DYNAMICS OF HEALTH POVERTY STATUS IN PAKISTAN

A NEW INSIGHT OF PAKISTAN PANEL HOUSEHOLD SURVEY

Submitted by

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CERTIFICATE

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TO

MY BELOVED PARENTS, TEACHERS,

HUSBAND, SISTERS And BROTHERS

Abstract

Traditionally, well-being of a mankind was considered how much money he has in monetary terms. Now-a-days this theory of well-being has been improved. Recently new approach of well-being has been introduced which is known as multidimensional perspective of the well-being. It is apparent that there is a significant reduction in headcount poverty from 34.4% in 2000-01 to 29.5% in 2013-14 in Pakistan. Nonetheless, there has been no considerable development in health dimension as a social indicator over this extended period of time. This study tries to evaluate the dynamics of health status and its determinants in Pakistan from 2001 to 2010. Alkire and Foster (2007, 2011) methodology has been used to measure the health poverty status and structural equation model has been used to check the determinants of health poverty status in Pakistan.

The estimation results for the first round of PRHS-I (2001) indicates that headcount health poverty ratio is 81.46 percent and intensity of health poverty is 46.59 percent. Health poverty index yields a value of 37.9 percent. While the estimation results for the last round of Pakistan Panel Household Survey (PPHS-2010) reveals that headcount health poverty ratio is 43.23 percent and intensity of health poverty is 51.4 percent. Multidimensional health poverty index yields a value of 22 percent.

The comparison of estimation result for these two period of time highlights that there is significant decline in the occurrence of health poverty from 81.4 percent in 2001 to 43.2 percent in 2010. Similarly the health poverty index also indicated the declining trend over this extended period of time from 0.37 in 2001 to 0.22 in 2010. But intensity of health poverty is increasing over this extended period of time from 46 percent in 2001 to 51.4 percent in 2010.

Dynamics perspective results highlights that 41.33 percent household lie in the category of chronic poor, about 47.19 percent household lie in the category of transitory poor and about 11.48 percent household lie in the category of never poor. The results indicate that about 10 percent household lie in the category of “moved into poverty pool” and about 90 percent households lie in the category of “moved out of poverty pool”.

All determinants are significantly related to the dependent variable i.e. health poverty index expect maternal health status and education by using the PRHS-I (2001) dataset.

Similarly, All determinants are significantly related to the dependent variable i.e. health poverty index expect use of healthcare service, quality of healthcare service and biological issue by using the PPHS-2010 dataset.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHICAL REPRESENTATION

LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
WHO	World Health Organization
MDGs	Millennium Development Goals
SDGs	Sustainable Development Goals
MPI	Multidimensional Poverty Index
HPI	Health Poverty Index
UNDP	United Nations Development Program
HDI	Human Development Index
PSLM	Pakistan Social and Living Standard Measurement
EU-SILC	European Union Statistics on Income and Living Conditions
HIES	Household Integrated Economic Survey
PDHS	Pakistan Demographic and Health Survey
HILDA	Household, Income and Labor Dynamics in Australia
BHPS	British Household Panel Survey
PPHS	Pakistan Panel Household Survey
PRHS-I	Pakistan Rural Household Survey (2001)
PRHS-II	Pakistan Rural Household Survey (2010)
SEM	Structural Equation Model
CFA	Confirmatory Factor Analysis
SRM	Structural Regression Model

CHAPTER 1

INTRODUCTION

1.1 Importance of Study

Traditionally, well-being of a mankind was considered how much money he has or in monetary terms. Now-a-days this theory of well-being has been improved. Recently new approach of well-being has been introduced which is known as multidimensional perspective of the well-being.[1] (Alkira and Foster 2007 and 2011). It captures the prosperity in different dimension like health, education, living standard etc. which determines the well-being of any individual in any country.

Investment is very necessary for the development of any country. There may be two types of investment such as investment in physical capital and investment in human capital. The investment in human capital is a broad visionary concept; it may be investment in terms of education, health, skills etc.

Pakistan is a developing country where the total population is too high and the investment for human capital is too low; that's why the GDP per capita is low. As the industrial revolution is as necessary for the development similarly the investment in health and education is as necessary for the enhancement of the human capital (Pakistan Economic survey 2016-17).

Health plays an important role in shaping the human capital. Good health enhances the productivity and efficacy of the labor force which leads to the economic growth and human welfare. World health organization (WHO) has defined health system as "all

1 Alkire and Foster (2007, 2011) highlighted a new technique for the measurement of deprivations of household. This methodology deals with qualitative as well as quantitative variables and it is easy to measure. This methodology captures the household deprivations in context of incidence as well as intensity.

organizations, people and actions whose primary intent is to promote, restore or maintain health".

Like other developing countries, Pakistan has also got many achievements in the field of health sector and has improved overall health status in the country. Unfortunately, in case of Pakistan; the investment in health sector is still low as compared to other countries with respect to increase in population. Overall Government of Pakistan has made a lot of efforts to improve the quantity and quality of healthcare for the people in the country. New and latest technologies are introduced in private and public sectors. GOP has enhanced financial allocation and adopts modern technologies in prevention, promotion and treatment of healthcare. For example, life expectancy at birth is 65.4 years in Pakistan, in comparison to a developed country such as Japan where it is 83 years [PDHS, 2012-13]. But still there are alarming modification that are necessary to maintain the health status in country like there is one doctor is available for 1099 individuals, one dentist for 13441 individuals, the ratio of population and number of beds available indicates 1647 individuals per bed [Pakistan, (2014)].

Different agendas have been introduced to tackle down these critical issues like Millennium development goals and Sustainable development goals. UNDP (2000) set different goals which are named as Millennium development goals (MDGs) for the betterment of mankind which are covering all aspect of life like health, education, environment, hunger and poverty; and these goals are interconnected with each other. In these goals there are three goal which are highlighting the importance of health sector i.e. reduce child mortality, Improve maternal health and Combat HIV/AIDS, malaria and other diseases. The purpose of these goals were to make the betterment in all these goals which were carried out till 2015. These goals were set from 2000 to 2015 after that these goals were replaced with sustainable development goals (SDGs). The purpose

of these SDGs was to maintain that declining rate in all seventeen goals till 2030 which is named as “2030 agenda for sustainable development”.

1.2 Motivation of Study

Poverty trend indicates that there is significant decline in the poverty in Pakistan which is 64.4% in 2000-01 to 29.5% in 2013-14 by using the income poverty approach (GoP 2013-14). But health sector indicates that there is no significant improvement as a social indicator over a period. Globally neonatal mortality rate has fallen by 47% between 1990 and 2015 i.e. 36 deaths per 1,000 live births in 1990 to 19 deaths per 1,000 live births in 2015. But unfortunately this is increasing in case of Pakistan; similarly, completely immunized children 12-23 month’s indicator show that there is also increase over the period in Pakistan [PDHS, (2015-16)].

The inequality in the access of health facilities vary from province to province like traveling distance to reach basic unit health indicator indicates that in KPK is 16 kilometers, in Balochistan is 39 kilometers, in Sindh is 13 kilometers and in Punjab is 8 kilometers [Iqbal and Nawaz, (2015)].

In literature, there exists a bundle of studies that indicates the trend of health poverty at world level but the literature on health poverty trend is not sufficient especially in case of Pakistan. Remarkably, the literature on the dynamics of health poverty in Pakistan don’t exist which will highlight the vivid picture of health poverty.

Different questions raised in this discussion. What is health status in Pakistan? When a country develops its Multidimensional Poverty Index, is it enough to take only four indicator for the representation of health status in Pakistan? What is the transition rate in health status in Pakistan? This study attempts to response these remarkable questions.

1.3 Objective of the Study

The thesis tries to have a glimpse on the health status and its determinants in Pakistan using the panel dataset i.e. Pakistan Panel Household Survey (PPHS). More specifically, following are the objectives

1. The purpose of this study is to estimate the health poverty index at national level and sub-national level in Pakistan.
2. The second objective of this study is to highlight the dynamics of health poverty.
3. The third objective of this study is to estimates the determinants of health poverty.

1.4 Significant of Study

It is apparent that there is a significant reduction in headcount poverty from 34.4% in 2000-01 to 29.5% in 2013-14 in Pakistan. Nonetheless, there has been no considerable development in health dimension as a social indicator over this extended period of time. This study tries to evaluate the health poverty status based on intervening and influencing factors, root causes of disparities in Pakistan and dynamics of health poverty profile by using a panel dataset. Firstly, this study highlights disparity related to health status at national and sub national level. Secondly, this study reveals the dynamics of health poverty in Pakistan during 2001 to 2010. Thirdly this study also highlights the determinants of these disparities. Alkire and Foster (2007, 2011) methodology has been used to measure the health poverty status and structural equation model has been used to check the determinants of health poverty status in Pakistan.

1.5 Data and Methodology

In this study, Pakistan panel household survey (PPHS) dataset has been used to estimate the health poverty index and its determinants in case of Pakistan. This survey was conducted with the collaboration of World Bank and Pakistan Institute of Development Economics. This survey covers the different dimensions of socio-

economics topics and demographic topics. PPHS dataset was covered during three rounds. This survey was captured through three round named as PRHS-I, PRHS-II and PPHS-2010. In this study only two years of data set has been taken under consideration i.e. PRHS-I and PPHS-2010. There are two types of statistical estimation methodologies are used in this study. First methodology is the Alkire and Foster methodology which estimate the health poverty status in Pakistan and second methodology is the structural equation model (SEM) which is used to check the determinants of health poverty status in Pakistan.

1.6 Organization of the Study

The study is organized as follows. Chapter 2 highlights the literature review related to deprivations in health status and this chapter also reveals the methodology review. Chapter 3 explains the data source and it also indicates the methodological framework of Alkire and Foster methodology as well as Structural equation model. This chapter also explains the list of variables, indicators, dimensions, cut-off and weights used in both methodologies. Chapter 4 explains the estimation results. These estimation results are divided into two sections. First section provides the results for the Alkire and Foster methodology and second section provides the estimation results related to structural equation model (SEM). Chapter 5 reveals the conclusion and recommendation of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section is highlights the review of literature related to research gap and methodology used in this study. Section 2.2 indicates the review of literature related to research gap and section 2.3 indicates the review of literature related to methodology.

2.2 Literature Review

The available literature primarily uses the human development index (HDI) to measure the wellbeing and living standards of the people [Greeley (1994); McGillivray (1991)]. The HDI, however, was criticised for not measuring poverty and development accurately because of its limited scope in covering various aspects of human wellbeing. The HDI uses only one health indicator i.e. longevity ignoring other health related aspects. Recently, attempts have been made to construct a Multidimensional Poverty Index (MPI) to measure poverty [Alkire, Conconi and Roche (2012); Alkire and Santos (2010); Chakravarty and Silber (2008)]. The MPI uses nutrition and child mortality as health indicators. These measures too fail to capture the health condition appropriately. Antony and Laxmaiah (2008) conclude that the HDI is not an appropriate measure to determine development because despite the improvement in the living conditions, under-nutrition is still among the major health issue in India. To address the health issues, this study concludes that further research is required to develop a comprehensive measure of health poverty. Few attempts have been made to construct a Health Poverty Index (HPI) using several social, economic, medical and resource factors [Laudicella, Cookson, Jones, and Rice (2009); Spinakis, *et al*. (2011)]. Spinakis, *et al*. (2011) use standardised death rate, life expectancy at birth and self-perceived health to develop the health inequality index. Nandi, *et al*. (2008) and Lasser, Himmelstein, and Woolhandler

(2008) measured poverty based on the accessibility to health service along with other social and economic indicators like insurance cost etc. This study further extends the use of indictors in constructing health poverty index including the use of cost of health services, quality of health services and maternal and child health.

A large number of studies have used empirical data to measure and identify the determinants of health poverty. Different studies considered the distance and time needed to travel to the nearest health facility as the contributing factor in increasing health poverty [Schuurman, Fiedler, Grzybowski, and Grund (2006); Shen and Hsia (2010)]. The quality of health service broadly depends on the infrastructure, location of the health centre, availability of focal person and others. Ur-Rehman and Zimmer (2010) measured child health using maternal literacy, poverty, water and sanitation, nutritional level, vaccination coverage and mother's education. A study by Nawaz-ul-Huda, Burke, and Azam (2011) analyses the socio-economic disparities in Balochistan using multivariate analysis. Shams (2013) used various socioeconomic factors like gender, education, income and age to measure health.

Planning commission of Pakistan estimated the Multidimensional poverty in Pakistan with the collaboration of UNDP. Three dimension have been used to capture the poverty in Pakistan i.e. education, health and living standard. Four indicators are used to capture the contribution of health dimension in poverty i.e. access to health facilities, immunization, ante-natal care and assisted delivery. Time series data has been used for this objective. Pakistan social and living standard measurement (PSLM) survey has been used from 2004-05 to 2014-15. By using the dataset of PSLM (2014-15) result indicates that 32.4% of total sample are deprive in indicator of access to health facilities, 14.0% of total sample are deprive in indicator of immunization, 9.1% of total sample are deprive in indicator of ante-natal care and 8.2 % of total sample are deprive in indicator of assisted delivery. While the contribution of access to health facility is 19.8%, immunization is 2.2%, ante-natal care is 1.9% and assisted delivery is 1.8% in

total MPI of 2014-15. Other result indicates that the trends of access to health facility and immunization are increasing over the period. While trends of ante-natal care and assisted delivery are decreasing over the period.

Alkire and Apablaza (2016) estimated the trend in poverty by using a multidimensional perspectives approach in Europe. For the purpose to check the trends in poverty, a time series dataset covering seven years (2006-2012) of European Union Statistics on Income and Living Conditions (EU-SILC) has been taken under consideration. Alkire and Foster methodology has been employed for this study by using six dimensions i.e. income, employment, material deprivation, education, environment and health status, while these dimensions are covered by twelve indicators. The health dimensions was captured through four indicators i.e. health status, chronic illness, morbidity and unmet medical services. Overall result indicates that multidimensional poverty showed the declining trend over this extended period of time (2006-2012). The estimation highlights that health dimension has also got an achievement over this extended period of time. Uncensored Headcount ratio has fallen in two health indicators i.e. health status (10.4%-9.5%) and unmet medical services ((7.7%-6.2%) while uncensored headcount ratio in two indicator of health has increased i.e. chronic illness ((31.2%-31.7%) and morbidity (7.6%-8.6%) over this extended period of time.

MDGs report (2015) indicated that there is a significant decline occurred over the period in under-five mortality rate which is 90 in 1990 to 43 in 2015 deaths per 1000 children's. Similarly, maternal mortality ratio has also declined significantly 45% over this extended period of time worldwide. This decline was higher in Southern Asia rather than North Africa. There are different indicators like assisted delivery, Antenatal care etc which shows the improvement over the period. Similarly, the occurrence of different diseases like HIV, malaria, tuberculosis etc have been reduced over this extended period of time.

Literature indicates that there are many index have been used to capture the well-being of economy like human development index (HDI), multidimensional poverty index MPI etc. The HDI was criticized due to covering only limited aspect of well-being and development of an economy like only one indicator of health (life expectancy at birth) has been used to capture the health sector; while neglecting many other health related indicators [Antony and Laxmaiah (2008)]. Recently multidimensional poverty index also has been used introduced to capture the well-being and the development based on three dimensions i.e. education, health and living standard; while four indicators (access to health facilities, immunization, ante-natal care and assisted delivery) have been used to handle the health dimension in the computation the MPI. These measure of well-being not fully cover the health condition appropriately.

Naveed and Ali (2012) estimated the multidimensional poverty in Pakistan by using the Pakistan Social and Living Standards Measurement Survey (PSLM 2008-09). Alkira and Foster methodology has been used for the identification of disparity covering four dimensions i.e. health, education, living standard and assets ownership. The result indicates that there exists the 0.18 score by computing multidimensional poverty index in Pakistan and the rural poverty is three times higher than urban poverty. At province level, Punjab is ranked as a least poor province among all four provinces. KPK and Sindh ranked equal by getting score 0.17 in the computation of MPI. While Balochistan is ranked as poorest province by attaining three times higher score in MPI than Punjab i.e. 0.29. The health dimension is covered by using two indicators i.e. access to healthcare facility and access to post-natal healthcare. Access of post-natal care contributes 11.76% in the computation of MPI while lack of access of health care contributes 9.7% in the computation of MPI at national level. At province level, Punjab has the highest level of deprivation in the indicator of post-natal care access (13. 93%) as compared to all other provinces. While Baluchistan has the highest level of

deprivation in the indicator of access of healthcare facilities (11.03%) as compared to all other provinces.

Sial *etal* (2015) estimated the inequality and multidimensional poverty in Pakistan by using the household integrated economic survey (HIES). Alkire and foster methodology has been applied on two data set 2005-06 and 2010-11. The purpose of this study is to check the trend of poverty in Pakistan. Four dimensions have been used to formulate the multidimensional poverty i.e. Health, education, living standard and expenditure. Health dimension contains two indicator (immunization and postnatal care) out of ten. The results indicates that over the period the multidimensional poverty has been declined from 51% in 2005-06 to 35.86% in 2010-11 which is 15 percent in Pakistan. While the contribution of health poverty in total multidimensional is our main focus which is declined 32% in 2005-06 to 28% in 2010-11.

WHO (2017) indicates that there are a lot of environmental issues which are affecting the child health. This report indicates that more than one out of four children are dying under the age of 5 years due to environmental issue; that is estimated 1.7 million children each year due to environmental problems. While the vaccination of Polio is being improved over the period like 116 million children in Africa and more than 9.5 million children in Afghanistan are vaccinated in March 2017. Similarly the viral of Hepatitis is being controlled over the period but still there is a need of attention for this viral because 325 million people are chronically affected due Hepatitis B and Hepatitis C at world level.

The literature indicates that the inaccessibility of health facilities affect the child health like pre-natal, post-natal and mortality rate. There exists a lot of literature which highlights the relationship between poverty and child health. While checking the child health, poverty and development, a group of researchers highlights that there is an absence of set of control variable while some other take education level, family structure as a control variable [Aber 1997].

Afzal and Yusuf (September 2013), indicates that well-being of mankind which is covered in all aspect of Millennium Development Goals. But Pakistan is not getting improvement which are defined in MDGs like Pakistan is ranked as eighth highest newborn death rate in the world, in 2001–07 one in every ten children born in Pakistan died before reaching the age of five. Similarly, women have a 1 in 80 chance of dying of maternal health causes during reproductive life. Compared to other South Asian countries, Pakistan currently lags behind in immunization coverage, contraceptive use, and infant and child mortality rates. Expenditure as a percentage of private expenditure on health is about 98 percent, positioning Pakistan among those countries with the highest share of out-of-pocket payments relative to total health expenditure (World Health Organization, 2009).

Pakistan Demographic and Health Survey reports (2017-18) highlights that fertility rate among women is declining from 5.4 births per woman in 1990-91 to 3.6 births per women in 2017-18. Similarly, under-5 mortality rate is also declining over the period i.e. 112 deaths per 1,000 live births in 1990-91 to 74 deaths per 1,000 live births in 2017-18. This report also indicates that infant mortality rate has also reclined from 86 (1990-91) to 62 (2017-18) deaths per 1,000 live births. This report also highlights that 66 percent of child age between 12-23 months received all vaccinations and 51 percent received only appropriate vaccinations while only 4 percent did not receive any kind of vaccination. Similarly, birth attended by a skilled provider is increasing over the period i.e. 17 percent in 1990-91 to 69 percent in 2017-18. Birth occurred in a health facility is also increasing over the period i.e. 13 percent in 1990-91 to 66 percent in 2017-18.

Suppa (2015) estimated the multidimensional poverty by using the German Socio-Economic Panel (SOEP) dataset for the three years (2001-02, 2006-07 and 2011-12). Alkire and Foster estimation methodology has been applied to check these deprivations. This paper used the six dimensions to estimate the multidimensional poverty i.e. education, housing, health, material deprivations, social participation and employment.

While the dimension of health is captured with the help of three indicator i.e. disability, obesity and number of health issues. Uncensored head count ratio indicates that about 36% of total population facing the disability and obesity issues while 46% of total population are facing more than two different health issues.

Khan *etal* (2011) estimated the poverty in Pakistan by using a multidimensional deprivation approach. This study used the Alkire and Foster methodology by applying on two years of dataset of Pakistan Social and Living Standard Measurement (1998-99 and 2007-08). Four dimensions have been taken under consideration i.e. income, education, health and housing & services. While dimension of health is captured with the help of three indicators i.e. immunization, purity of water and pre-natal healthcare service. The estimation result highlights that there is a significant decline in multidimensional poverty from 43.34 percent in 1998-99 to 38.31 percent in 2007-08. Moreover this paper indicates that the reduction in multidimensional poverty over this extended period of time was due to education and housing & services. While the contribution of health dimension is very low in the reduction of multidimensional poverty over this extended period of time.

Rogan (2016) checked the multidimensional poverty on the basis of gender discrimination in South Africa. South African National Income Dynamic survey for 2008 year has been employed to estimate the multidimensional poverty within gender gap by using Alkire and Foster methodology. This sample survey covers the 25255 individuals and 6893 households in 2008. Three dimensions have been used for the identification of poverty i.e. education, health and living standard. While health dimension is captured through two indicators which are child mortality and nutrition level based on BMI score. The estimation results highlights that 57 percent of women face the multidimensional poverty which is higher than male ratio i.e. 46 percent. While health indicators shows that child mortality ratio

was too high in females rather than males. Similarly, nutritional level deprivations based on BMI score was also high in females instead of males.

2.3 Methodological Literature Review

Martinez and Perales (2017) estimated the dynamics of multidimensional poverty based on panel dataset in Contemporary Australia by using the structural equation modeling (SEM). Thirteen years of panel dataset (2001-2013) of Household, Income and Labour Dynamics in Australia (HILDA) Survey has been used to capture the dynamics of multidimensional deprivations based on individual (19,914 individuals) as well as household level (7,682 households). Seven dimensions comprises twenty one indicators have been used to capture the dynamics of poverty over this extended period of time. The result indicates that the indicators related to education, health, social support and material resources have the upward trends in terms of deprivations while the indicators related to the community participation, safety perceptions and employment indicated the downward trend in terms of deprivations over this extended period of time.

Hajdu (2007) estimated the poverty, relative deprivation and social exclusion by using the structural equation modeling (SEM). The purpose of this study is to examine the theoretical linkages between coefficients on one side and estimate their significance on the other side. Hungarian households dataset has been used covering the 3 571 Hungarian households in the year of 2003. Unit of analysis in this study is the household. Four dimensions comprises eleven indicator have been used for this purpose. Final remarks of this writing indicates that it is not necessary to split the society into two groups: poor and non-poor on the basis of deprivation and social exclusion.

Iqbal and Nawaz (2015); checked the health poverty profile in Pakistan by comparing the data of two years of household from Pakistan social and living standards

measurement (PSLM) survey of (2012-13) and 2008 data of Pakistan bureau of statistics at MOUZA level. There are two type of econometrics techniques used to estimate the health poverty and socioeconomics determinants which affect the health poverty in Pakistan i.e. Alkire foster (AF) method and logistic regression model. The result highlights that there exists 41 percent overall health poverty in Pakistan. Other result indicates that this proportion is very high in rural area which is 50% as compared to urban areas which is 22%. This paper also highlights the difference of health poverty at province level in Pakistan; Punjab shows less health poverty which is 36 percent as compared to Balochistan which is 62 percent. The data indicates that majority of the households in that survey have not access to healthcare facilities. The indicator of maternal health situation indicates that there exists 11.5 percent household which have not access the pre-natal care facilities and there exists 21.8 percent households which have not access the post-natal care facilities. Similarly child immunization indicator indicates that there are 14.8 percent households that have not access of child immunization.

Wagle (2005) estimated the multidimensional poverty for the province of Nepal; Kathmandu. Economic well-being, capability and social inclusion perspectives have been used to capture the multidimensional poverty. For this purpose, structural equation modeling (SEM) has been applied on the dataset of 625 household living in Kathmandu which were interviewed in 2002-03. Descriptive results indicates that 82% household are those who have 50% of median income and in these households there is at least one member which is employed in unregistered business. The results indicate that supply of education and health care facilities have major role in enhancing the capabilities. Other result indicates that the thirty percent of the population was the multidimensional poor.

Betti, D' Agostino and Neri (2002) estimated the dynamics of multidimensional poverty in British. A British Household Panel Survey (BHPS) has been used to estimate

the poverty from 1991 to 1997. This panel dataset covers the 5734 households. This study highlights the difference between two approaches of poverty measure i.e. Fuzzy Monetary (FM) and Fuzzy Supplementary (FS). Logit model has been used to capture the effect of these two different approaches. The result indicates that autoregressive is the main component between these two approaches, according to FM approach the autoregressive is the smaller then the FS approach. Other result indicates that the housing condition and ownership of durable goods are less volatile and the monetary conditions are more volatile.

Arif and Farooq (2014) estimated the dynamics of rural poverty in Pakistan by using the Pakistan Panel Household Survey (PPHS). This panel dataset covers three waves i.e. 2001, 2004 and 2010. This survey covers the four provinces and sixteen districts of Pakistan. Spell approach and component approach, both are used to check the dynamics of rural poverty. Multinomial logit technique has been used for the purpose of dynamics of rural poverty. The results indicate that natural shocks and loan obtained last year are the main reason that pull the rural household into the poverty pool. While business shock don't effect the poverty movement over this extended period of time. Other result indicates that Sindh and southern Punjab are poorer region as compared to northern Punjab.

CHAPTER 3

DATA SOURCE AND METHODOLOGY

3.1 Introduction

This section highlights the data source as well as methodology used in this study. Section 3.1 indicates the introduction of this chapter and 3.2 section highlights data source. Pakistan Panel Household Survey data source has been used to measure health poverty status in Pakistan. While section 3.3 indicates the methodology. There are two types of methodologies under taken in this study i.e. Alkire and Foster methodology and Structural Equation Model (SEM). Alkire and Foster methodology has been used to capture the health poverty index and Structural Equation Model has been used to find the determinants of health poverty status in Pakistan.

3.2 Data Source

Pakistan Panel Household Survey (PPHS) has been used to check the dynamics of health status. This is a longitudinal project of World Bank and Pakistan Institute of Development Economics containing data of socio-demographic and economic variables. This survey consists three waves of panel of data sets i.e. 2001, 2004 and 2010. This panel dataset is covering 16 districts of Pakistan; Faisalabad, Attock, Hafizabad, Vehari, Muzaffar Garh and Bahawalpur from Punjab, Badina, Nawab Shah, Mir Pur Khas and Larkana from Sindh, Dir, Mardan and Laki Marwat from KPK, Loralai, Khuzdar and Gawadar from Balochistan.

First round of this panel survey covers the rural areas of all four province (Punjab, Sindh, KPK and Balochistan) in Pakistan named as PRHS-I (2001). The second round of this panel survey covers rural area of only two province (KPK and Balochistan) among all four provinces of Pakistan which is named as PRHS-II (2004). The third and

last round of this panel survey covers the rural areas as well as urban areas of all province in Pakistan which is name as PPHS.

There are some features of this panel dataset which are necessary to highlight:

- Rural Households of only two provinces (Punjab and Sindh) are covered during all rounds of survey.
- Rural households of all provinces are covered only in two waves which are PRHS-I (2001) and PPHS.
- Urban households of all provinces are covered only in one survey which is named as PPSH (2010).
- The practice of matching split households to original households is not an easy job. There will be a need of more attention to tackle down this analysis.

Table 3.1: Summary of PPHS Dataset

		2004			**2010**				
	2001	Original HH	Split HH	Total sample HH	Original HH	Split HH	Total Rural HH	Urban HH	Total HH
Pakistan	2721	1614	293	1907	2198	602	2880	1342	4142
Punjab	1071	933	146	1079	893	328	1221	657	1878
Sindh	808	681	147	828	663	189	852	359	1211
KPK	447	--	--	--	377	58	435	166	601
Baluchistan	395	--	--	--	265	27	292	160	452

Source: Author's calculation from the micro-data set of PRHS-I 2001 and PPHS 2010

3.3 Methodology

This section is highlights the methodology framework used for estimation process. This methodology is divided into three sections. First section represents the introduction of this chapter. Section 3.3.1 indicates the Alkire Foster (AF) methodology used for first two objectives and section 3.3.2 indicates Structural Equation Modeling (SEM) which is used to estimate the third objective of the study.

3.3.1 Alkire- Foster Methodology

Alkire and Foster (2007, 2011) highlighted a new technique for the measurement of deprivations of household. This methodology deals with qualitative as well as quantitative variables and it is easy and direct measure of deprivations. This methodology captures the poverty score at household level in context of multidimensional by using incidence of poverty as well as intensity of poverty. This methodology allows for the investigation of poverty pattern.

- **Data Source**

  The basic and most important condition of this measurement type is; data of each dimension and indicator should be collected from one survey. In other words; data of different dimension should not collected through different surveys like health data is collected through one survey and education data is collected through other survey etc (Santos, M. E., & Alkire, S. (2011).

- **Unit of Analysis**

  According to this measurement approach, the unit of analysis is household instead of individual. So the deprivation score for each individual will be based on household scoreboard.

- **Choosing dimensions and indicators**

  There is no fix list of the dimension and indicators according to this methodology. These dimension and indicators can vary within countries and across countries. This list is open; means indicators and dimensions related to health profile can be added or dropped on the basis of strong arguments.

- **Choosing the indicators deprivation cut-offs**

  While calculating the HPI, there is need of deprivation cut-off for each indicator. Deprivation cut-off for any indicator can be used like **"*zi*"** such that

any individual **"*i*"** will be deprived in some indicator **"*x*"** will below that cut-off that is ***xi<zi.***

- **Choosing the Indicators weights**

  After selecting an indicator and their cut-off, the next important step is the weight selection for each indicators. According to this technique, each dimension is equally weighted and the each indicator is not equally weighted with respect to their dimension respectively. It is not necessary that each dimension is equally weighted. It can be unequally weighted according to well-justified reason. The important thing is that the sum of weights will be equal to one.

- **Choosing the Poverty cut-off**

  Each individual with respect to his/her household will be assigned a deprivation score. These scores will be according to deprivation in each indicator. The deprivation score will be weighted sum of deprivations in each indicator; which will lie between 0 and 1. The digit one indicates the maximum deprivation and zero means no deprivation. An individual is considered as a poor if its deprivation score is equal or greater than the poverty cut-off. It is known as multidimensional poor; which means this type of poverty is due to weighted sum of all indicator not only one indicator.

- **Computing the HPI**

  As it is mentioned earlier, HPI captures the incidence as well as intensity of deprivation in health. Incidence of poverty is known as **multidimensional headcount ratio (H):**

$$H=q/n$$

Where ***"q"*** is multidimensional poor and ***"n"*** is the total population. And intensity indicates the average deprivation score of the multidimensional poor. HPI is the product of incidence (H) and intensity (A).

$$\mathbf{HPI=H\times A}$$

Components of HPI

The HPI is composed of five dimensions made up of eight indicators. Each indicator is associated with its minimum level of satisfaction. This minimum level of satisfaction which is required for indicator is known as deprivation cut-off.

In literature, a lot of studies indicates the there are various factors that influence the health inequality. These factors are grouped into three categories i.e. root causes, intervening factors and situation of health. Root causes of health inequality are income, human capital, education quality, educational resourcing, wealth and gender; intervening factors of health inequality are home environment, living standard, life style and access to basic preventive healthcare (local government or preventative care); situation of health factor covers the effective health care, health capital, physical psychological and premature morbidity, access to secondary care, quality and access to social care etc. These factors are necessary to check the progress in health sector.

According to base paper of Iqbal and Nawaz (2015) titled as "Spatial Differences and Socio-economic Determinants of Health Poverty" five dimensions have been used to tackle down the health poverty profile in Pakistan. These five dimension are classified as use of healthcare facilities, quality of healthcare facilities, costs of healthcare facilities, maternal health status and child health status.

Further these five dimension are covered in eight indicators. Use of healthcare facilities dimension is based on two indicators i.e. access to doctor during fever or injury and assisted delivery. Similarly quality of healthcare facilities is captured on the bases of two indicators i.e. satisfied with the use and access of healthcare facilities and institutional delivery. While cost of healthcare facilities is based on only one indicator

named as time cost. Maternal health status is captured through two indicators i.e. pre-natal care and ante-natal care. Lastly, child Health Status is based on only one indicator i.e. child immunization. According to this list of indicators, four indictor are taken from the new national poverty measure i.e immunization, pre-natal care, ante-natal care and access to doctor during fever or injury. The remaining indicators are taken from strong arguments and each indicator based on reference.

Table 3.2: Dimensions, Indicators, Cut-off and Weights used for the computation of HPI

Dimensions	Indicators	Deprivations cut-off	Weights
Use of health care services	Access to doctor during fever or injury	Deprived if any individual in the household did not consult to doctor during sickness or injury. (Household with no sickness or injury will be considered as non-deprived)	1/10
	Assisted Delivery	Deprived if any woman has given birth in the household (during last pregnancy) with untrained person (family member, friend, tba, etc.) while household with no women that has given birth will be considered as non-deprived.	1/10
Quality of health care services	Satisfied with the use and access of healthcare facilities	Deprived if any individual in household did not use health care service due to unsatisfactory quality or access constraints of health services. (Household with not required is non-deprived)	1/10
	Institutional delivery	Deprived if any woman has given birth in the household (during last pregnancy) with inappropriate facility (home, other) - household with no women that has given birth will be considered as non-deprived.	1/10
Cost of health services	Time cost	Household will considered as deprived if it takes more than 30 minutes to reach the Health clinic/Hospital.	1/5
Maternal Health Status	Pre-natal care	Deprived if any woman in the household that has given birth (during last pregnancy) did not received prenatal check-ups. (Household with	1/10

Dimensions	Indicators	Deprivations cut-off	Weights
		no women that has given birth will be considered as non-deprived).	
	Ante-natal care	Deprived if any woman in the household that has given birth (during last pregnancy) and did not receive ante-natal care. (Household with no women that has given birth non-deprived).	1/10
Child Health Status	Immunization	Deprived if any child in household (under age of 5 years) didn't fully immunized according to vaccinations calendar. (Household with no children under 5 year age will be considered ass non-deprived).	1/5

Table 3.2 highlights the list of dimensions, list of indicators, and detailed deprivation cut-off for each indicator and weight for each indicator. The sum of weights will be always equal to one either checked in dimension wise or checked in indicators wise. Similarly, all dimensions are equally weighted and indicators are unequally weighted.[2] These dimensions and indicators are referred from Iqbal and Nawaz (2015) paper. In this paper, health poverty status has been checked on the basis of socio-economic determinants. This paper indicates health poverty profile in Pakistan by using the Pakistan Social and Living Standards Measurement (PSLM) survey 2012-13. The purpose of this thesis is to estimate the dynamics of health poverty status. First of all, it is necessary to differentiate between trend of health status and dynamics of health status. In dynamics of health status, same households are taken under observation over the period. While in trend of health status, same households are not taken under observation over the period. A panel dataset is required to analyze the dynamics while time series dataset is required to analyze the trend.

2 The task of equal weighting for each dimension separately and consequently to each indicator is tracked by the Martinez and Perales (2017), Alkire et al. (2012) and Angulo (2016).

3.3.2 Structural Equation Modeling(SEM)

SEM is not one statistical technique .it integrates a number of different multivariate techniques into one model fitting framework. It is integration of factor analysis and measurement analysis by its psychology. Secondly its integration of path analysis by biology. Thirdly integrated by regression it's by statistics. Fourthly simultaneous equations by econometrics. SEM is useful for research question that involve complex multifaceted constructs that are measured with errors. This type of models are used to estimate the latent variables. SEM that specified system of relationship rather than a dependent variable and a set of predictor. SEM focused on indirect (mediated) as well as direct effects of variables on other variable. SEM is also known as (1) covariance structure analysis, (2) analysis of measurement structure (AMOS). (3) LISRELs. (4) Casual modeling .There are a lot of different software that fits the SEM. the original and best is known as LISEREL. Other are EQS, Amos, MX, R, and STATA. SEM can be thought of as path analysis using latent variable. We can measure latent variable using observed indicators. Benefit of latent variable. (1) Most social concept are complex and multiple faced. (2) Using single measure will not adequately cover the full conceptual map. (3) Remove /reduce random error in measured construct .(4) Random error in dependent variable estimates unbiased but less precise.(5) Random error in independent variables attenuates regression coefficient toward zero.

SEM is a multivariate data analytic technique and it is widely used for testing and establishing causal relationship among variables in a particular. It integrates a number of different multivariate technique into one model fitting framework. It is an integration of measurement theory, factor (latent variable) analysis, path analysis, regression and simultaneous equation. Structural Regression Model (SEM) is a very general statistical modeling technique which is widely used in the behavioral sciences. This type of models are used to estimate the latent variables. Structural Equation Model (SEM) is a combination of Confirmatory Factor Analysis (CFA) and Structural Regression Model

(SRM). The interest in SEM is often on theoretical construct which is represented by latent factors. The relationship between theoretical construct or represented by regression coefficients between the factors the SEM implies the structure for the covariance between the observed variables which provide the alternative name covariance structural modeling.

Before estimating SEM analysis it is required to screen our data to check for missing values, out layers as well as check these assumptions of linearity normality and independence will be looking all these things. Every theory (model) Implies a set of correlations, this correlation can be between latent variable as well as between the error terms. So SEM specifies why variables are correlated one with other. Hence it is importance of the using theory to draw our model so the logic behind SEM is that it can be used.

Intangible constructs that are measured by a variety of indicators .these are also called unobserved variables. For example Quality of health care is latent variable in theoretical framework when we specify our SEM. Specifically our observed variable using elliptical boxes. It is widely recommended that here three indicators to represent all first odder latent variables. Single head arrow towards latent to observe represent the prediction of the observed variable from the latent variable. SEM analysis will give the coefficient of each of these path. An oval shape can also represent latent variables to measure latent variable at least three indicators, items are require. When SEM modeling is regressed for three regression equations then weights are assigned for each observed variables and its relationship with latent variable. Latent variable and observed variable both makeup measurement model.

3.3.2.1 Structural Model/Path diagram

The diagrammatic representation of a theoretical model using standardized notation. SEM represented by system of equation but it is also represented by diagram as visual

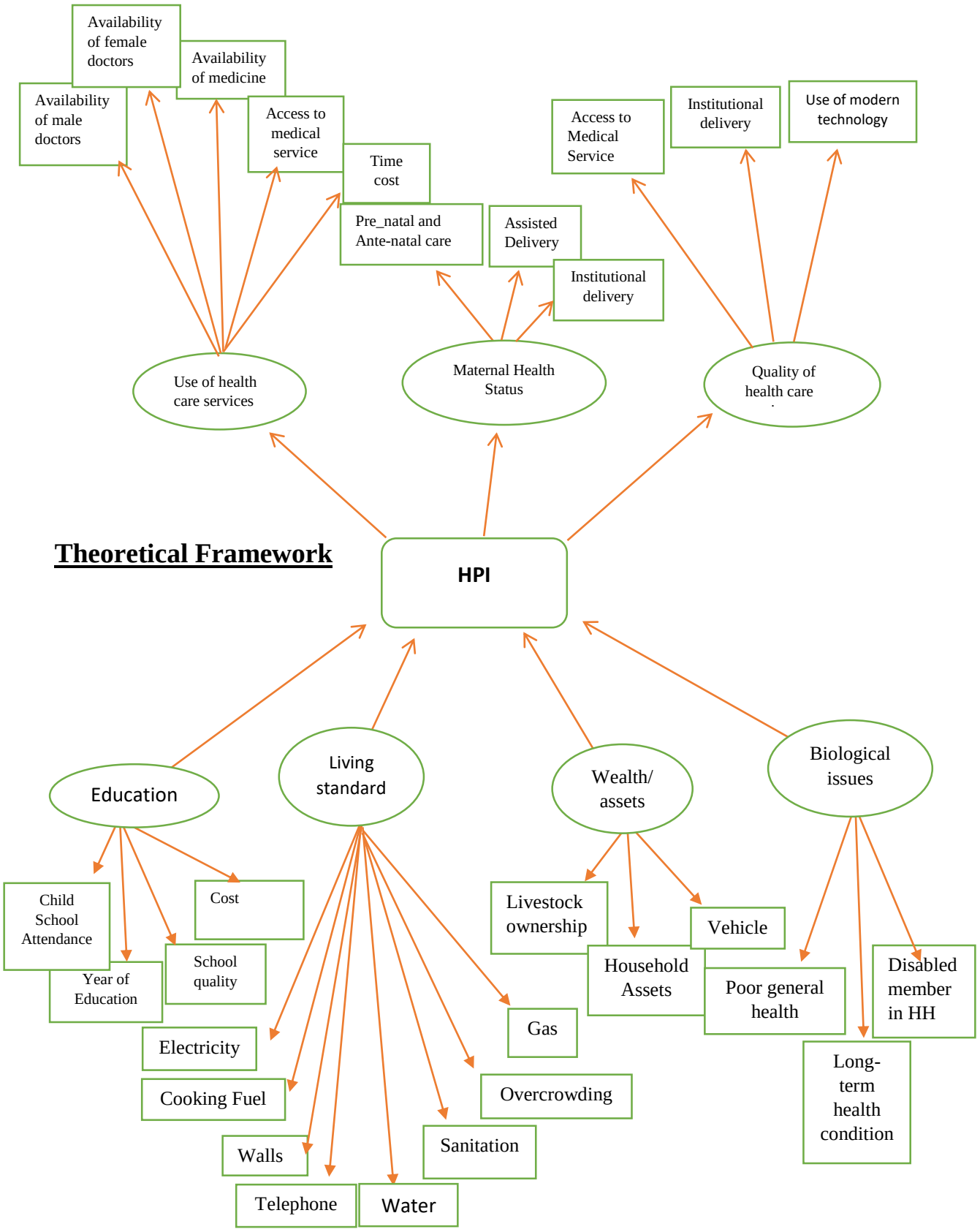
aspects. So standardize path analysis notation is a very important feature. Second, path analysis represent regression equation measured variables. Third feature of path analysis ‘effects ‘of predictors variables can be direct, indirect and total. There are different notation in path diagram. Latent variables can be presented as ellipse. Observed /manifest variable presented as rectangular. Error variance/disturbance term represented by circles. Covariance path where specifying two variables in model are related or correlated one and another and another. Covariance non directional path where specifying two variable in model are related or correlated one and another represented as curved as double headed arrow. Single headed straight arrows represented directional path regression from one variable to another.

Structural model/path diagram is use to specified model in SEM. The general conventional specify the model is that the causal flow is from left to right or from top to bottom. This means the variables on the left are causing the variable on the right. In SEM analysis straight arrows represent direct effect they are generally used between dependent variable as well as independent variables. The curved arrows represent the correlation between the variables.

Represented the latent variables and rectangular box represented the observed variables.in structural model/path diagram. There are seven latent variable each of these variables have different numbers of indicators. And there are total 29 twenty-nine indicator exist in theoretical framework.

In theoretical framework / path diagram the first Latent variable with ellipse is use of health service has five observed indicator variables which include availability of male doctors, availability of female doctors, availability of medicine, access to medical healthcare service and time cost. The second latent variable with ellipses include maternal health status has three observed indicators which are pre-natal care and post-natal care, assisted delivery, institutional delivery in rectangular boxes. The third latent

variable with ellipses which include quality of health care has three observed indicator variable which are access of healthcare, institutional delivery and use of modern technology in rectangular boxes. The fourth latent variable with ellipses which include education has four observed indicators variable which are child school attendance, year of education, school quality and cost of education (time cost and monetary cost) in rectangular boxes. The fifth latent variable with ellipses which include living standard has eight observed indicators variables which include electricity, cooking fuel, walls, telephone, water, sanitation, overcrowding and gas. The sixth latent variable with ellipses is wealth/asset has three observed indicators variables which include livestock ownership, household assets and vehicle in the rectangular boxes. The seventh latent variable with ellipses include biological issues has three observed variables in rectangular boxes these are poor general health, long-term health condition and disabled member in household.



Step 1: Confirmatory Factor Analysis (CFA)

Confirmatory modeling usually started out with the hypothesis that gets represented in a causal model. This model is testing against the obtain measurement data to determine

how well model fits the data. The biggest advantage of SEM is that it can simultaneously test measurements and structured relationship among a set of variables.

Confirmatory factor analysis is used to estimate the latent variable by using its components. CFA is a type of SEM analysis that is used to test measurement models. The term confirmatory implies the model is specified a priori. CFA can be used to test the relationship between items and the latent factors and the correlational relationship among the latent variables.

In CFA model, seven latent variables have been observed on the basis of their determinants. According to CFA, each variable is assigned a score or categorized into scaling based on expertise references. Twenty nine variables have been used to observe these seven latent variables. Some variables are categorized into deprive and non-deprive i.e. electricity, cooking fuel, availability of male and female doctor, access to medical facility, poor general health and long term health condition. Deprived is shown by “5” while non-deprive is assigned “1”.

Some indicates are scaled into three categories like material used for house structure, access to safe drinking water, pre-natal and ante-natal care etc. Indicator “house structure” is classified into three categorized i.e. “1” is assigned for paka structure, “2” is assigned for mixed structural and “3” is assigned for kacha structural. Indicator “sanitation system” is classified into three categorized i.e. “1” is assigned for underground and covered sanitation system, “3” is assigned for open sanitation system and “5” is assigned for no sanitation system. Similarly indicator “access to water source” is classified into three categorized i.e. “1” is assigned if access to safe drinking water is in the home, “3” is assigned if access to safe drinking water is within two kilo meter of distance and “5” is assigned if access to safe drinking water requires more than two kilo meter of distance.

Indicator “assisted delivery” is classified into five categorized i.e. “1” is assigned if birth attendant was doctor, “2” is assigned if birth attendant was nurse, “3” is assigned if birth attendant was TBA or LHV, “4” is assigned if birth attendant was family member or friend and “5” is assigned if birth attendant was any other. Indicator “pre-natal and ante-natal care” is classified into three categorized i.e. “1” is assigned if both healthcare facilities are used by household, “3” is assigned if anyone healthcare facility among these two is used by the household and “5” is assigned if no healthcare facility among these two is used by household.

While some indicators are scaled into five categories. Indicator “institutional delivery” is classified into five categorized i.e. “1” is assigned if birth place was government hospital, “2” is assigned if birth place was private hospital, “3” is assigned if birth place was RHU or BHU, “4” is assigned if birth place was home and “5” is assigned if birth place was any other. Indicator “disability” is classified into five categorized i.e. “1” is assigned if anyone in the household faced any kind of disability for less than three months, “2” is assigned if anyone in the household faced any kind of disability for three to six months, “3” is assigned if anyone in the household faced any kind of disability for seven to twelve months, “4” is assigned if anyone in the household faced any kind of disability for one to five years, “5” is assigned if anyone in the household faced any kind of disability for more than five years. Indicator “time cost” is classified into five categorized i.e. “1” is assigned if it requires less than fifteen minutes to reach the healthcare facility, “2” is assigned if it requires (16-30) minutes to reach the healthcare facility, “3” is assigned if it requires (31-45) minutes to reach the healthcare facility, “4” is assigned if it requires (46-60) minutes to reach the healthcare facility, “5” is assigned if it requires more than sixty minutes to reach the healthcare facility

For making all possible econometric models/equations all latent and items variables are renamed with alphabetic. The list of all variables along with indicators is written on

previous page. Here the HPI(y) is the main variable of our whole theoretical framework. For each latent variable represented by observed variable with single headed arrows. Together they called CFA/measurement model. Now look at the CFA model to test or measurement model.

Step 2: Structural Regression Model (SRM)

Structural regression model indicates overall impact of all observed variables on health poverty status. Here health poverty index (HPI) is dependent variable and seven independent variables i.e. use of healthcare service (UHS), maternal healthcare service (MHS), quality of healthcare service (QHS), education (Edu), living standard (Ls), wealth and household assets (Wa) and biological issues (Bi).

Econometric Model

There are two steps while estimating the Structural Equation Model i.e. confirmatory factor analysis and regression analysis.

Step 1: **Measurement Model/ Confirmatory Factor Analysis (CFA)**

$$UHS_1 = \propto_1 UHS + e_1$$
$$UHS_2 = \propto_2 UHS + e_2$$
$$UHS_3 = \propto_3 UHS + e_3$$
$$UHS_4 = \propto_4 UHS + e_4$$
$$UHS_5 = \propto_5 UHS + e_5$$

UHS

$$MHS_1 = \propto_1 MHS + e_6$$
$$MHS_2 = \propto_2 MHS + e_7$$
$$MHS_3 = \propto_3 MHS + e_8$$

MHS

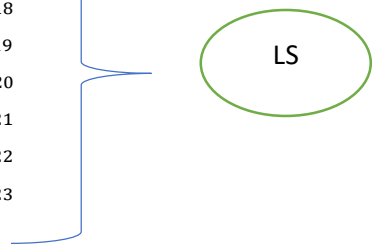
$$QHS_1 = \propto_1 \text{QHS} + e_9$$
$$QHS_2 = \propto_2 \text{QHS} + e_{10}$$
$$QHS_3 = \propto_3 \text{QHS} + e_{11}$$

QHS

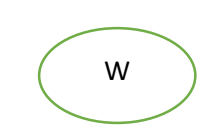
$$\text{EDU}_1 = \propto_1 EDU + e_{12}$$
$$\text{EDU}_2 = \propto_2 EDU + e_{13}$$
$$\text{EDU}_3 = \propto_3 EDU + e_{14}$$
$$\text{EDU}_4 = \propto_4 EDU + e_{15}$$

EDU

$LS_1 = \propto_1 LS + e_{16}$
$LS_2 = \propto_2 LS + e_{17}$
$LS_3 = \propto_3 LS + e_{18}$
$LS_4 = \propto_4 LS + e_{19}$
$LS_5 = \propto_5 LS + e_{20}$
$LS_6 = \propto_6 LS + e_{21}$
$LS_7 = \propto_7 LS + e_{22}$
$LS_8 = \propto_8 LS + e_{23}$



$W_1 = \propto_1 W + e_{24}$
$W_2 = \propto_2 W + e_{25}$
$W_3 = \propto_3 W + e_{26}$



$BI_1 = \propto_1 BI + e_{27}$
$BI_2 = \propto_2 BI + e_{28}$
$BI_3 = \propto_3 BI + e_{29}$

$UHS = \boldsymbol{\delta}_1 HPI + e_{30}$
$MHS = \boldsymbol{\delta}_2 HPI + e_{31}$
$QHS = \boldsymbol{\delta}_3 HPI + e_{32}$

Step 2: Structural Regression Method (SRM)

HPI=f (UHS, MHS, QHS, Edu, Ls, Wa, Bi)

$$HPI=\propto_1 UHS +\propto_2 MHS +\propto_3 QHS +\propto_4 Edu +\propto_5 Ls +\propto_6 Wa +\propto_7 Bi + \varepsilon_\circ$$

UHS=Use of health care services
MHS= Maternal Health Status
QHS= Quality of health care services
Edu = Education
Ls = Living standard
W/A = Wealth/assets
Bi = Biological issues

CHAPTER 4

ESTIMATION RESULTS

4.1 Introduction

This chapter represents the estimation results for the study. This chapter is divided into four sections. First sections highlights the introduction for the estimation results. Second section highlights the estimation results for the health poverty status based on the Alkire and Foster (2007, 2011) methodology. The third section reveals the results for the determinants of health poverty status by using the Structural Equation Modeling. While the last sections reveals the conclusion of this chapter.

4.2 Alkire and Foster Methodology Results

4.2.1 Uncensored Headcount Ratio

This ratio indicates the percentage of those individual who are deprived in each indicator while ignoring whether household is poor or non-poor. Other name pf uncensored headcount ratio is raw headcount ratio. Table 4.1 highlights the percentage of individuals facing deprivations for all indicators ignoring they are lie in the category of poor or not. The estimation results for PRHS-I (2001) highlights that maximum deprivations lies in the indicators of "Access to doctor during fever or injury, time cost and satisfied with the use and access of healthcare facilities" that is 98.99%, 72.87% and 51.57% respectively. Post natal care and immunization are ranked as least deprivations indicators with 23% and 31% respectively. The estimation results for PPHS (2010) highlights that maximum deprivations lies in the indicators of "Institutional delivery and time cost" that is 37% and 46.5% respectively. Access to doctor during fever or injury, post natal care and immunization are ranked as least deprivations indicators with 12.5%, 20.6% and 20% respectively. Overall uncensored headcount ratio indicates that this trend has fallen over this extended period of time in

all concerned indicators. More surprising thing is that maximum uncensored headcount ratio has fallen for the indicator of "Access to doctor during fever or injury" which was ranked as most deprived indicator in 2001 and also ranked as least deprived indicator in 2010 i.e 98.99% in 2001 to 12.55% in 2010.

Table 4.1 Uncensored Headcount Ratios

Dimensions	Indicators	PRHS-I (2001)	PPHS-(2010)
Use of health care services	Access to doctor during fever or injury	98.99	12.55
	Assisted Delivery	35.59	23.30
Quality of health care services	Satisfied with the use and access of healthcare facilities	51.57	34.28
	Institutional delivery	41.82	37.01
Cost of health services	Time cost	72.87	46.50
Maternal Health Status	Pre-natal care	48.15	29.18
	Post-natal care	23.15	20.61
Child Health Status	Immunization	31.05	20.38

Source: Author's calculation from the micro-data set of PRHS-I 2001 and PPHS 2010

4.2.2 Censored Headcount Ratios

Term "Censored headcount ratio" reveals the percentage of individuals who are facing overall poverty as well as deprivation in each indicator. Table 4.2 highlights the percentage of individuals facing deprivations in indicators and also taking in account that they are lie in the category of poor. The censored headcount ratio results for PRHS-I (2001) highlights that maximum deprivations lies in the indicators of "Access to doctor during fever or injury, time cost and satisfied with the use and access of healthcare facilities" that is 81%, 68.7% and 46% respectively. Post natal care and immunization are ranked as least deprivations indicators with 21.8% and 31.9% respectively. Surprising thing is that ranking of all these indicator was same in both categories i.e censored headcount ratio and uncensored headcount ratio.

While censored headcount ratio results for PPHS (2010) highlights that maximum deprivations lies in the indicators of "Time cost" that is 35.7%. Access to doctor during fever or injury, pre natal care, post natal care and assisted delivery are ranked as least deprivations indicators with 11%, 14%, 15% and 18% respectively. Overall censored headcount ratio indicates that this trend has fallen over this extended period of time in all concerned indicators. Maximum censored headcount ratio has fallen for the indicator of "Access to doctor during fever or injury" i.e 81% in 2001 to 11% in 2010.

4.2 Censored Headcount Ratios

Dimensions	**Indicators**	**PRHS-I (2001)**	**PPHS-(2010)**
Use of health care services	Access to doctor during fever or injury	81.161	11.1453
	Assisted Delivery	34.3661	18.0667
Quality of health care services	Satisfied with the use and access of healthcare facilities	46.0529	21.6705
	Institutional delivery	39.061	24.9404
Cost of health services	Time cost	68.75	35.7412
Maternal Health Status	Pre-natal care	42.0643	14.5795
	Post-natal care	21.8008	15.0352
Child Health Status	Immunization	31.9919	22.688

Source: Author's calculation from the micro-data set of PRHS-I 2001 and PPHS 2010

4.2.3 Health Poverty Index (HPI) at National level

Table 4.3 represents the health poverty index and its components i.e. incidence of health poverty and the intensity of health poverty for the year 2001 and 2010 at national level by using Alkire and Foster (2007, 2011) methodology.

The estimation results for the first round of PRHS-I (2001) indicates that headcount health poverty ratio (% of individuals who are categorized as multidimensional health poor) is 81.46 percent and intensity of health poverty (percentage of deprivation faced by a poor household) is 46.59 percent. Health poverty index (HPI) is a multiplication of occurrence of health poverty (H) and intensity of health poverty (A) which yields a value of 37.9 percent. While the estimation results for the last round of Pakistan Panel

Household Survey (PPHS-2010) reveals that headcount health poverty ratio is 43.23 percent and intensity of health poverty is 51.4 percent. Multidimensional health poverty index (HPI) which is multiplication of occurrence of health poverty (H) and intensity of health poverty (A) which yields a value of 22 percent.

The comparison of estimation result for these two period of time highlights that there is significant decline in the occurrence of health poverty from 81.4 percent in 2001 to 43.2 percent in 2010. Similarly the health poverty index also indicated the declining trend over this extended period of time from 0.37 in 2001 to 0.22 in 2010. But intensity of health poverty is increasing over this extended period of time from 46 percent in 2001 to 51.4 percent in 2010.

4.3 Health Poverty Index at National level

	2001	**2010**
Headcount Poverty (H)	0.81469	0.432455
Intensity of Poverty (A)	0.46599	0.514032
Health Poverty Index (HPI)	0.37964	0.222296

Source: Author's calculation from the micro-data set of PRHS 2001 and PPHS 2010

4.2.4 Health Poverty Index at Province level

Table 4.4 represents the health poverty index and its components i.e. incidence of health poverty and the intensity of health poverty for the year 2001 and 2010 at sub-national (province) level by using Pakistan Panel Household Survey (PPHS).

Results for PRHS-I (2001) shows that KPK lie in that category in which there minimum level incidence of health poverty, intensity of health poverty as well as HPI. Similarly Balochistan lie in that category in which there is maximum level of incidence of health poverty, intensity of health poverty as well as HPI. While results for PPHS-2010 shows that Sindh and Punjab have same value for the incidence of health poverty i.e. 37 percent. Moreover, Sindh lie in that category in which there minimum level incidence of health poverty, intensity of health poverty as well as HPI. Similarly Balochistan lie

in that category in which there is maximum level of incidence of health poverty, intensity of health poverty as well as HPI.

The estimation result indicates that Balochistan was ranked at the top in which major proportion of population is facing deprivations by using the both panel datasets i.e PRHS-2001 and PPHS-2010. In 2001 about 95 percent of population was facing the multidimensional health poverty while till 2010 this ratio was declined up to 79.9 percent in case of Balochistan. Micro data estimation results indicates that incidence of health poverty declined in all the provinces over this extended period of time. Similarly, the intensity of health poverty declined only in Sindh and Balochistan during this time period. But in case of Punjab and KPK the intensity of health poverty in increased from 2001 to 2010.

4.4 Health Poverty Index at Province level

	2001			2010		
Province	**H**	**A**	**HPI**	**H**	**A**	**HPI**
Punjab	0.847973	0.453491	0.384541	0.371738	0.503682	0.187238
Sindh	0.851096	0.4952	0.421463	0.373716	0.480114	0.179426
KPK	0.656174	0.344168	0.225834	0.472734	0.498771	0.235791
Balochistan	0.95092	0.662482	0.629968	0.799811	0.595573	0.476346

Source: Author's calculation from the micro-data set of PRHS-I 2001 and PPHS 2010

4.2.5 Dynamics of Health Poverty

Table 4.5 represents the dynamics of health poverty by using Alkire and Foster (2007, 2011) methodology based on Pakistan Panel Household survey (PPHS). The dynamics of health poverty are categorized into three groups i.e chronic poor, transitory poor and never poor. Chronic poor are those households who are facing multidimensional health poverty in both round of survey i.e PRHS-I (2001) and PPHS-2010. Transitory poor are those households who are facing multidimensional health poverty in any one of these two rounds of survey. While never poor are those households who never faced multidimensional health poverty among both surveys. The estimation results highlights that 41.33 percent household lie in the category of chronic poor, about 47.19 percent

household lie in the category of transitory poor and about 11.48 percent household lie in the category of never poor. Moreover, the transitory poor are sub-divided into groups i.e moved onto poverty pool and moved out of poverty pool. The results indicate that about 10 percent household lie in the category of "moved into poverty pool" and about 90 percent households lie in the category of "moved out of poverty pool".

4.5 Dynamics of Health Poverty

Health Poverty Dynamics	2001-10 (all provinces)
Chronic Poor	41.33
Transitory Poor	47.19
Never Poor	11.48
All	100

Source: Author's calculation from the micro-data set of PRHS 2001 and PPHS 2010

4.3 Estimation Results for Structural Equation Model (SEM)

Structural equation model has been used to estimate the determinants of health poverty index. SEM is a two stage model. In first stage, the results of measurement model are represented. While in second stage, results of structural regression model are presented. Section 4.3.1 explains the results for measurement model and section 4.3.2 represents the results of structural regression model.

4.3.1 Measurement Model Results

Table 4.6 presents the results of measurement model for PRHS-I (2001). According to the results obtained from the measurement model, availability of male doctors, availability of female doctors, availability of medicine and access to medical services have an impact on the "Use of Healthcare Service" (shown by the p-value, which is less than 0.05). Although coefficient of the variable Time cost shows a negative effect on the model, but as stated by the p-value it does not significantly impact the model. All variables except time cost variable has positive effect on the model. The value of each coefficient indicate how much a predictor variable impact the "Use of Healthcare Service" if all other variables are kept constant. For example, the coefficient of

Availability of male doctors is 0.528. This means a unit increase in the value of this variable will cause an increase of 0.528 in the "Use of Healthcare Service" if all other variables are kept constant.

While results related to maternal health indicates that all variables i.e. pre-natal care and ante-natal care, assisted delivery and institutional delivery are insignificantly related to maternal health status (shown by the p-value, which is greater than 0.05). All variables have positive effect on the model. According to the results obtained from the measurement model, access to medical service and use of modern technology have a significant impact on the "Quality of Healthcare Service" (shown by the p-value, which is less than 0.05). Although coefficient of the variable institutional shows a negative effect on the model, but as stated by the p-value it does not significantly impact the model. All variables except institutional delivery variable has positive effect on the model.

Measurement model results for education indicates that years of education and school quality have a significant impact on the "Education" (shown by the p-value, which is less than 0.05). Although coefficient of the variables child school attendance and cost variable do not show a significantly impact on education. Child school attendance and years of education have positive effect on the model while cost and school quality have a negative effect on the model. Measurement model results related to living standard indicates that water source, electricity connection, overcrowding, sanitation system have a significant impact on the "Living Standard" (shown by the p-value, which is less than 0.05). While remaining all other independent variable do not have a significant effect on living standard. More surprising thing is that all variables except source of cooking fuel variable have negative effect on the model.

Measurement model results related to wealth and household assets represents that all independent variables expect livestock ownership have a significant effect on the

"Wealth and household assets" (shown by the p-value, which is less than 0.05). Similarly, all related variables expect household assets have a positive effect on the model. Measurement model results related to biological issues reveals that long-term health condition has a significant effect on the biological status while remaining other variable do not show the significant result. Similarly, all remaining other variables expect the "presence of disable member in the household" have a positive effect on biological issue.

4.6 Measurement Model Results for PRHS-I (2001)

	UHS	MHS	QHS	EDU	LS	W	BI
UHS1	0.528 (0.000)						
UHS2	0.647 (0.000)						
UHS3	0.491 (0.000)						
UHS4	0.862 (0.000)						
UHS5	-0.139 (0.058)						
MHS1		0.325 (0.398)					
MHS2		0.897 (0.307)					
MHS3		0.936 (0.300)					
QHS1			0.889 (0.000)				
QHS2			-0.083 (0.716)				
QHS3			0.602 (0.000)				
EDU1				0.055 (0.910)			
EDU2				0.685 (0.037)			
EDU3				-0.041 (0.933)			
EDU4				-0.773 (0.044)			
LS1					-0.797 (0.012)		
LS2					0.279 (0.314)		
LS3					-0.606 (0.141)		
LS4					-0.591 (0.034)		
LS5					-0.555 (0.232)		
LS6					-0.359 (0.042)		
LS7					-0.099 (0.613)		
LS8					-0.409 (0.302)		
W1						-0.827 (0.044)	
W2						0.596 (0.015)	
W3						0.516 (0.19)	
BI1							0.248 (0.458)
BI2							0.731 (0.022)
BI3							-0.429 (0.263)

Source: Author's calculation from the micro-data set of PRHS 2001 and PPHS 2010

Table 4.8 (see appendix) presents the results of measurement model for PPHS-2010. According to the results obtained from the measurement model, availability of male doctors, availability of female doctors, availability of medicine, access to medical services ant time required to reach at medical service center have a significant and positive impact on the "Use of healthcare service" (shown by the p-value, which is less than 0.05). The value of each coefficient indicate how much a predictor variable impact the "Use of healthcare service" if all other remaining variables are kept constant. For example, the coefficient of Access to Medical Service is 0.867. This means a unit increase in the value of this variable will cause an increase of 0.867 in the "Use of healthcare service" if all other remaining variables are kept constant.

While results related to maternal health indicates that all independent variables i.e. assisted delivery and institutional delivery are positively correlated with the "Maternal health" (shown by the coefficient sign). While Pre-natal care and Ante-natal care is negatively correlated with "Maternal health" i.e. maternal health. Similarly assisted delivery has a significant effect while institutional delivery and Pre-natal care and Ante-natal care have an insignificant effect on the "Maternal health" in this model.

According to the results obtained from the measurement model, access to medical service and use of modern technology have a significant impact on the "Quality of Healthcare Service" (shown by the p-value, which is less than 0.05). While the variable institutional delivery shows has an insignificant effect on the quality of healthcare service. All other remaining variables related to "Quality of Healthcare Service" have a positive effect in the model.

Measurement model results related to living standard indicates that electricity connection, overcrowding, cooking fuel, walls material, overcrowding and sanitation system have a significant as well as positive impact on the "Living standard" (shown by the p-value, which is less than 0.05). While remaining all other variable i.e. water

source, telephone connection and gas connection have an insignificant as well as negative effect on “Living standard”.

Measurement model results for education indicates that years of education and school quality and cost of education (monetary and time) have a positive effect on the “Education” while child school attendance has a negative effect on “Education”. More surprising thing is that all remaining other variables are significantly related to the “Education” (shown by the p-value, which is less than 0.05) in this model.

Measurement model results related to wealth and household assets represents that all variables i.e. household assets, vehicle ownership and livestock ownership have a significant effect on the “Wealth and household assets” (shown by the p-value, which is less than 0.05). Similarly, all other remaining variables expect livestock ownership have a positive effect on the “Wealth and household assets” in this model.

Measurement model results related to biological issues reveals that general poor health condition has an insignificant as well as negative effect on the “Biological issues”. While long term health condition and disable member in household have a significant (shown by the p-value, which is less than 0.05) as well as positive effect on “Biological issues” in this model.

4.3.2 Structural Regression Model (SRM)

Table 4.7 highlights the estimation results of the structural regression model by using the Pakistan Panel Household Survey (PPHS-2010). Here health poverty index is dependent variable and seven independent variables i.e. use of healthcare service (UHS), maternal healthcare service (MHS), quality of healthcare service (QHS), education (Edu), living standard (Ls), wealth and assets (Wa) and biological issues (Bi). Structural regression model results related to health poverty index highlights that use of healthcare services and quality of healthcare service are positively and highly significant to the health poverty index by using PRHS-I data set. While maternal

healthcare service do no significantly affect the health poverty index by using PRHS-I (2001) data set. While structural equation model results reveals that living standard and biological health status have a positive and significant effect on the health poverty status by using PRHS-I data set. While "education" and "wealth and household assets" do not significantly affect the health poverty index by using PRHS-I data set. It also indicates that there is negative effect of "wealth and household assets" on the dependent variable i.e. health poverty index by using PRHS-I (2001) data set.

$$HPI_{2001} = 0.969UHS + 0.076MHS + 0.909QHS + 0.135Edu + 0.094Ls - 0.066Wa + 0.107Bi$$

Results of structural regression model highlights that use of healthcare services and quality of healthcare service are positively and highly significant to the health poverty index by using PPHS-2010 data set. While maternal healthcare service is insignificantly affect the health poverty index by using PPHS-2010. While structural equation model results reveals that education, living standard and wealth are significantly associated with the health poverty index by using PPHS-2010. While biological issues is insignificantly associated health poverty index by using p-value. This model highlights that education and biological issue have positive impact on health poverty index by using PPHS-2010. While wealth and living standard have negative impact on health poverty index in this model by using PPHS-2010.

$$HPI_{2010} = 00.037UHS + 0.004MHS + 0.035QHS + 0.13Edu - 0.147Ls - 0.068Wa + 0.033Bi$$

Table 4.7: Structure Regression Model Results

	Health Poverty Index	
	PRHS-I (2001)	**PPHS-2010**
Use of Healthcare Service	0.969	0.037

	(0.000)	(0.071)
Maternal Healthcare Service	0.076 (0.665)	0.004 (0.0146)
Quality of Healthcare Service	0.909 (0.000)	0.035 (0.072)
Education	0.135 (0.094)	0.13 (0.016)
Living Standard	0.094 (0.023)	-0.147 (0.000)
Wealth and HH Assets	-0.066 (0.111)	-0.068 (0.005)
Biological Issues	0.108 (0.011)	0.033 (0.072)

Source: Author's calculation from the micro-data set of PRHS-i 2001 and PPHS 2010

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

It is apparent that there is a significant reduction in headcount poverty from 34.4% in 2000-01 to 29.5% in 2013-14 in Pakistan. Nonetheless, there has been no considerable development in health dimension as a social indicator over this extended period of time. This study tries to evaluate the dynamics of health status and its determinants in Pakistan from 2001 to 2010. Alkire and Foster (2007, 2011) methodology has been used to measure the health poverty status and structural equation model has been used to check the determinants of health poverty status in Pakistan.

Alkire and Foster estimation results for the first round of PRHS-I (2001) highlights that headcount health poverty ratio was 81.46 percent and intensity of health poverty was 46.59 percent. While multidimensional health poverty index (HPI) is a multiplication of occurrence of health poverty (H) and intensity of health poverty (A) which yields a value of 37.9 percent. Whereas the estimation results for the last round of Pakistan Panel Household Survey (PPHS-2010) reveals that headcount health poverty ratio has decreased at 43.23 percent and intensity of health poverty has increased at 51.4 percent. While the health poverty index declined over this extended period of time and reached at 22 percent in 2010.

There exist a variation in health status at province level in Pakistan. Results for PRHS-2001 shows that KPK lie in that category in which there minimum level incidence of health poverty, intensity of health poverty as well as HPI. Similarly Balochistan lie in that category in which there is maximum level of incidence of health poverty, intensity of health poverty as well as HPI. While results for PPHS-2010 shows that Sindh and Punjab have same value for the incidence of health poverty i.e. 37 percent. Moreover, Sindh lie in that category in which there minimum level incidence of health poverty,

intensity of health poverty as well as HPI. Similarly Balochistan lie in that category in which there is maximum level of incidence of health poverty, intensity of health poverty as well as HPI.

The estimation result indicates that Balochistan was ranked at the top in which major proportion of population is facing deprivations by using the both panel datasets i.e PRHS-2001 and PPHS-2010. In 2001 about 95 percent of population was facing the multidimensional health poverty while till 2010 this ratio was declined up to 79.9 percent in case of Balochistan. Micro data estimation results indicates that incidence of health poverty declined in all the provinces over this extended period of time. Similarly, the intensity of health poverty declined only in Sindh and Balochistan during this time period. But in case of Punjab and KPK the intensity of health poverty in increased from 2001 to 2010.

The dynamics of health poverty status highlights that 41.33 percent household lie in the category of chronic poor, about 47.19 percent household lie in the category of transitory poor and about 11.48 percent household lie in the category of never poor. Moreover, the transitory poor are sub-divided into groups i.e moved into poverty pool and moved out of poverty pool. The results indicate that about 10 percent household lie in the category of "moved into poverty pool" and about 90 percent households lie in the category of "moved out of poverty pool".

Structural equation model has been used to check the determinants of health poverty status for both years of datasets. There is positive effect of use of healthcare service, quality of healthcare service, education and biological issues on the health poverty status in both years. Only "Wealth and Assets" indicator has a negative effect on health poverty status in both years. Maternal health status has a negative effect on health poverty index in 2001 while living standard has negative effect on health poverty status in 2010.

All determinants are significantly related to the dependent variable i.e. health poverty index expect maternal health status and education by using the PRHS-2001 dataset. Similarly, All determinants are significantly related to the dependent variable i.e. health poverty index expect use of healthcare service, quality of healthcare service and biological issue by using the PPHS-2010 dataset.

5.2 Recommendations

- Measuring Health Poverty Index is necessary but still it's no enough. The researcher should concentrate on the dynamics of deprivation related to health status instead of trends in deprivation. Similarly, Government of Pakistan should introduced new surveys have the feature of panel data rather than time series or cross sectional data.
- The intensity of deprivation is the key component during estimating the Health poverty index. Almost 47% face the "transitory health poverty" over this extended period of time, this movement can be reduced by refining the dimension of cost and quality of healthcare service and child health status.
- Multidimensional poverty index use only four indicators to capture the health dimension. This framework consisting eight indicators related to health dimension in this study can be replace with official poverty measure for good and depth results.

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APPENDIX

Measurement Model Results for PPHS-2010

	UHS	MHS	QHS	EDU	LS	W	BI
UHS1	0.717 (0.000)						
UHS2	0.749 (0.000)						
UHS3	0.416 (0.000)						
UHS4	0.867 (0.000)						
UHS5	0.235 (0.000)						
MHS1		-0.485 (0.204)					
MHS2		0.952 (0.002)					
MHS3		0.481 (0.393)					
QHS1			0.890 (0.000)				
QHS2			0.013 (0.882)				
QHS3			0.682 (0.000)				
EDU1				-0.321 (0.048)			
EDU2				0.677 (0.000)			
EDU3				0.642 (0.000)			
EDU4				0.605 (0.000)			
LS1					0.591 (0.000)		
LS2					0.165 (0.000)		
LS3					0.694 (0.000)		
LS4					0.584 (0.000)		
LS5					0.560 (0.000)		
LS6					-0.088 (0.332)		
LS7					-0.099 (0.613)		
LS8					-0.409 (0.302)		
W1						0.854 (0.000)	
W2						0.690 (0.000)	
W3						-0.208 (0.000)	
BI1							-0.136 (0.647)
BI2							0.917 (0.000)
BI3							0.507 (0.044)

Abbreviations for Structural Equation Modeling

Y1	UHS		UHS_1	Availability of male doctors
			UHS_2	Availability of female doctors
			UHS_3	Availability of medicine
			UHS_4	Access to Medical Service
			UHS_5	Time cost
Y2	MHS		MHS_1	Pre-natal care and Ante-natal care
			MHS_2	Assisted Delivery
			MHS_3	Institutional delivery
Y3	QHS		QHS_1	Access to Medical Service
			QHS_2	Institutional delivery
			QHS_3	Use of modern technology
Y4	EDU		EDU_1	Child School Attendance
			EDU_2	Year of Education
			EDU_3	Cost (Time+ Monetary)
			EDU_4	School quality
Y5	LS		LS_1	Electricity
			LS_2	Cooking Fuel
			LS_3	Walls
			LS_4	Overcrowding
			LS_5	Sanitation
			LS_6	Water
			LS_7	Gas
			LS_8	Telephone
Y6	W		W_1	Household assets
			W_2	Vehicle ownership
			W_3	livestock ownership
Y7	Bl		BI_1	Poor general health
			BI_2	Long-term health condition
			BI_3	Disabled member in HH
Y(HPI)	UHS	Z1	UHS_1	Availability of male doctors
			UHS_2	Availability of female doctors
			UHS_3	Availability of medicine
			UHS_4	Access to Medical Service
			UHS_5	Time cost
	MHS	Z2	MHS_1	Pre-natal care and Ante-natal care
			MHS_2	Assisted Delivery
			MHS_3	Institutional delivery
	QHS	Z3	QHS_1	Access to Medical Service
			QHS_2	Institutional delivery
			QHS_3	Use of modern technology