness coming about because of the augmenting hole in life expectancy.

Yaqoob *et al.* (2018) Impacts of Economic and Population Factors on Health Expenditures in Special Case of Pakistan. This examination plans to investigate the variables influencing the social insurance and health consumption's of Pakistan by utilizing the Multivariate procedures for the yearly information arrangement from 1960 to 2010. Factor Analysis proposes that the conduct of Health Expenditures is basic with Gross Domestic Product (GDP), populace of age 65 or more and future in Pakistan while populace of age 0 to 14, populace development rate and Crude Birth rate are moving inverse way for example as GDP, $P_{\geq 65}$ and LE of Pakistan expands $P(0-14)$, GR and

CBR will diminishes. This investigation can further be stretched out by including the per capita salary of Pakistan so as to see the more extensive picture while segregation of health expenditures offices among urban and country regions must be consolidated to imagine the genuine status of health care in Pakistan. Financial expert and strategy creators should find a way to improve the health part in Pakistan not just by building up emergency clinics or expanding the quantity of specialists yet in addition stress on making mindfulness with respect to the medical issues of a person.

Adeel (2016) Effect of Government Expenditure on Health Sector of Pakistan. Studies demonstrate the effect of government consumption on health part of Pakistan. Over the period 1990-2012. ARDL method is utilized for looking at cointegration among factors. The effect of various factors in type of baby death rate government use % of GDP, improved sanitation offices and education rate over health part of Pakistan (rough passing rate, unrefined birth rate) is broke down. The observational proof demonstrates that newborn child death rate has a positive association with rough passing rate while improved sanitation office and government consumption has negative association with unrefined demise rate. Newborn child death rate has a positive association with unrefined birth rate, education rate has a negative association with rough birth rate and government consumption has a positive association with rough birth rate. These experimental discoveries recommend that health division can be improve if the sterile offices are improved, better training can lessen newborn child death rate. This should be possible if the administration use is used in a powerful and straightforward way.

Bashir *et al.* (2012) expressed that education and health system are basic for advancement of an economy. It expands profitability, monetary development and business level. At the point when all offices of health and training are given to individuals it disposes of the variations and gives work in long run and short run. The information on training consumption, absolute enlistment, number of emergency clinics, health expenditures use and business level used to discover the relationship of health education and work. knowledge builds the human asset advancement. A decent health care is fundamental for a decent life. The standard least square technique, granger causality test, chi square tests, cointegration model and the business model are utilized to test the connection between work, education and health care. The outcomes express that there is sure relationship among education, health care and government use in long run. The administration use on health and training in type of venture would build the work in Pakistan.

Mahumud *et al.* (2014) Effect of Life Expectancy on Economics Growth and Health Care Expenditures in Bangladesh. To discover decide the effect of the future on changes of financial development and social insurance consumption. To look at the normal connection between future during childbirth on determinants of human services consumption, various relapse investigation was used. The basic various straight relapse models relating to every factor. The higher Gross Domestic Product per capita was found in a more drawn out future. i.e., one dollar expanding in GDP per capita will change in a normal the future by 33 days, and furthermore one unit increment in per individual Health Expenditure Per Capita (HEPC) will build the future in a normal of 8 days in a year. one dollar expanding in GDP per capita by 33 days will likewise build future, for Health Expenditure Per Capita (HEPC), by 8 days by one year by and large. The higher extent of complete consumption on health as a level of GDP and direct close to home use on health by family unit as an offer of private use on health results in additionally longer life expectancy.

2.2 Literature Gap

Relationship between health expenditures and life expectancy many research studies conduct related to this topic globally. In Pakistan less research were conducted related to effect of economic and population factors on health expenditure and effects of government expenditure on health care system of Pakistan. But study related to relationship between health expenditure and life expectancy in Pakistan is less work on this topic. To fill the gap this research make an effort in the available literature.

CHAPTER 3

Theoretical Framework and Methodology

This chapter is include theoretical and methodology framework of study and discussion about the data source of variables. List of variables and source, methodology is clarify in this chapter.

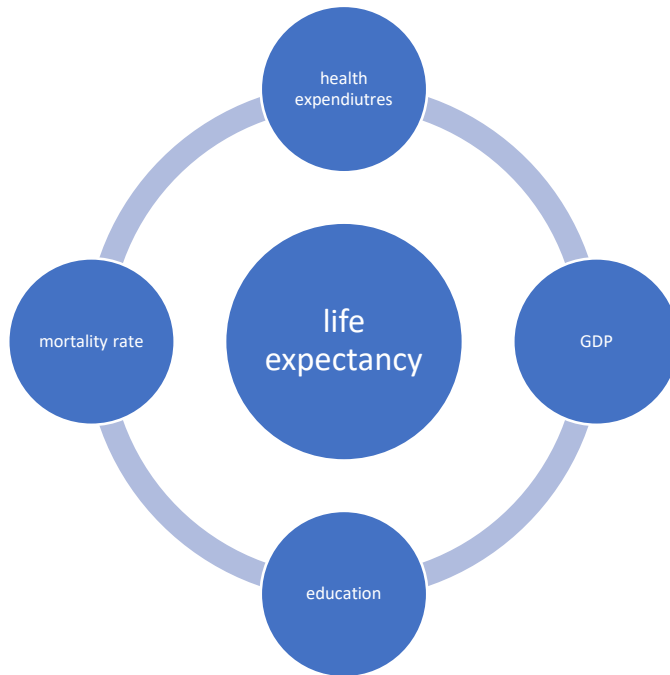
3.1 Theoretical framework

the theoretical structure of the paper has been display to break down the understandable theoretical channels and connections through which informative factors like (health expenditure, GDP, education and mortality rate can impact on the dependent variable, Life expectancy) which can be explained.

As shown in figure,1 below, the possibility factors of life expectancy is discussed like better health care, income, infectious disease. these determinants will effects the life expectancy at any human age.in this study we make some links between the variables which effect the life expectancy of any age group of human. This is economic factors to make a links or association between the depended variable which is life expectancy and independent variables of this research.

Using the pervious study of research relationship of health care spending use and life expectancy is relies upon better distribution of assets. A few examinations have been directed to build up the causal connection between government use and health both in created and creating country. Be that as it may, dominant part of these investigations just thought about the connection between the health and macroeconomic factors. Thusly, it is basic to think about the nexus between government utilization and life expectancy expenditures. This paper is organized as follow; this early on segment is trailed by area that talks about calculated issues and exact literature. section two presents technique and theoretical supporting, section four strategies and materials. section five will be focuses on results and its interpretation while segment six will be finishes up the paper.

Figure.1: Diagram of Theoretical Framework



This diagram show the relationship between the dependent variables and independent variables of this study. Life expectancy is depends on these variables which show some impact on health care, which result of increase or decrease in life expectancy of population. Life expectancy is effected by these variables of which are link by one other. There is some relationship between these variables. In this research study independent variable life expectancy is effected by health expenditures and health expenditures effected by GDP. Health expenditures are part of GDP and it will be link to GDP for to allocation of resources. Education is also make some connection to life expectancy for knowledge about the health care and facilities. Mortality rate is also impact on life expectancy to increase and decrease of the life expectancy.

3.2 Data and Methodology

This is time series study based on time series data from 1980-2017 of Pakistan. Data is taken from the world development indicators (WDI). In this research use one dependent variable which is life expectancy and independent variables which are out of pocket HE, GDP per capita, education, mortality rate. These are my research variables show effects on life expectancy with time series data. econometric technique will use to find results of this study. Regression analysis and models is to use for check he relationship of these variables and results for interpretation. Either these variables are corelated with each other to show impact of health expenditures on life expectancy. As shown in table : 1

Table 1. LIST OF VARIABLES

Variables	Sign	sign	Reference
Life expectancy	+ve	LE	Sghari and Hammami (2016), Sunday and Adeleye (2017)
Health expenditure	+ve	HE	Sghari and Hammami (2016), Sunday and Adeleye (2017)
GDP	+ve	GDP	Sghari and Hammami (2016), Sunday and Adeleye (2017)
Education	+ve	EDU, LR	Jensen and Romo (2015), Bashir <i>et al.</i> (2012)
Mortality rate	-ve	MR	Jensen and Romo (2015), <i>Bashir et al.</i> (2012)

Table 1. show the significance and justification for variables which are taken in this research. In previous studies these variables show positive connection between health expenditures and life expectancy and also make relation with other variables. But in studies pervious also show a negative relationship with morality and life expectancy. Because morality rate increase in the country then result loss more life's.

3.3 Econometric model

Based on proposed variables:

The following form of econometric model is assumed to be estimated,:

$$LE = \alpha_0 + \beta_1 HE_t + \beta_2 GDP_t + \beta_3 Edu_t + \beta_4 MR_t + ut$$

Where :

$$ut \sim iid$$

LE = life Expectancy > is dependent variable

HE = Health Expenditure > independent variable

GDP = Gross Domestic Product > is independent variable

Edu(LR) = Education > independent variables

MR = Mortality rate > independent variable

3.4 Data Collection Instrument and Description

World development indicator (WDI) is source of data collection for analysis. this study is time arrangement dependent on time series data of Pakistan. After collection of data regarrison analysis is use to gets results. Data of all research variables is available on one source which is World development indicator.

3.5 Methodology

This is time series study of life expectancy and health expenditure in the case of Pakistan. In this research time series variable data is used for analysis and results. Appropriate method will use to get impact of variable and relationship with existing variables. Make general model of variables in methodology with help of EViews to check stationarity of variables.

3.6 Study Design

This is time series and quantitative study to obtain the “connection of health expenditure and life expectancy”. This is secondary data research and data is also secondary for analysis and gets results.

3.7 Duration of Study

This study was conducted over a period of time of 4 months to data collection, analysis and data interpretation were complete in this time period.

3.8 Sample Size

Sample size of this study based on time which is 1980-2017 of Pakistan. This is about 36 years of data is used in this study to check results and relation of variables.

3.9 Data Analysis Plan

EViews 9 is used for data analysis and generate results. Unit root test applied for check stationarity of data.

In current study we are going to apply ARDL analysis to check long run and short run effect of paper. We are expecting that all variables are $I(0)$ and if some variable are not $I(0)$ then by using appropriate transformation use to make these variable stationary and then apply appropriate methodology.

3.10 Estimation Techniques and ARDL Modelling Approach

Before introducing observational after effects of ARDL model, we apply following econometric steps of stationarity test of the time series data of by augmented-dickey-fuller and we continue to decide the F test for ARDL model. some variables are stationary and some are non-stationary. According to proceedings variables properties atuo-regressive distributed lag model is apply for results and analysis.

CHAPTER 4

Results and Discussion

Before accessing the ARDL bound test technique, we use and apply the augmented dickey-fuller test for stationary and non-stationary time series. The results are presenting in table.2 showing that all variable are integrated of order one I (1) excepting the life expectancy and GDP per capita when the variables are stationary at I(0).

Table 2. Stationary Results of ADF Test

Variables	Level 1(0)	Ist difference 1(1)
LE	-4.24**	-0.77
HE	-1.93	-6.57**
GDP	-3.75**	-7.41
LR	-2.18	-12.13**
MR	0.27	-3.33***

*show values are significant at 10% level with Mackinnon (1996).

**show values are significant at 1% level with Mackinnon (1996).

***show values are significant at 5% level with Mackinnon (1996).

The results of ADF unit root test implies that the condition for cointegration using Johnsen method was met by series. The objective of this method to analysis the long run and short run dynamics relationship between the dependent and explanatory variables of interest using ARDL procedure and as well a maximum lag of dependent variable is one and independent variables is (3,2) consider appropriate based on the majority of the criteria including AIC as evidenced from table of appendix. However, the general results of econometric model of ARDL are shown in table.3

Results show the short run relationship between the variables of model.

Table.3 Results of Econometric model ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LIFE_EXPECTANCY(-1)	0.971707	0.002180	445.6712	0.0000
_00P_HE	0.001891	0.000460	4.107220	0.0007
_00P_HE(-1)	0.002934	0.000562	5.219485	0.0001
_00P_HE(-2)	0.002609	0.000475	5.491652	0.0000
_00P_HE(-3)	0.002825	0.000487	5.804737	0.0000
GDP	-0.005166	0.000990	-5.219696	0.0001
GDP(-1)	-0.005817	0.000830	-7.010370	0.0000
GDP(-2)	-0.004539	0.000761	-5.964085	0.0000
GDP(-3)	-0.003855	0.000898	-4.292549	0.0005
EDU_LR_	0.010402	0.003406	3.053607	0.0072
EDU_LR_(-1)	0.007603	0.003190	2.383307	0.0291
EDU_LR_(-2)	-0.007766	0.002818	-2.756321	0.0135
MR	-0.013094	0.005195	-2.520485	0.0220
MR(-1)	0.039925	0.013202	3.024258	0.0076
MR(-2)	-0.039004	0.013210	-2.952680	0.0089
MR(-3)	0.011671	0.005269	2.214900	0.0407
C	0.704174	0.356635	1.974493	0.0648
R-squared	0.999998	Mean dependent var		62.45429
Adjusted R-squared	0.999995	S.D. dependent var		2.568804
S.E. of regression	0.005555	Akaike info criterion		-7.241258
Sum squared resid	0.000525	Schwarz criterion		-6.478078
Log likelihood	140.1014	Hannan-Quinn criter.		-6.980992
F-statistic	440993.5	Durbin-Watson stat		1.886708
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model

the results show the significance and relationship of variable dependent variable life expectancy lag is significant and positive impact with health expenditures. That indicate 1% increase in health expenditures in the country will result 0.002% increase in level of life expectancy. Sunday and Adeleye (2017) also reported the same results, There is positive and significant relationship between life expectancy and health expenditures. GDP is used to proxy factor for life expectancy has a Negative and insignificant relationship on life expectancy. For its lag one value is contrary theoretical expectation. . If one 1% increase in GDP then results -0.005 percent decrease in life expectancy. The third independent variable of model is literacy rate. there is positive and

significant relationship between the life expectancy and literacy rate. Deshpande *et al.*, (2014) also reported the same results, there is still positive and significant relationship between life expectancy and literacy rate. If one percent increase in Literacy Rate then the result is 0.007 % increase in life expectancy. Last one independent variable is mortality rate of neonatal born (per 1000 live birth). If one percent increase in mortality rate then result is -0.039 decrease in life expectancy.

4.1 Long Run Estimation

A careful look at the long run results in table. 4 shows that the coefficient of life expectancy health expenditures, GDP, literacy rate, mortality rate and their lagged value of all their expected sign and significant as suggested by theory. Expected three lag value of health expenditure that carries statistical direct relationship with life expectancy. Health expenditures is indicate positive and significant relationship with life expectancy. While the lag value of Health expenditures is reveals a positive impact and statistically significant on the level of life expectancy-health outcomes in line with our a priori expectations. Sunday and Adeleye (2017) also Reported the same results. Health expenditures show the positive and significant relationship with life expectancy. This indicate that a 1 % increase in level of health expenditure in country will result in 0.363 % increase in level of life expectancy in long run with yearly. The GDP is used to proxy factors as a negative and statistically insignificant relationship on life expectancy for its lag one contrary to theoretical expectation. . If 1 % percent increase in GDP will results -0.685 percent decrease in life expectancy in long term. While two lag value of GDP is show positive and significant relationship on the life expectancy as indicate by the value of T-ratio and probability value to our priori expectations. Literacy rate and its lag value indicate a positive and statistically significant relationship with life expectancy in Pakistan. Also, a 1% increase in the literacy rate will give rise in the life expectancy (health outcome) by 0.01 percent in long run. Deshpande *et al.*, (2014) also

report the same results, the relationship of literacy rate and life expectancy is positive and statistically significant. Mortality rate is also show negative and statistically insignificant relationship on life expectancy. Meanwhile, the morality rate show negative and statistically insignificant relationship with life expectancy. If 1% increase in Mortality Rate then result will be -0.018 reduce in life expectancy in long run.as the results of long run estimation is shown in table.4

Table.4 Long Run Results Coefficient From ARDL Estimation-Dependent Variable: LE

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(_00P_HE)	0.001891	0.000341	5.547969	0.0000
D(_00P_HE(-1))	-0.005433	0.000336	-16.160992	0.0000
D(_00P_HE(-2))	-0.002825	0.000311	-9.069899	0.0000
D(GDP)	-0.005166	0.000548	-9.423342	0.0000
D(GDP(-1))	0.008394	0.000529	15.857278	0.0000
D(GDP(-2))	0.003855	0.000529	7.292500	0.0000
D(EDU_LR_)	0.010402	0.002380	4.370304	0.0004
D(EDU_LR_(-1))	0.007766	0.002298	3.380263	0.0036
D(MR)	-0.013094	0.003699	-3.539563	0.0025
D(MR(-1))	0.027333	0.006421	4.256671	0.0005
D(MR(-2))	-0.011671	0.003692	-3.160823	0.0057
CointEq(-1)	-0.028293	0.000128	-220.668698	0.0000

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
_HE	0.362590	0.026196	13.841238	0.0000
GDP	-0.684854	0.043702	-15.670994	0.0000
EDU_LR_	0.361879	0.161076	2.246634	0.0382
MR	-0.017757	0.021291	-0.834011	0.4158
C	24.888549	12.701039	1.959568	0.0667

Table.5 Bound Test Results for Co-integration

Computed wald test (F-statistic) 6271.2

K=4

Critical value	upper bound value I(1)	lower bound value I(0)
1%	4.37	3.29
5%	3.49	2.56
10%	3.09	2.2

Sources: (i) Pesaran et al. (2001), Table CI (iii), Case 111: Unrestricted intercept and no trend. K is the number of regressors in the ARDL model. Narayan and Narayan (2005), Case III, *, ** and *** denotes significance at 1%, 5% and 10% respectively. (ii) Authors' Computations using E-views 9.

4.2 Post Estimations Analysis

The robustness of model has been definite by serval diagnostic tests such as serial correlation test, heteroskedasticity test, Ramsey RESET specification test and Jacque-Bera normality test. All the tests indicate that the model has a satisfactory econometric properties, with a correct functional form and as well the models residual are serially uncorrelated, normally distributed and homoscedastic. Hence, the result reported are valid for reliable interpretation and policy making. The results of residual analysis can be confirmed as shown in table.6 the results reveal that, the residual of data are normally distributed. The null hypothesis of normality of residual of data is accepted at 84.83 percent confidence level as indicated by the probability value of 0.848304 and jarque- Bera value of 0.329032 which is greater than zero.

Table.6

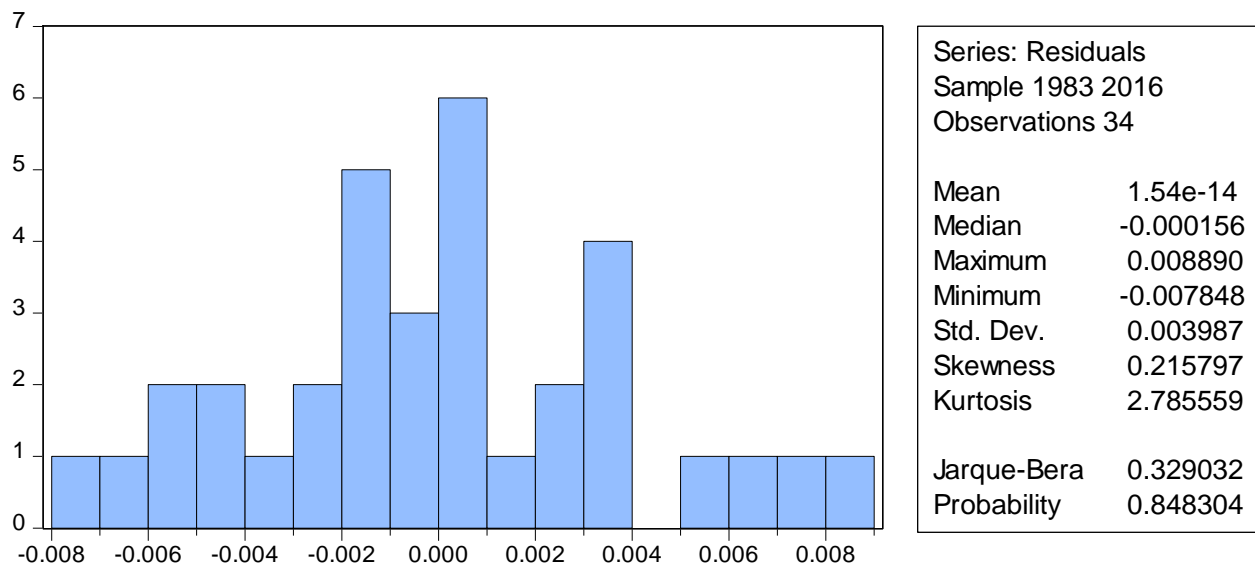
Diagnostic Tests of the ARDL Model Results

S/No.	TEST	F-statistic	P-value
i.	Serial correlation test: B-G serial correlation LM test	1.908556	0.0318
ii.	Heteroskedasticity test:	0.855371	0.9996
iii.	Normality test: jerque Bera	0.329	0.848304
iv.	Ramsey Reset test:	0.249008	0.6246

Table 6 show the ARDL diagnostic test results, in this analysis we see the f-statistics value with probability value to check appropriate results of model.

Figure.2: Normality Test Diagram

y-axis

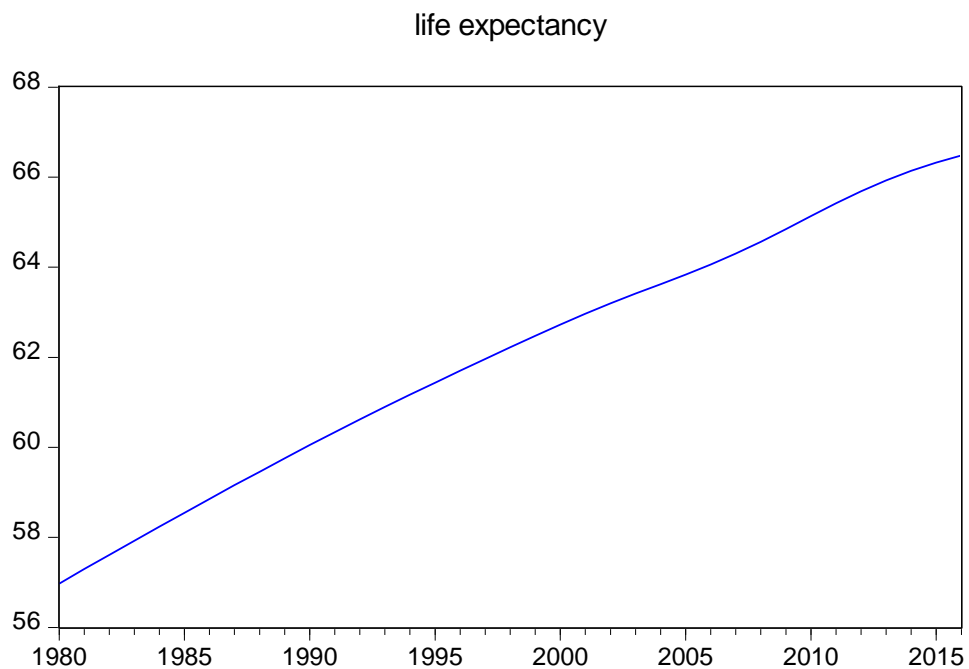


x-axis

4.3 Trend Analysis

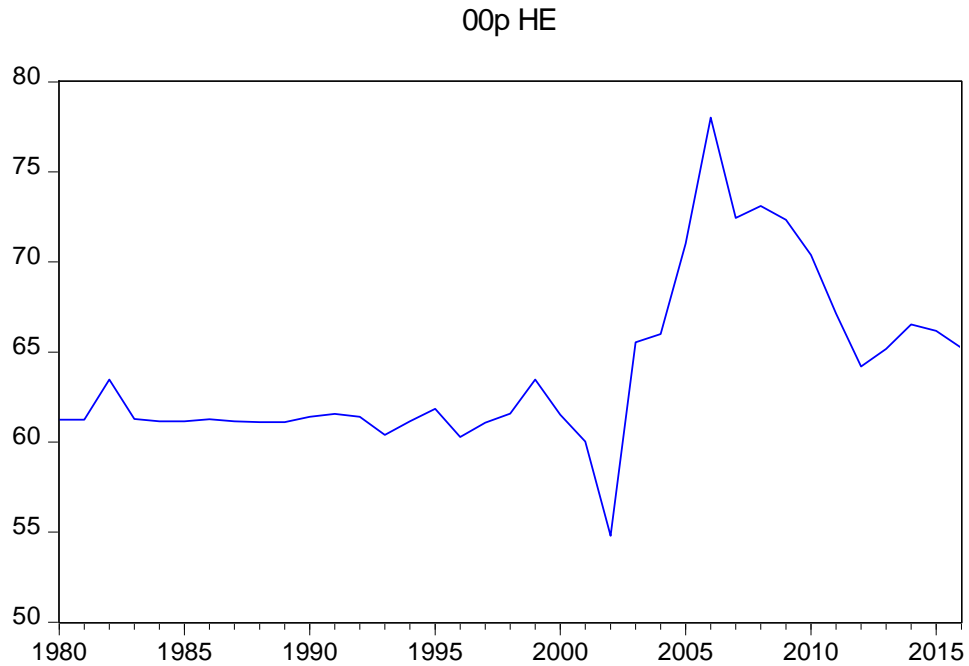
Figure below represent an illustrated analysis of the series in model in a some properly analyzed the objective of the study. The trend analysis revealed that figure 3 and 4 show upward trend in life expectancy and health expenditures between 1980 to 2015. However, upward trend occurs after 2000. while, figure 5,6 and 7 show no trend in GDP, literacy rate and downward in mortality rate during the period consider 1980-2016 as diagrammatically depicted below.

Figure.3 life expectancy trend analysis diagram



This diagram show the trend in life expectancy form 1980 to 2015, this is constant increase in life expectancy throughout the years.

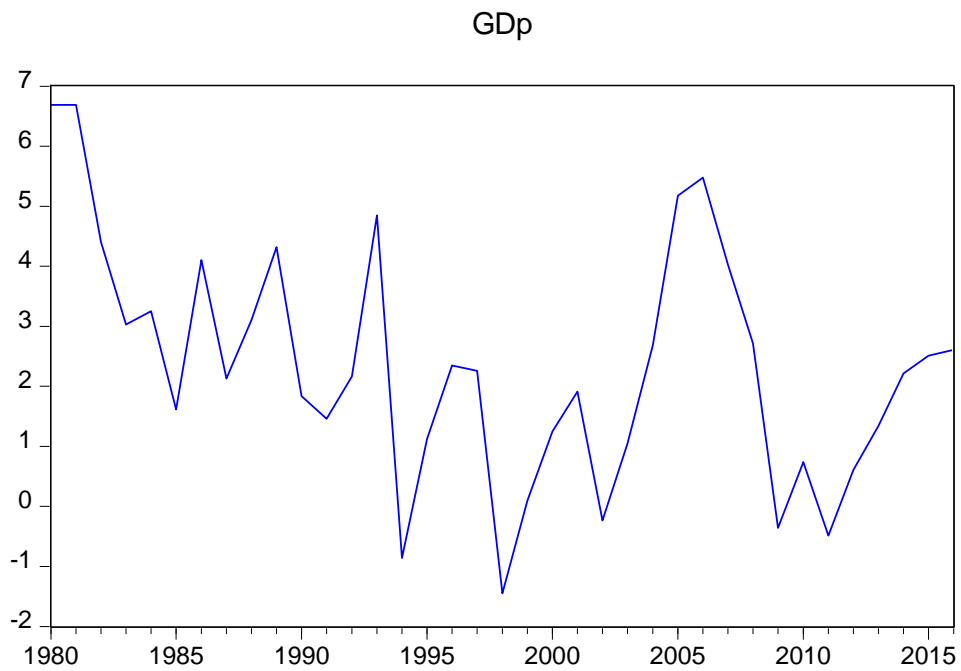
Figure.4 Health expenditures trend analysis diagram



This diagram is show trend in health expenditures through 1980 to 2015, this trend show increase and decrease in health expenditures between 1980 to 2000. But after 2000 some fiscal years health expenditures value is increase and upward shift. Which effects to life expectancy at certain of time.

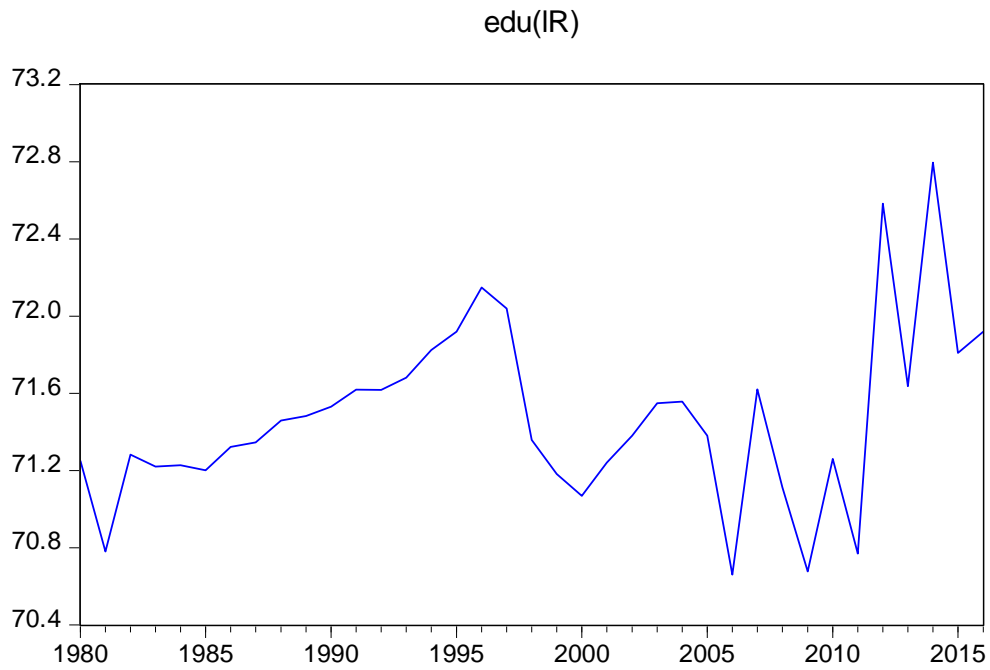
Figure.5

gross domestic product trend analysis



this diagram show no trend in GDP from 1980 to 2015, there is downward shift in the GDP in Pakistan so this may negative impact on life expectancy between 1980 and 2015.during the period of 1980 to 2000 downward shift in value of GDP but after some 2000 to 2015 GDP is increase in some fiscal years.

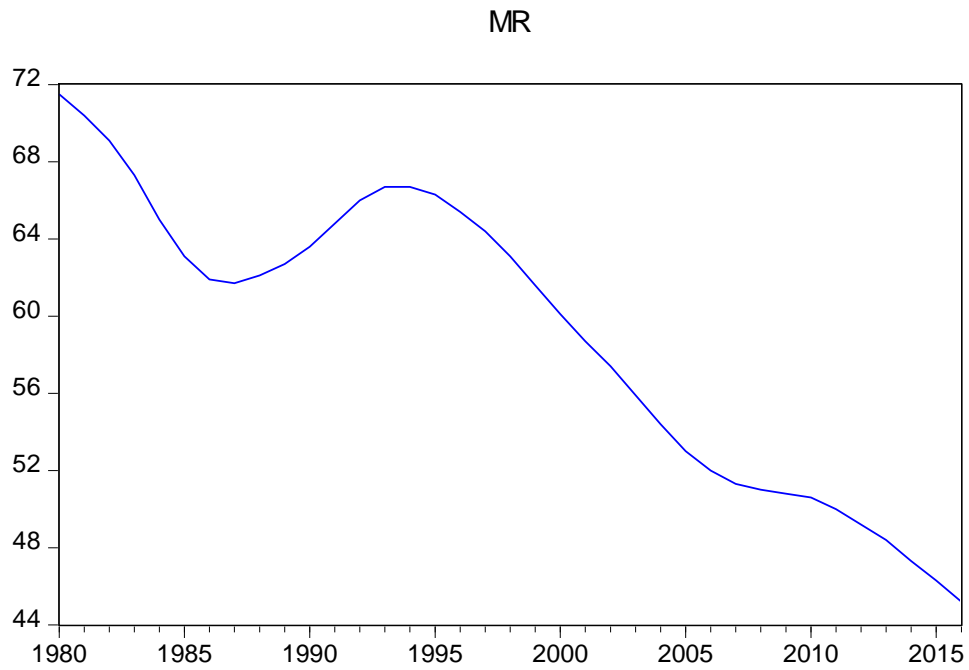
Figure.6 education, literacy rate trend analysis diagram



This diagram show trend analysis of literacy rate of Pakistan between 1980 to 2015.which shows the 71.2 % literacy rate from 1980 to 2005 and after that shift in 2009 to 2015 is upwards.

Figure.7

Mortality rate trend analysis diagram



This diagram shows the downward shift of mortality rate in between 1980 to 2015, higher value of 72% of mortality rate in 1980 but after this period decrease in mortality rate year by year.

CHAPTER 5

CONCLUSION & POLICY IMPLICATIONS

5.1 conclusion

The contributions of the life expectancy (health outcome) to economic progress of any economy has been well established in the development literature. The study examined empirically impact of public health spending on health outcomes in Pakistan. Using time series data spanning between 1980 and 2016. This study made to use of bound test cointegration approach developed within the framework of the autoregressive distributed lag ARDL econometric procedure to determine the long run relationship between health expenditure and life expectancy in Pakistan. Utilizing the ADF unit root test, the stationarity of the variables were guaranteed, depend by the choice of ideal lag and after that test for existence of co-integration. Experimental findings recommend that a long run association between health outcome (life expectancy), and public health expenditure, literacy rate at lagged two withdrawal in Pakistan. The results showed that health expenditures and literacy rate at lagged two significantly and positively partial the rate of life expectancy in Pakistan. This was as a outcome of appropriate channel of funds to health sector in the country. Thus, imitate the effectiveness of health consequences proxied by life expectancy in the research. Moreover, observational proof likewise demonstrated that literacy rate at lagged two is conversely related yet authentic noteworthy to life expectancy in Pakistan inside this study time frame. This outcome is similarity with Neo-Classical hypothesis just as past exact studies. This likewise determines if satisfactory measures are set up against morality rate, this will expand the dimension of life expectancy in Pakistan.

Different diagnostic tests were carried out on the short and long run models, the results show the model passes all tests.

5.2 Policy Implication

Flowing naturally from this, are the policy recommendation which include:

- i. Health expenditures and life expectancy is show positive relationship in this study. So the policy should be made for increasing health expenditures of Pakistan.

- ii. On based of results of this study some changes should be taken for increase health expenditures for health sector. The policy maker should take serious action to improve the health expenditures allocation and standards.
- iii. Government of Pakistan should Increase and restructure the public expenditure distribution to health sector in arrangement to provide health facilities and also, adequate management of funds and development of health services should be greatly pursued.
- iv. Lastly, government should introduce programs that will give awareness concerning the effect of GDP and literacy rate on individual health and should also advise people and health ministry to appropriate measure to be taken for proper public health policy, to avoid any kind of hazard about health care.

5.3 Limitations

A limitations and decomposition of analysis to appropriate selection of lags for model and variables. this is one of weakness of the analysis of model.

Lag selection criteria to remove collinearity in variables according to limited set of variables set to generate proper results.

5.4 Future direction of research

After analysis of our research results and policy implications suggest that proper and additional research on following topics;

- The role of health spending as a determinants of mortality when forecasting the life expectancy.
- Additional investment in health care sector to improve health is may causes increase in life expectancy

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