IMPACT OF ENVIRONMENTAL HAZARDS ON CHILD POVERTY: A TREND ANALYSIS OF PAKISTAN

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CERTIFICATE

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Author's Declaration

I Summera Bibi hereby state that my MPhil thesis titled "Impact of environmental hazards on child poverty: A trend analysis of Pakistan" is my own work and has not been submitted previously by me for taking any degree from Pakistan Institute of Development Economics or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw my Mphil degree.

Date: 11-03-2022

Summera Bibi

Dedication

I dedicate my work to my beloved parents

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The Almighty is indeed the one who never let the faith diminishes even for a second being the Compassionate and the Merciful.

I dedicate this accomplishment to my late father (Bashir Ahmad Awan) who would have been so happy if he was alive today. Nothing could have been achieved without the continuous and never lasting support of my family who showed resilience and contentment during the course of time.

I would pay my regard to my supervisor Dr. Shujaat Farooq, who I believe is one of the best mentors I came across with. He not only provided keen supervision, but also made sure that the research would turn out to be significant. Thanks to the Pakistan Institute of Development Economics for awarding me this opportunity to complete this goal. Finally, thanks to friends, who endured this long process with me, always offering support.

ABSTRACT

Child poverty is an international problem and policies have been devised at national and international level to deal with the issue. Pakistan has also devised certain policies regarding health care, development and population growth to deal with the problem of child poverty. These policies have resulted in reducing the infant and child mortality rate to the greater extent. However, the problem is not addressed fully yet and needs further consideration of the policy makers.

Child poverty is determined through various indirect variables like Infant mortality, Child mortality, Infant morbidity and Child malnutrition. These indicators are further analyzed through different sets of indirect factors like child characteristics, mother characteristics, household characteristics and environmental characteristics. All these characteristics bear individual as well as collective effect on the child poverty directly or indirectly.

It is established in the results of this study that in mother characteristics mother education level and working status plays very important role in development of the child. On the other hand, good health care system, normal size of the child with low number of siblings, and higher birth order reduces chances of infant mortality. Similarly, vaccination also plays an important role in the survival of the child.

The results also show that the region and province of the household plays important role in reducing child poverty. The families living in urban areas with access to the modern health care system of the Punjab province and Islamabad area are more benefited and there are very few chances of infant and child mortality as compared to the people living in rural areas of Sindh and Baluchistan province. Similarly, the internal household facilities like access to improved drinking water sources, improved toilet facilities, kitchen facility and good financial status of the family also increase chances of infant and child survival.

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LIST OF ABBREVATIONS

DHS	Demographic Health Survey
PDHS	Pakistan Demographic Health Survey
PSLM	Pakistan Social and Living Standard Measurement Survey
PSES	Pakistan Socio Economic Survey
WHO	World Health Organization
UNICEF	United Nations International Children's Emergency Fund
MAM	Moderate Acute Malnutrition
MDGs	Millennium Development Goals
NNS	National Nutrition Survey
IMR	Infant Mortality Rate
ARI	Acute Respiratory Infection
HAZ	Height for Age Scores
WAZ	Weight for Age Z score
WHZ	Weight for Height Z score
WFP	World Food Program
SAM	Severe Acute Malnutrition
WASH	Water Sanitation and Hygiene
LHW	Lady Health Worker
MoH	Ministry of Health
NGO	Non-Government Organization
CMAM	Community-based Management of Acute Malnutrition
BHU	Basic Health Unit
GAM	Global Acute Malnutrition
GOP	Government of Pakistan
OR	Odd Ratios

Chapter 1: Introduction

1.1 Introduction

Environmental health hazards are defined in various different ways. However, any situation or an event which possess threat to health of human can simply be said as environmental health hazard. These hazards can further be categorized into four different categories, i.e. chemical hazards, Physical hazards, biological hazards and Psychosocial hazards (Ibrahim, 2016). All these types of environmental hazards are mostly linked with the human behavior. These are targeted towards preventing disease, creating health-supporting environments and encouraging positive human behaviors.

Our environment generally consists of physical, chemical and biological factors and our relationship with our environment is always interactive. This means that we affect our environment and our environment affects us. These interactions may expose us to environmental health hazards; that is any environmental factors or situations that can cause injury, disease or death. More than three million children under five die each year from environment-related causes and conditions. This makes the environment one of the most critical contributors to the global toll of more than ten million child deaths annually as well as a very important factor in the health and well-being of their mothers.

Child poverty is defined by various researchers and human right protection organizations, however, as per UNICEF **"***Children experience poverty as an environment that is damaging to their mental, physical, emotional and spiritual development."* This shows that poverty is not only associated with the material wellbeing, rather physical, mental and environmental side of the children can also be included in broad spectrum of child poverty (Wickham, 2016) (Sophie

Wickham, 2016). Various studies have been conducted on the child's rights and health issues in Pakistan.

The statistical data and other indicators show that Pakistan is having high child mortality rate among the developing countries. The statistics show that almost one out of each six children in Pakistan dies under the age of five years. It was observed that the factors causing deaths are mostly lack of access to clean and hygienic drinking water and water borne diseases are the major causes of these deaths. The data studies also show that on average 1100 children in Pakistan die because of the water borne and other environmental diseases (Qayyum, 2018). The current indicators and data on child poverty for Pakistan show that almost 9 percent of the children in Pakistan suffer from emaciation, children with stunted growth are 50 percent and underweight children contribute almost 30 percent of the total population (UNICEF, 2019).

Further studies had probed into the matter of child mortality in Pakistan. They have considered important indicators like morbidity and malnutrition measured. These two things can be measured by scale of weight for age and height for age(Arif, 2004). Along with this the nominal scale i.e. demand for medical services is also determined in the literature. The studies show different factors have caused high level of destruction in the field of child morbidity. The excessive breast feeding, education level of mothers, poverty and low nutritional level of the children are adding fuel to the fire (Qayyum, 2018).

Polluted indoor and outdoor air, contaminated water, lack of adequate sanitation, toxic hazards, disease vectors, ultraviolet radiation, and degraded ecosystems are all important environmental risk factors for children and in most cases for their mothers as well. Particularly in developing countries, environmental hazards and pollution is a major contributor to childhood deaths, illnesses and disability from acute respiratory disease, diarrheal diseases, physical injuries,

poisonings, insect-borne diseases and prenatal infections. Childhood death and illness from causes such as poverty and malnutrition are also associated with unsustainable patterns of development and degraded urban or rural environments.

- Diarrhea kills an estimated 1.6 million children each year, caused mainly by unsafe water and poor sanitation.
- Indoor air pollution associated with the still-widespread use of biomass fuels kills nearly one million children annually, mostly as a result of acute respiratory infections. Mothers, in charge of cooking or resting close to the hearth after having given birth, are most at risk of developing chronic respiratory disease.
- Malaria, which may be exacerbated as a result of poor water management and storage, inadequate housing, deforestation and loss of biodiversity, kills an estimated one million children under five annually, mostly in Africa.

Unintentional physical injuries, which may be related to household or community environmental hazards, kill nearly 300 000 children annually: 60 000 are attributed to drowning, 40 000 to fires, 16 000 to falls, 16 000 to poisonings, 50 000 to road traffic incidents and over 100 000 are due to other unintentional injuries (WHO).

1.2 Situation in Pakistan

The child poverty is affected by the environmental hazards in the developing countries to the large extant. The quality of life is not as good as it observed in the developed nations. The social and economic indicators like poverty, inflation, household income, literacy, access to the health care etc are very poor in the developing countries. These indicators in turn affect the child survival and their growth at the initial stages of birth. The ultimate result of these indicators is child mortality, child morbidity and/or child poverty. Similarly, the environmental hazards like

clean drinking water and sanitation and hygiene conditions also bear the same results. In case of Pakistan the scenario is worse. The population is divided into various segments on the basis of social and economic status. The biggest division is that of life standard difference in the rural and urban settings in Pakistan.

It is commonly observed that the life standard is much better in urban settings as compared to the rural areas of Pakistan. The basic needs of life are not easily accessible in the rural settings of Pakistan. In some instances, the household have to travel for miles to treat a simple illness.

Table 1.1: Child mortality rates by Provinces of Pakistan (in percentage)

Region/ Province	Rural / Urban	Neonatal Mortality	Infant Mortality	Child Mortality
Punjab	Total	51	73	13
	Urban	44	63	7
	Rural	54	77	17
Sindh	Total	38	60	17
	Urban	37	50	7
	Rural	39	69	26
Khyber Pakhtunkhwa	Total	42	53	12
	Urban	29	36	5
	Rural	45	57	13
Baluchistan	Total	34	66	13
	Urban	32	62	12
	Rural	34	67	14
ICT Islamabad	------	24	44	5
FATA	------	18	29	4

Azad Jammu and Kashmir	Total	30	47	6
	Urban	28	38	5
	Rural	31	48	6
Gilgit Baltistan	------	47	63	14

Source: Pakistan demographic and Health Survey (DHS) 2017-18

Table 1.1 shows neonatal mortality, infant mortality and child mortality rates in different areas of Pakistan. It is evident from the data that the highest mortality rates are observed in Punjab region. On the other hand, lowest rates are observed in FATA (now merged in KP Province). The reason for high rates in Punjab is due to the reason that greater portion of population lives in rural areas. Similarly, the difference between rural urban setting shows that the mortality rates are observed high in the rural areas as compared to the urban areas. It is because of the reason that the health facilities and other socio-economic factors are very low in the rural areas. On the other hand, life standard is much better in the urban areas and all the health facilities are available.

The child mortality factor can be divided and bifurcated into various groups on the basis of various scales. The overall child mortality rates i.e., neonatal, infant and child mortality is illustrated on the basis of sex of the child.

Table 1.2: Sex wise mortality rates in Pakistan according to background characteristics

Child Sex	Neonatal Mortality	Infant Mortality	Child Mortality
Male	52	71	10
Female	33	53	15

Source: Pakistan demographic and Health Survey (DHS) 2017-18

The DHS data shows that mortality rates for boys are higher as compared to the girls in Pakistan. The reasons for high mortality rates in boys are many folds. First of all the birth rate for males is

high in the region which ultimately results in high mortality rate at all the stages. Similarly, the mortality rates increase as we move from urban to rural settings in Pakistan.

1.3 Problem Statement

The modern era is marked with environmental changes and its impact on the social and economic wellbeing of the humans. However, the household environmental conditions are very poor, the poor hygiene conditions, low socio-economic status of most of the families, their access to clean drinking water is very limited and low level of education, all these factors cause high mortality rate of in the children under age of five. The environmental factors, hygiene conditions and access to clean drinking water causes diarrhea and malnutrition of the children, which in turn becomes the instant cause of the death.

1.4 Objective of the study

The objective of the thesis in broader term is to check and analyze the trend of child poverty in Pakistan in the light of Pakistan Demographic Health Survey and policies implemented for reduction of child Poverty. The child poverty is measured via child mortality, morbidity and malnutrition. Similarly, the environmental hazards are too broad to be summarized; hence different household, environmental and social factors are considered as environmental hazards in this thesis. The objectives are further narrowed down and explained as follow;

1 To evaluate the impact of household environmental factors on the survival of child under the age of five.

2 To evaluate and investigate the impacts of poor hygiene condition of family on the health of child.

3 To evaluate and examine the impacts of socio-economic status of the family on the health and survival of the children under the age of five years.

1.5 Research Questions of the Study

The research questions of the thesis are framed in the light of objectives of the study. The main research questions addressed in this thesis are as under;

1. Do variations in household's environment within the country could affect children's survival chances?
2. Do the social status of the family and number of family members have relation with the child mortality under the age of five years?
3. Does the child poverty have improved along with the development of the health care systems?
4. Does variation in the province or region of living affect the levels of child poverty in Pakistan?
5. Does the financial status of the family have relation with the child mortality under the age of five years?

1.6 Hypothesis of the Study

Hypothesis for child poverty and its determinants are given as under.

- **Hypothesis 1:**

H_0: There is no relation between overall household environment and child poverty in Pakistan.

H_1: There exists significant relation between overall household environment and child poverty in Pakistan.

- **Hypothesis 2:**

H_0: There is no relation between financial status of the family and child poverty in Pakistan.

H_2: There exists significant relation between financial status of the family and child poverty in Pakistan.

- **Hypothesis 3:**

H_0: There is no relation between the infant mortality and child poverty in Pakistan.

H_3: There exists significant relation between the infant mortality and child poverty in Pakistan.

- **Hypothesis 4:**

H_0: There is no relation between the child mortality and child poverty in Pakistan.

H_4: There exists significant relation between the child mortality and child poverty in Pakistan.

- **Hypothesis 5:**

H_0: There is no relation between the child morbidity and child poverty in Pakistan.

H_5: There exists significant relation between the child morbidity and child poverty in Pakistan.

- **Hypothesis 6:**

H_0: There is no relation between the child malnutrition and child poverty in Pakistan.

H_6: There exists significant relation between the child malnutrition and child poverty in Pakistan.

1.7 Significance of the Study

The studies conducted so far in this area do not indicate the impact of individual household environmental factors on the survival of a child under the age of 5. This study has a comparative

edge over the previous studies in following different ways. First this study will provide a detailed list of household environmental factors related to an average house hold. Secondly, the study will highlight the impacts of these factors on the health of children. The least considered environmental and hygiene factors of a common household and its relation to child mortality will be analyzed in this study.

In addition, no such study has been carried out for Pakistan and recorded mortality rates are not analyzed in the light of international environmental standards. This study will open doors for new aspects of household hygiene/ environment and child survival in Pakistan.

1.8 Organization of the Study

This study is organized into five chapters. Chapter one includes the introduction, which explain importance of the research topic, issues and phenomena in Pakistan along with the objectives of the study. In addition, it includes Hypothesis, contribution of the study, statement problem and research questions. Chapter 2 focuses on the literature review for different nations and including gap of the study. Chapter 3 includes Research Methodology and source of data. Chapter 4 includes the results of cross tabulation analysis; chapter 5 presents the results of trend analysis, chapter 6 includes results of multivariate analysis and the last chapter conclusion of the study along with the policy recommendations and points for further studies in this area.

Chapter 2: Literature Review

2.1 Introduction

This chapter will include an outline of studies that are related to the factors effecting child survival in Pakistan. Various studies have been conducted in Pakistan and in other countries around the world on the same issue. All these studies show some common factors like social status, financial status, access to different facilities of livelihood and education level of the people. However, for Pakistan no such extensive study has been conducted. The statistical data and studies portray different pictures about the child mortality rates. As the infant mortality is extremely high on the one hand but on the other very little is published in the literature about factors associated with infant survival in Pakistan.

In the previous two decades this topic has gained attention of the health economists and other researchers. Some of these studies have been conducted on infant and child survival/ mortality in Pakistan, but these studies haven't considered all the possible variables influencing the infant survival. Along with this the lack of clearly defined conceptual framework is also observed in research studies in this area. These studies took samples which do not fully portray all the classes of the society and hence the results are skewed to some extent. Besides, most of the published research works did not use appropriate statistical methods (Agha, 2000).

The present study has tried to access the significant risk factors of infant mortality and execute a more comprehensive analysis of factors related to infant survival in Pakistan as compared to available and published literature. The specific objective of this study is to investigate and assess the magnitude of infant mortality in Pakistan, its causes and associated risk factors including the house hold environmental factors and hygiene factors. This study uses the nationally

representative, good-quality data of DHS Pakistan. The study includes a spectrum of variables affecting child health and employs appropriate statistical methodology. The review of literature is divided into various segments to clarify the specific work done so far.

2.2 Empirical evidence of environmental factor on Child Poverty

Merike and Mojekw (2012) used data from NDHS (Nigeria Demographic and Health Survey) 2008 and NBS (National Bureau of Statistics) 2009 to analyze and examine the environmental determinants of child mortality in Nigeria. They have used the principle component analysis to drive the effective portion of the data. After cleaning data multiple regression analysis was applied to draw results and see the impact of various variables. They took immunization, low polluting fuel, education, household income, disposal practice, refuse disposal, rich household, unsafe water, proximity to dump site, employment status, and child mortality as main variables for their study. All the variables were found correlated to the child mortality, as their impact was positive. However, the results of the study showed that child mortality can be significantly lowered by encouraging usage of cleaner fuel source.

Kembo and Van-Ginneken (2009) have tried to explore determinants of infant and child mortality in Zimbabwe. They used data from (ZDHS) Zimbabwe demographic and health survey 2005-06 to explore impact of material socioeconomic and sanitation variable on infant and child mortality. The study showed impact of maternal factors, child birth, order birth interval, mother's age, child sex, type of birth, socio economic factors, mother's education, father's education, wealth index, place of residence, sanitation system, source of drinking water and type of toilet on infant and child mortality. To check the impact of variables factors on child and infant mortality multivariate hazard analysis was applied to analyze data. The results of the study are multidimensional as the order and birth interval are significantly related to infant mortality while

improved sanitation facilities reduced infant mortality to the greater extent. Similarly, father's education bore effects on child mortality and left the infant mortality unaffected. On the other hand, effect of mother's education was contrary to the assumption and was not significantly related to either of the dependent variable. All the other factors i.e. birth order, birth interval, mother's age and type of birth had varying effects and they were more affective for infant mortality as compared to child mortality. The study showed that birth spacing was much important and hence recommended family planning methods.

Haines (2010) has used a slightly different approach in analyzing the issue of using infant and child mortality. The study took both the variables as indicators of inequality in United States in twentieth century. Micro data from 1900 and 1910 from Integrated Public Use Micro Samples (IPUMS) was used to draw the results of the study. The researcher also used data of Birth Registration Area in 1920's. The results were withdrawn by linking all these variables with Birth and Infant Death Files from national Center for Health Statistics (1991). The results were in line with the assumptions and showed that infant mortality was directly affected by socio economic factors such as father and mother education and working status, ethnicity, race, income of house hold, and place residence. All these variables resulted in gradual increase of both the variables. On the other hand, inequality remained unaffected over 20th century in United States.

Kabir et al., (2011) probed into early childhood mortality and its allied factors in Bangladesh. The study focused on demographic, socioeconomic and health care determinates of childhood mortality in Bangladesh. Data from Bangladesh demographic and health survey (2004) was analyzed through logistic regression for various independent variables such as mother's age at birth, child sex, birth interval, birth order, No. of living children, place of residence, region, mothers educational level, source of drinking water, access to safe sanitation, habit of reading newspaper and magazine and TT injection during pregnancy. The results showed that some of

the variables like birth interval, birth order, and no. of living children were directly and significantly affecting childhood mortality in Bangladesh. Other factors like mother's education, source of drinking water, access to safe sanitation, exposure to media, also bore positive effects on childhood mortality but were insignificant.

Zahid (1996) has analyzed the impacts of mother's health seeking behavior (during prenatal, neonatal and post natal period) and childhood mortality in Pakistan. The study examined patterns of health seeking behavior of mother at various stages and its effect on childhood mortality. The study also compared effects of socioeconomic factors and demographic factors on childhood mortality. Lastly the study established relationship between health seeking behavior and childhood mortality while demographic and socio-economic factors were taken as controlled variables. Pakistan Demographic and Health Survey (PHDS) (1990-91) data was used for analysis. Bivariate analysis approach for analysis of the data was applied. Along with this logistic regression was used to see the net effect of each variable on infant and child mortality. Maternal education, place of residence, sex differentials, place of delivery, breast feeding, immunization effect, drinking water supply, toilet facility, age of mother at birth, birth order of child were considered as the basic indicators for child mortality. Mother's education and health care affected child, neonatal and infant mortality significantly. On the other hand, mother's high education resulted in significant decline in child mortality. In case of birth order mortality rate was higher at the first as compared to second and third order. The study recommended that health services and education be increased in order to decrease the child mortality rates.

Ali (2001) established a relationship between poverty and different correlates of child mortality in Pakistan. The Multiple Classification Analysis (MCA) technique was used to analyze the data taken from Pakistan Socio-Economic Survey (PSES), 1999. The impact of mother's education, mother's employment status, dwelling crowding, housing condition, socioeconomic condition

(electricity, gas), housing sanitation, and nutritional status were taken as indicators of poverty and their effect was checked on child mortality. The results showed food poverty, electricity and mother's work participation in rural areas results in higher child mortality rates in rural areas as compared to urban areas. Beside these all other variables showed significant and positive results on the child mortality.

Arif et al., (2012) have probed into socio-economic determinants of child health in Pakistan. The study focused on various areas of child health like geographical variation in disease incidence (different ecological zones), relationship between child health and economic factors and child immunization on child illness. Pakistan Social and Living standard Measurement survey (PSLM) of 2009-10 data was used for analysis. The results of the study were withdrawn with the help of logistic regression. Child's characteristics: age, sex; parent's characteristics: mother's age, mother's educational and employment status; household characteristics: total no. of children born and having construction material, economic factors, poverty status, ownership of agriculture land and livestock, environmental factors, source of drinking water, toilet facilities, access to electricity,; regional characteristics,: health seeking behavior, child immunization were taken as the factors effecting child mortality. The economic factors such as land and livestock had not only positive impact on child health but they were also observed important for child health in all zones of rural and urban areas. Child mortality and economic position of household were found to be inversely related, as better economic status grants access to better health facilities. Parent's characteristics had the same impact on child health as economic factors.

Rayhan and Khan (2006) analyzed impact of demographic, socio economic, behavioral, environmental, health related factors in Bangladesh on nutritional status of children under the age of 5. The data of Bangladesh Demographic and health survey 1999-2000 was used for analysis. Cox's linear logistic regression model's multivariate and bivariate analysis was done to

recognize the determinants of malnutrition among the children under the age of 5 years. The results of the study showed that previous birth interval, size at birth, mother's body mass index and parent's education were the major factors which affected the nutrition status of the children in the area. Along with this the study also showed that the children from bigger families faced the problem of malnutrition in Bangladesh.

WHO (2017) indicated various environmental issues directly affecting the child health over the past two decades. The report highlighted that more than one out of four children are dying under the age of 5 years due to environmental issue. In another estimate 1.7 million children die each year due to environmental problems. The mortality rate in children is increasing day by day due to environmental degradation. The increase in industries in the rural areas is adding fuel to the fire. These industries cause increased emission of $CO_2$and hence the environment is over polluted. In this way the health is getting affected badly.

The fertility rate in women is decreasing as per Pakistan Demographic and Health Survey reports (2017-18). The report shows that the fertility rate has declined from 5.4 births per woman in 1990-91 to 3.6 births per women in 2017-18. The mortality rate is following the same pattern as the fertility rate in Pakistan. The mortality rate has decreased from 112 deaths per 1,000 live births in 1990-91 to 74 deaths per 1,000 live births in 2017-18. The infant mortality rate has followed the same path but its magnitude is less as compared to fertility and mortality rate under the age of 5 years. The infant mortality rate has declined from 86 (1990-91) to 62 (2017-18) deaths per 1,000 live births. The case of vaccination as highlighted in this report is irregular because of access to the health facilities in different areas. About 66 percentage of child age between 12-23 months received all types of vaccinations as the health care facilities were easily accessible to them. On the other hand, the remaining received only appropriate vaccinations, and

still there are 4 percent who did not receive vaccination at all. The control on infant and child mortality has increased over time due to increased nursing facilities in the same time.

Iqbal and Nawaz (2015) studied and analyzed health poverty profile in Pakistan. They compared data for two years of household from Pakistan taken from Social and Living standards Measurement (PSLM) survey of (2012-13) and 2008. The study was conducted at MOUZA level. Alkire foster (AF) method and logistic regression model were used to estimate the health poverty and socioeconomics determinants. 41 percentage overall health poverty in Pakistan was observed in this study. The study shows that health poverty is very high in rural area as compared to urban areas. The difference of health poverty at province level in Pakistan is also analyzed and highlighted in this study. Baluchistan is at the top among all provinces having high health poverty while Punjab is lowest. The study indicated that majority of the households had no access to healthcare facilities. The study further divided the households into various categories. In these almost 11.5 percent had no access to the pre-natal care facilities and 21.8 percent had no access to post-natal care facilities. On the hand, 14.8 percent had no access to child immunization.

Various studies have been conducted on malnutrition in different areas. As per Heinekens et al. (2008) more than 50 percentage deaths of effected children is caused by malnutrition globally. Almost one third of the children die to severe malnutrition. Gross and Webb (2006) had ranked Pakistan at the highest position of malnutrition in the world in 2006.As per there analysis 43.7 percent stunting is caused in Pakistan. After Pakistan the second highest position is occupied by India in terms of wasted children. In the southeastern three countries i.e. Bangladesh, India and Pakistan about 78 percent children of the world are wasted.

As per report of Aga Khan University Pakistan, published in 2011 stunting, wasting and micronutrients malnutrition is found in Pakistan at much higher levels. The major causes for these as highlighted in the same report are dietary deficiencies, poor maternal and child health and nutrition, a high burden of morbidity and low micronutrient content in the soil i.e. iodine and zinc. All the factors highlighted above are considered not import important rather essential for growth, immunity and mental development of children. The other important factors which work at the base line to increase malnutrition in Pakistan are poverty, high illiteracy rates among mothers, food insecurity, infant feeding practices and lack of access to age-appropriate foods.

Arif et al (2012) studied malnutrition in Pakistan from 2000 and 2010. Estimates of poverty and health status of children and their mothers were taken into consideration for analysis. Malnutrition changed behavior in Pakistan was difficult to ascertain hence variables like household and community level for individuals were used in this study. The study focused on child illness, mother's health and poverty status of households. The results of the study were bit shocking as no association between poverty and malnutrition or food shortages and malnutrition was found. Rather the study indicated that child illness in addition to child's and mother's nutritional status, environmental factors and poor healthcare facilities were the major causes of child malnutrition.

Makoka (2013) in a study tried to establish a relationship between maternal education and children's nutritional status. The study was conducted on a data from three African countries, i.e. Malawi, Zimbabwe and Tanzania. Further data used in this analysis was taken from Demographic and Health Surveys (DHS). The major measures of nutritional status, i.e. stunting, wasting and underweight were observed in the sample children below the age of 5years.Pearson Chi-Square Test of independence and bivariate analysis technique was used to estimate and analyze the data. Along with this logistic regression was also used in this analysis. As per results

of the study importance of the mother's education for improved child's nutrition was categorized at the top. The other two indicators stunting and underweight were improved in Malawi after 9 years of schooling in Tanzania and Zimbabwe after 11 years of schooling.

Buror (2003) used the Ghana Demographic and Health Surveys (GDHS) to study the relation of mother education and the survival of their children. The effects of mother education, antenatal care, nutrition of mothers, nutrition of children and postnatal care were analyzed on child malnutrition. Along with this prevalence of various diseases and their effect on malnutrition of children were checked against mother's education. The results of the study showed that mother's education was directly affecting malnutrition in the area. The study also indicated that in Africa malnutrition was causing child mortality to the greater extent. The results clearly showed the difference between illiterate mothers and mothers with secondary education or above. The scale used for measuring malnutrition was weight for age and height for age.

Kaneta K. Choudhury (2000) probed into the health status of young girls and boys in Bangladesh and difference between them firstly the study explained the gender bias through various socio-economic, demographic and health related factors. Mid-upper arm circumference (MUAC) method was used to measure malnutrition. The study took sample of 2016 children less than 5 years of age. The ratio of malnutrition was found higher in female as compared to male, i.e. female; 54.2 percent, male; 45.8 percent. The age of children, education of the head of the households and use of immunization services were found to be significantly affecting this gender gap in logistic regression analysis. Due to the social factors and culture it was revealed that the girls were about 44 percent more malnourished as compared to boys. The results of the study also showed that the mother's age and increased education resulted decrease in malnutrition of children.

Raj A et al. (2015) analyzed malnutrition in India, Nepal and Bangladesh in the children under age of 5 years. Demographic and Health Surveys of the three were used for data. A multinomial logistic regression was used to check relationship between number and sex of siblings and malnutrition. The fate of girls being stunted was dependent upon number of brothers. As the number of brothers increased the girls in the household got stunted while the boys faced no such effects due to girls. However, overall increase in the number of siblings also affected boys in the household. For other variables like being underweight girls were more affected as compared to boys. Similarly, the results for wasting were also more common in girls who had brothers. However, boys were not found to be malnutritioned by the presence of siblings.

Wamani H et al. (2007) probed into sex difference and its impact on malnutrition. The study sample was taken from 10 Sub-Saharan countries. The data used for analysis was taken from 16 demographic and health surveys (DHS). The focus of the study was to analyze Sex difference and stunting rates in the children under the age of 5. The major factor considered in this study was household socio-economic status. For data analysis t-test, chi-square test and binary logistic regressions were used. The results of the study were in line with the assumptions, as the stunting rate was higher in males as compared to females. The results also showed that the poor class almost 40 percent of the households had stunted males as compared to females in the same group. Similarly, sex differential was found to be at peak in the lowest socio-economic groups.

Ayaya et al. (2004) studied effects of vaccination on the malnutrition. The study showed that the children having not completed the vaccination for communicable diseases are prone to malnutrition. Similarly, Hossain et al. (1999) also showed in a study for Bangladesh that in case of incomplete Bacilli Chalmette-Guerin (BCG) vaccination against TB Protein Energy malnutrition is possible. The same study had recommended that promotion of education and important vaccinations can reduce the occurrence of PEM.

The Human Development Report (UNDP 2006) showed that diarrhea causes death due to poor WASH conditions of about 1.8 million in children under five. It is evident from the data that deaths caused by diarrhea are more as compared to tuberculosis or malaria in the world. Caulfield et al. (2004) has also established that diarrhea is more likely to cause death as compared to other diseases. The results of the study showed that with diarrhea probability of malnutrition is 60.7 percent, with pneumonia is 52.3 percent, with measles is 44.8 percent and with malaria is 57.3 percent. Repeated and regular episode of these infectious diseases pave the way for malnutrition in children under the age of 5.

Ochoa et al. (2004) showed that there was a cyclical relationship between, poverty, poor personal, domestic and community hygiene and early weaning. As per WHO (2013) WASH conditions can play the role of life savior by controlling infection like diarrhea and hence malnutrition in the developing world. In a bigger spectrum malnutrition as well as inadequate WASH conditions can be linked to the poverty easily. Firstly repeated diarrhea causes loss of nutrition and then in return malnutrition causes infectious diarrhea, in this way a reinforcing vicious circle is established amongst children in developing countries. As per United Nations (2013) report almost 7 billion people in the world including 2.5 billion people from the rural areas, do not have proper sanitation and even 1.1 billion people still defecate in the open.

Ferdous et. al (2013) studied the relationship between diarrhea and malnutrition in children under the age of 5 years. The study was conducted on primary data collected from 2324 children admitted in different hospitals of Bangladesh. The children suffered from Mild Disease (MD) and Moderate to severe disease (MSD). The study took into consideration disease severity, age of the child, mother's schooling and monthly household income as the significant factors. A multivariate analysis was carried out in order to draw the results. The results of the study showed that children suffering from MSD were more prone to the malnutrition as compared to the

children having MD. The study also showed that the malnutrition caused death in children suffering from MSD.

Semba et. at (2011) studied the impact of diarrhea on child mortality in low and middle income countries. The authors used existing literature to collect the data. In the literature multiple diseases were treated as cause of death in children. Further the researchers constructed a logistic model to estimate the country and area wise mortality proportions contributed to diarrhea. The literature used for data collection was from 1980 to 2009. The results of the study showed that in America diarrhea caused almost 10 percent of the deaths in the children while in South-east region it caused 31.3 percent deaths.

2.3 Empirical evidence of Child Poverty in Pakistan

The case of Pakistan is same like the world in terms of declined infant death rates. In Pakistan child mortality has declined from 90 to 65/1000 live births for the same duration (The World Bank 2017; World Health Organization 2017). As per the report number of babies in Pakistan who died before completing the first year of life was about 330,479. It is also assumed as one of the highest infant mortality rates (64 per 1000 live births). If the same is compared with European Region, it is almost eight times higher, where in European Region it was recorded as 8 per 1000 live births (WHO, 2017).

Khan et. al. (2019), in their research study, “Determinants of stunting, underweight and wasting among children less than 5 years of age: evidence from 2012-2013 Pakistan demographic and health survey” stated that young age malnutrition is a basic general health issue in Pakistan. The study planned to investigate factors related with malnutrition in Pakistani children (less than 5 years old) utilizing the Pakistan Demographic and Health Study (PDHS) 2012–2013. A sample of 3071 Pakistani children 0–59 months in age from the PDHS 2012–2013, with complete

anthropometric estimations were taken for the research. Nutritional status was assessed utilizing anthropometric indicators; height for-age, weight-for-stature and weight-for-age, as intermediary proportions of three types of under-five malnutrition including wasting, stunting and underweight. Uni and multivariate binary logistic regressions were used to look at the relationship between maternal socio-economic and children level factors, (for example, child sex, age, size at childbirth, antenatal clinic visits, late diarrheal rate and breastfeeding status) and three intermediary proportions of kid healthful status.

The recent trend of women's autonomy and their social and economic status has important implications for their children's health. Overall gender inequity has remained an important determinant of women's and children's health in Pakistan. As compared to men, Pakistani women have always scored poorly on the United Nations Human Development Index. The statistical data of population show that most women in Pakistan are poor, illiterate and have low social and legal status (Patel 1991). The same fact is also evident from the fact that maternal mortality is among the highest in the world (Midhet et al. 1998). However, there were some improvements in the legal status of women in the early 1960s, which has resulted in betterment of life standard of women in Pakistan, but these advances were reversed because of a government-encouraged "Islamization" process that started during the late 1970s and continued through the 1980s.

Rabbani & Qayyum (2018) in their study "Comparative analysis of factor affecting child mortality in Pakistan" explored determinants of child mortality in Pakistan. Pakistan is among one of the five nations who have the most noteworthy child death rates on the planet. Studies regarding the matter have discovered broad variety of reasons for child mortality. The study used micro data of Pakistan Demographic Health Survey (PDHS) of 2006-07 gathered by National Institute of Population Studies (NIPS). It is established this study that neonatal death rate is high

for Pakistan. In statistical analysis, binary logit model was estimated by means of Maximum Likelihood Method (MLM). The study puts focus on the impact of wealth, mother's education, exposure to media and ethnicity. Impact of moms' education, economic status, and exposure to media discovered huge determinants of child mortality in Pakistan. Information on state of a subject at national and local level gives essentials for forming productive polices to address the Problem.

Mansuri, (2006) probed into inter regional migration, sex bias and child growth in rural Pakistan. Due to climate differences coupled with resources restrains People migrate temporarily from one place to another and even to other countries. The number of migrants from a single family abroad can be easily determined from the amount of remittances sent back. The rural areas are mostly dependent upon the agriculture income and hence face greater rates of uninsured income risk. However, the study has focused on early child growth in the rural areas with agricultural settings. For analysis primary data was collected from rural Pakistan. The study also highlighted another important social thinking where son preference is substantial and inevitable. The result of the study showed that the migration factor greatly effects the growth of young girls as compared to the older ones. Similarly, the migration factor also increases the gap between the siblings and hence provides greater opportunity of survival. Along with this the migration factor provides intergenerational benefits and thus the nutritional and other health tremors are avoided easily in early child hood for girls.

Mahmood & Kiani (1994), in their study, “Health care determinants of child survival in Pakistan” analyzed wellbeing and survival status of children. These are significant indicators of social prosperity, have become subject of incredible worth in Pakistan recently. The accessible writings recommend that baby and infant mortality rates in Pakistan are high even with regards

to the Asian locality and progress in wellbeing and survival of infants has been substantially less than the ideal level (World Bank, 1993).

Despite the fact that estimates of child and infant death rates as got from different sources in Pakistan show incredible variation, the statistical evidences demonstrates about 58 percent of all passing's happen among kids under five years old, 36 percent leave this mortal world at early stages of life and the greater part of all newborn child death happen in a month after their birth [Irfan (1986); Afzal et al (1988); Farooqui (1988); Sathar (1994)]. Perceiving the way that the majority of these deaths could be reduced, it is necessary to understand and study the important factors that affect the chances for survival in the infant stage of the children. These factors include education of the parents, health care facilities, hygiene factors and other environmental factors.

Bennett (1999), in his research, "Correlates of child mortality in Pakistan: a hazards model analysis" studied factors related with child mortality in Rawalpindi, one of the huge urban communities of Pakistan. The study used anthropological and demographic methods to conduct research. The basic purpose of this research was to understand the processes by which link is established between child mortality and its covariates. Controlling for the financial status as a determinant of child mortality, the study sample was constrained to a lower pay layer living in a homogeneous condition where all family units had equivalent access to wellbeing related and different facilities. Results of the proportional hazards model analysis on 1301 index children suggest that non-monetary variables like maternal wellbeing, attitudes and behaviors were identified with high child mortality. The social standard of bearing an enormous number of kids was the most critical factor. Other factors which followed were contraceptive use, current age of the mother, age at marriage and the hygienic conditions of the household. The study gives solid proof of familial grouping of mortality by order of the family.

2.4 Health care policies and Child Poverty

Fayehun, (2010) in his study, "Household environmental health hazards and child survival in Sub-Saharan Africa." explained and analyzed that house hold environmental and hygiene factors are the reason for high child mortality rates in the world. For this purpose, he took sample from the Sab-Saharan Africa and selected 8 countries. These countries were further divided into categories on the basis of high and low child mortality rates. The factors of all these countries were compared. The results were stunning, as the countries with compromised house hold environment, low socio-economic maternal status and poor hygiene conditions faced high mortality rates as compared to the ones with relatively better house hold environment and other factors. Comparing the statistics of under five-year child mortality rates in these countries one can easily say that the household environmental conditions and child mortality are negatively related with each other.

High child mortality rates were observed in the 18^{th} and early 19^{th} century. However, the global annual infant death rate has declined from with the passage of time. This declined is contributed to various factors. These factors include accessibility to the modern day facilities, high level of education and better health care centers. The studies show that child mortality rate in 1990s was 8.8 million (65 deaths per 1000 live births) while now it has declined to almost 4.1 million (29 deaths per 1000 live births). Further studies show that about three-fourth of all deaths of children < 5 years old had occurred within the first year of life in 2017.

The studies show that high infant mortality rates also have negative implications of rapid population growth: parents fear that their newborns are not going to survive to older ages and hence they tend to have more children. As per reports (UNICEF, 2018) Pakistan is already the sixth most populous country in the world. Along with this it scores very poorly on all indexes of

human development and its political stability in the long run is threatened. This instability may result due to unequal access to the limited economic resources.

On the other hand, socioeconomic inequalities have emerged due to the concentration of political power in the powerful rural elite. Poor economic and political management and the belief among the upper classes that rapid economic growth will trickle down to the poor is adding more fuel to the fire. An important aspect of lack of attention to distributional issues (Naseem 1981; Zaidi 1985) has contributed to substantial differences in access to income, nutrition, education, housing, water and sanitation within and between different regions. This fact has further resulted in high infant mortality rate in the poor and degenerated class of the society.

About 44.4 percent of under-five children were stunted, 29.4 percent were underweight and 10.7 percent were squandered. Children whose moms lived in rural regions (OR = 0.67, 95 percent CI 0.48–0.92), were of age ≥18 years at marriage (OR = 0.76, 95 percent CI 0.59–0.99) and had visited antenatal clinics at multiple occasions during pregnancy (OR = 0.61, 95 percent CI 0.38–0.98) were less prone to be hindered. Mother's low educational level (OR = 2.55, 95 percent CI 1.26–5.17), short height (OR = 2.31, 95 percent CI 1.34– 3.98), small infant size during childbirth (OR = 1.67, 95 percent CI 1.14–2.45) and mother's BMI were fundamentally connected with child's underweight status. Children whose moms had no training were bound to be squandered (OR = 3.61, 95 percent CI 1.33–9.82). The study proposes that the majority of the variables analyzed that represented lack of healthy sustenance in Pakistani children, (for example, mother's age at marriage, educational level and moms' nourishing status) are preventable. In this manner, to decrease the level of malnutrition steps that can address these variables are required; such as community-based education and targeted nutritional steps.

Engdaw (2017), in their research named, “Household environmental health hazards’ effect on under-five mortality in sub-Saharan Africa: What can we learn from the Demographic and Health Survey?” studied and analyzed the important environmental and other house hold hygiene factors and also checked its impact on child mortality. Family hygiene and environmental health hazards are pathogens and chemicals in the family that can mess up health issues. In this research, the authors survey their impact on under-five mortality in 12 sub-Saharan African nations. They analyzed data from the Demographic and health Surveys. Principal component analysis (PCA) was used to measure house hold hazards by using following indicators: sources of water and its area, type of toilet facility, flooring material, kind of wall, sort of roof and sort of cooking fuel. In an unadjusted multilevel discrete-time hazard model, the authors found that house hold hazards influence child mortality in 9 of the 12 countries positively, while this impact introduced itself just in 4 countries when controlling for different covariates.

Using a model with correlation between the child age and House hold hazards, it has been shown that discovered that increased levels of the house hold hazards are reliably related with increased danger of death during 24–59 months after birth in eight countries. Future studies are expected to translate the instruments behind these findings, regardless of whether clarified by the amassing of risky condition in childhood or continuous contact with toxic conditions at a later phase of youth, or both.

Jayewardene 2014 probed into the causes of child and maternal malnutrition in urban areas of Sri Lanka. Demographic and Health Survey 2006-07 of Sri Lanka were used as primary sources for data collection. Probit model was used in order to determine the determinants of child and maternal malnutrition. The results of the study showed that various factors causing malnutrition were inter related with each other. For instance food security, life cycle of malnutrition, alcoholism, poor social and economic conditions and the inadequate education and knowledge of

women combinly caused malnutrition at bigger levels. The study pointed out that wrong kind of food intake, consumption of less protein rich food and use of alcohol are the prominent reasons of the vicious cycle of malnutrition.

Singh et al., (2011) in their study have tried to explore the relationship between various factors. These factors included child malnutrition with child mortality, female literacy with poverty and have also correlated the geographic regions that were disadvantaged in terms of female literacy, wealth and child nutrition with malnutrition. For data household survey of 1992-1993, NFHS 1998-1999 and DLHS 2002- 2004 were used as sources. For simplicity, analysis and easy understanding geospatial classification the whole of India was divided in to 76 natural regions. This division was made with reference to agro climate scheme. The results of the study show that there are sever inequalities among the regions regarding malnutrition and infant mortality. These differences were drawn in intra state and inter regional areas in India. On the other hand, mother's education effects child malnutrition heavily as compared to economic status of the family.

Smith et al., (2004) analyzed and compared child malnutrition in rural vs. urban areas in 36 developing countries. The fact that child malnutrition is higher in rural areas as compared to the urban settings is dependent upon various factors. It is an established fact that the environment, challenges and opportunities are different in rural areas as compared to the urban areas. Keeping in view these differences the factors that affect child malnutrition in both the areas are different and hence need to be chalked out. The data used in this study was taken from the health and demographic surveys of thirty-six developing and underdeveloped countries. For socio economic factors women's status and education, availability of and access to safe water and sanitation, household economic conditions and status were considered for analysis in this study. The results of the study show differences in the nature of socioeconomic elements and various other factors

with reference status of child malnutrition across urban and rural areas. The result of the study also showed that there are various points at which the urban areas get benefited in terms of child malnutrition status as compared to the rural areas. These factors included birth, prenatal and maternal care, quality of complementary nurturing, and immunization of children. All these factors are available in the urban setting while are missing in the rural settings.

Chapter 3: Data and Methodological Framework

3.1 Introduction

This chapter consists of four sections. First section includes data source and sample population used in this study. The second section is about the theoretical framework of the study. The third section explains the variables and their characteristics. The last portion is about the methodology used in this study, including the econometric modeling and statistical techniques used in this study.

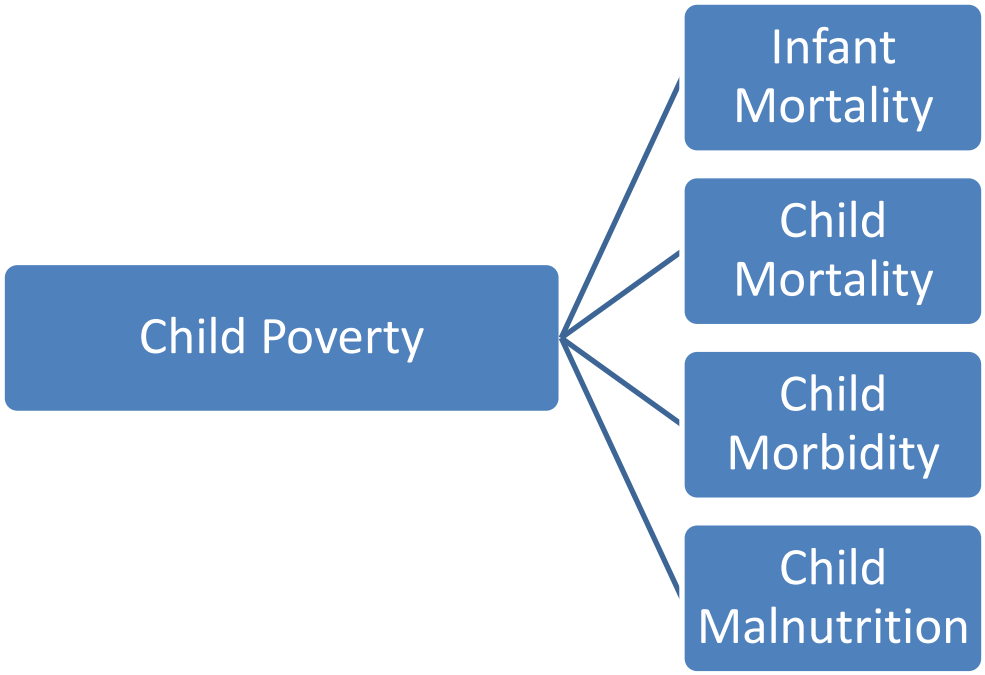
3.2. Child Poverty

Child poverty is a global problem. The international social organizations like UNICEP, UNDP and WHO along with the leading financial institutes like IMF have devised various projects from time to time to elevate the child poverty. Child poverty can be defined as, “The children who lack food, sanitation, shelter, education and health care needed for survival are poor”. In light of the above said definition we can say that main indicator of child poverty are threefold, i.e. child specific characters, mother specific characters and household specific characters. These characteristics are numerous in number and need consideration in detail.

The world leading organizations have differentiated child poverty into two types of poverty. The first type which is very common throughout the globe is multidimensional child poverty. The multidimensional child poverty covers food, health, sanitation, education, living conditions, nutrition and water. It can also be considered as direct indicator of child poverty. The second type is that of monetary child poverty. The monetary child poverty covers the financial side of the poverty faced by the children. It is well established in the literature that the monetary child poverty is directly linked to the multidimensional child poverty. In other words we can say that if

the monetary child poverty is addressed properly than the multidimensional child poverty will be addressed in itself.

This thesis has divided the indicators and effectors of child poverty into four major groups. The division is of two types. The first type includes indicators of the child poverty which are Infant mortality, Child mortality, Child malnutrition and Child morbidity. These indicators are also shown in the diagram below. The second type is further subdivision of these indicators into the effectors. The effectors again have three categories, i.e. child specific characteristics, mother specific characteristics, household specific characteristics and environment specific characteristics. The details of each of this sub division, termed as independent variables is given in the next section of the thesis.



3.3 Data Source and sample population

This section explains the source from where data has been collected and used in this study and also specifies the sample population and its characteristics

3.3.1 Data Source

In this study data has been used from the Pakistan Demographic and Health Survey, 2017-18. PDHS collects data for vide range of variables from the eligible household throughout the country including AJK and GB. The data includes health care, social characteristics and economic indicators.

The data regarding infant and children was collected from married women of age between 15-49, children up to the age of 5 years and married men between the ages of 15-49. PDHS 2017-18 collected data from 11869, 1697 and 974 households from Pakistan, AJK and GB respectively. This data set included eligible women from Pakistan 12364, from AJK 1720 and from GB 984. On the other hand, ratio of men included in this survey is much lesser as compared to the women. Only 3145, 336 and 210 men were included from Pakistan, AJK and GB respectively. The response collected from the household regarding their children was considered as response of the child and was further used to calculate child poverty infant and child mortality rates, child morbidity and child malnutrition. It is one of the limitations of the study that direct response from the concerned children is not possible.

3.3.2 Sample population

In this study PDHS 2017-18 data is used which includes women in the age of 15-49 years. The data used includes children under the age of five years. As given in the above section the data is collected from 11869 household which included 12364 women in the range of eligible defined age. A big chunk of these household were taken from Punjab as the population share of Punjab is

much higher than other provinces. The data was collected from the households regarding their children for all the relevant fields needed to determine child poverty. Hence, the same sample is being used in this research.

3.4 Description of Variables

For this very research different variables are used to see effects on child mortality, infant mortality, child morbidity and child malnutrition. The variables which are effecting these variables can be divided into various categories as under;

1. The first category is maternal characters, i.e. mother's age, mother's education, mother's height and weight and last but not the least mother's occupation.
2. The second category is that of biological factors, i.e. size and weight of the child at the time of birth, child being single or twin, interval between the child birth and age of the child.
3. The third category consists of environmental factors. These factors include household type, household size, access to clean drinking water and sanitation, toilet facility, and wealth index.
4. The fourth and last category is that of behavior factors. These factors are vaccination of the child, breast feeding, family planning and antenatal visits.

3.4.1 Dependent Variables

1. Child Poverty: Child poverty can be defined as, "The children who lack food, sanitation, shelter, education and health care needed for survival are poor". The child poverty is determined through a set of variables like infant mortality, child mortality, child morbidity and child malnutrition.

2. Infant Mortality (0-11) months: The infant mortality refers to the death of infant within first year of its birth. Variable will be 1 if child died within first year of birth and 0 otherwise. The data used for this variable is from all over Pakistan as gathered by the PDHS 2017-18.

3. Child Mortality (12-59) months: The term child mortality refers to the death of child in between the age of one year to 5 years. A binary dummy is used for this variable, wherein the death of child is indicated by 1 and survival of the child is indicated by 0.

4. Child Morbidity (0-59) months: Morbidity refers to an incidence of ill health in a population. We will calculate it through ARI & Diarrhea, as there are no direct measures to calculate this very variable.

5. ARI (Acute Respiratory Infection) (0-59) months: Acute respiratory infection is an infection that may interfere with normal breathing. The ARI can affect either the upper respiratory system, which starts at sinuses and ends at vocal chords, or the lower respiratory system, which extends from vocal chords to lungs. Variable will be considered as 1 if the children under 5 year age have symptoms of ARI and 0 otherwise.

6. Diarrhea: Diarrhea can be defined as having loose and watery stools three or more times a day in a child. Diarrhea is again divided into various categories depending upon the consistency and persistency of the loose stools. Hence the diarrhea can be acute, persistent, or chronic. Variable will be considered as 1 if the children under 5 year age have diarrhea and 0 otherwise.

7. Child Malnutrition (0-59) months: Malnutrition is a broader term and is defined in number of ways. However, malnutrition includes both extremes of nutrition in children. On one side there is under nutrition, which is classified into stunting, wasting, underweight and mineral deficiencies. And on the other side is overweight and obesity. Both these conditions hamper the normal growth of a child. However, in this study we will consider the under nutrition only.

8. Stunting: Stunting can be defined as when the child has low height to age. It means that child has not acquired height according to his age. This thing arises from malnutrition of child, repeated infections and poor social stimulation.

9. Wasting: Wasting can be defined as "low weight to height ratio". It means that the child has not acquired required weight as compared to his height. This situation again rises due to various reasons like malnutrition, infections etc.

10. Underweight: Underweight can be defined as "having low BMI". The literature shows that usually when the BMI is low than 18.5 than the child is underweight. There are many reasons which attribute to being underweight.

3.4.2 Independent Variables

1. Gender of the child (GC): Gender of the child reflects the biological and physical construct of the child. It is divided into two categories, i.e. Male, which will be represented by "1" and female represented by "0".

2. Age of the child (AC): The age of the child is calculated from the date of his/her birth. Hence the number of living days, months and years are the units for measurement. In this study month is taken as basic unit and the age of the child is categorized into 6 different categories. These categories are, No of living months <6 = 1, (6-11) =2, (12-23) =3, (24-35) =4, (36-47) =5, (48-58) =6.

3. Birth size of Child (BSC): The size of child can be defined as the size of the child at the time of birth/ delivery of the child. In this study we have considered three birth sizes, i.e. small, average and large.

4. Birth Order (BO): The birth order in study is taken as number of the child in overall siblings. From this we can say that birth order is one if the child is first to his parents and so on.

5. Birth Interval (BI): Birth interval means the time period between the births of two consecutive children. In this study we have taken five categories for the birth interval variable. The first category of birth interval is less than 17 months, second is 18 to 23 months, third is 24 to 35, fourth is 35 to 47 months and the last one is 48 to 60 plus months.

6. Tetanus Injection (TT): Tetanus injection is given to the child in early age. In this study if the child is vaccinated with tetanus injection than its value will be 1 and 0 if not vaccinated.

7. No. of sibling (NS): Number of siblings is defined as the total numbers of sisters and brother a child under consideration have. The variable is divided into various categories depending upon the number of siblings. The different categories are as under. If the child has no siblings then it will be represented by "1", (1-2 siblings) =2, (3-4 siblings) =3, (5 plus siblings) =4.

8. Mother age Current (MAC): Usually the age is calculated in by living day/ months or years. In this study our unit of calculation for age is years. Hence different categories are formulated for the fertile and significant age of the mother. These categories are as under. (15-19 years) =1, (20-24) =2, (25-29) =3, (30-34) =4, (35-39) =5, (40-44) =6, (45-49) =7.

9. Mother education (MED): The mother education is defined as the total number of years of schooling that the child's mother have. It is divided as, No education =1, Primary =2 (MEP), Secondary =3 (MES), Higher =4 (MEH).

10. Mother employment status (MES): Mother Employment status is defined as whether the mother of the child is working for consideration of money or not. In this variable the age of women is taken as that of fertility age and the employment status is considered from 12 months preceding the PDHS survey 2017-18. The variable is represented with "0" if the mother is currently employed and is represented with "1" when the mother is not employed.

11. Assistance Delivery (AD): The assistance delivery can be defined as the person present at the time of delivery of the child to assist the mother. In this variable we have only two categories, i.e. skilled assistant and unskilled assistant.

12. Mother BMI: Body Mass Index (BMI) can be defined as "a person's weight in kilograms divided by the square of height in meters". On the basis of this definition the variable is divided into various categories as given below. Underweight =1, Normal =2, overweight =3.

13. Mother Smoking (MS): Mother smoking refers to percentage of married women in fertile age 15-49 who smoke various tobacco products, keeping in view the background characteristics and maternity status according to background characteristics and maternity status. The variable is simply divided into two categories, i.e. Smokes =0, Does not smoke =1

14. Water Source (WS): Access to clean drinking water is defined by the quality of water the household is using. This determines the source of water and also determines the improved/ unimproved sources of water. The variable has two basic categories, i.e. improved sources = 1 and unimproved = 0. Both these categories contain following sources of drinking water; Piped into dwelling/yard/plot, Public tap/standpipe, Tube well or borehole, Protected dug well, Bottled water, improved source for cooking/hand washing, Filtration plant, Otherwise.

15. Toilet facility (TF): Toilet facility can be defined as a space that contains a lavatory and a toilet. This definition also includes modern and improved toilet systems. The variable toilet facility is divided into following three categories. Improved toilet facility = 1, unimproved toilet facility = 0

16. Soap Facility: Soap facility is the availability of soap to the households. If the soap is available than its value is 1, otherwise its value is 0.

17. House Floor (HF): Type of house can be explained keeping in view the material used in construction of the house. On the basis of construction material the variable is categorized as follows; Kacha =0, Pakka =1.

18. Number of Rooms: The Number of rooms is taken on the basis living rooms present in the house where child is growing. In this study the category includes rooms from one room to 22 rooms in the house.

19. Kitchen (K): Separate kitchen is the cooking place designed specifically for cooking. In this variable there are only two categories, i.e. separate kitchen = 1, No separate kitchen = 0

20. Cooking Fuel (CF): The variable cooking fuel can be defined as "the source used for heating and cooking in a household". The variable is categorized as, Clean Energy=1, Not Clean=0

21. Water Treatment (WT): Water treatment can be defined as any process done to the water to make it safe. If the water is treated than its value is 1 and if not treated than its value is 0.

22. Exposure to media (EXM): Exposure to media is related to the mother of the child. This variable can be defined as "exposure of married women (15-49) to specific media on weekly basis in percentage, keeping in view the background characteristics." Further the media is divided into following categories. Exposure to media yes =1 and when not exposure to media than no =0.

23. Wealth quantile (WI): The wealth index is simply defined as a composite measure of a household's cumulative living standard. The variable is divided into the following categories. Poorest =1, Poorer =2, Middle =3, Richer =4, Richest =5

24. Region (RGN): The region variable is defined as "whether the place of residence of the household is in rural settings or in urban areas. The variable is defined by a binary dummy in which the urban area is represented by "1" and rural area is represented by "0".

25. Province (PVN): In this variable the total territory of Pakistan is divided into 5 regions as, Punjab =1 Sindh = 2 KPK =3 Baluchistan = 4 GB=5 AJK=7

3.5 Methodology

3.5.1 Bivariate and Multivariate analysis

As explained in the data we are dealing with a complex data set. Basically the impact of environmental hazards on child poverty will be determined indirectly. For this purpose we need to see impact of different environmental factors, biological factors, social and economic factors on different variables like child mortality, infant mortality, child morbidity and child malnutrition.

This analysis will be focused on the results as whether the child has chances of survival at infant stage and/or under the age of five years. Along with this it will also be observed that whether the child is nourished properly or is facing the situation of malnutrition. All these results will sum up to the conclusion of different environmental factors and its link with the child poverty in Pakistan.

3.5.2 Logistic regression analysis

In bivariate and multivariate analysis cross tabulations are used to establish the link between various independent variables and the dependent variables. Now the logistic regression analysis will help us predict the success of the explanatory variables and their significance in the model. As the data used for this study is secondary as well as most of the dependent variables are binary in nature, hence LOGIT model is proposed to estimate the effects of different variables on child mortality and child morbidity. For this purpose, following econometric models are formulated. The first model will capture the impact of different factors/ variables on the infant mortality in Pakistan. In this model different household environmental variables, hygiene variables and socio-

economic variables are considered. The second estimates the effects of different factors on child mortality. In the third model child morbidity and its effective variables like diarrhea, fever in early stage and Acute Respiratory Infection (ARI) are considered. The two main variables of child morbidity are again estimated separately through a set of equations. The last model is formulated to estimates the effect of different biological, environmental and social factors on child malnutrition.

1. Infant Mortality

$$IM = X_i\alpha_i+\mu$$

Where IM = infant mortality will be 1 if the child died in the first year of birth and 0 for otherwise.

X_i = vector of explanatory variables

α_i = vector of parameters

μ = error term

Or

$$IM = f(GC,BSC,BO,BI,NS,MAC,MA1^{st},MEP,MES,MEH,$$
$$MES,AD,TT,WS,TF,EXM,HF,WI,RGN,PVN,\mu)$$

Or

Infant mortality = $\alpha_0 + \alpha_1$ (GC) + α_2(BSC) + α_3(BO) + α_4(BI) + α_5(NS) + α_6 (MAC) + α_7 (MA 1^{st}) + α_8 (MEP) + α_9 (MES) + α_{10} (MEH) + + α_{11} (MES) + α_{12} (AD) α_{13} (TT) +α_{14} (WS) + α_{15} (TF) + α_{16} (EXM) + α_{17} (HF)+ α_{18} (WI) +α_{19} (RGN) + α_{20}(PVN) + €$_0$-------(1)

2. Child Mortality

$$CM = X_i\ \beta_i+\mu$$

Where CM = child mortality will be 1 if the child died in the first year of birth and 0 for otherwise.

X_i = vector of explanatory variables

β_i = vector of parameters

μ = error term

Or

$$CM = f(GC,BSC,BO,BI,NS,MCA,MA1^{st}, MEP, ME, WS,TF,EXM,HF,WI,RGN,PVN,\mu)$$

Child Mortality = $\beta_0+\beta_1$ (GC) + β_2 (BSC) + β_3 (BO) + β_4 (BI) + β_5 (NS) + β_6 (MCA) + β_7 ($MA1^{st}$) +β_8 (MEP) +β_9 (ME) + β_{10} (WS) +β_{11} (TF) +β_{12} (EXM) +β_{13} (HF) +β_{14} (WI) +β_{15} (RGN) +β_{16} (POV) +∂_1--- (2)

3. Child Morbidity

Child Morbidity = ∂_0+ ∂_1 (ARI) + ∂_2 (Diarrhea) + €$_0$ ---------- (3)

Where, ARI and Diarrhea will be calculated through following two separate equations.

$$ARI = X_i \acute{Y}_i+\mu$$

Where ARI = ARI will considered as 1 if the children under five years of age have symptoms of ARI and 0 for otherwise

X_i = vector of explanatory variables

$\acute{Y}_i$ = vector of parameters

μ = error term

Or

$$CM = f(GC,AC,BO, NS,MAC,MED, ME, K,CF,MS,NR,WS,EXM,HF,WI,RGN,PVN,\mu)$$

Or

$ARI = ϒ_0 + ϒ_1(GC) + ϒ_2(AC) + ϒ_3(BO) + ϒ_4(NS) + ϒ_5(MAC) + ϒ_6(MED) + ϒ_7(ME) + ϒ_8(K) + ϒ_9(CF) + ϒ_{10}(MS) + ϒ_{11}(NR) + ϒ_{12}(WS) + ϒ_{13}(EXM) + ϒ_{14}(HF) + ϒ_{15}(WI) + ϒ_{16}(RGN) + ϒ_{17}(POV) + €_0$ ---------- (3.1)

$$Diarrhea = X_i£_i + \mu$$

Where Diarrhea = Diarrhea will considered as 1 if the children under five years of age have faced diarrhea and 0 for otherwise

X_i = vector of explanatory variables

$£_i$ = vector of parameters

μ = error term

Or

Diarrhea = f(GC,AC,BO,MAC,MED ,ME,K,WS,WT,TF,S, HF, EXM,WI,RGN,PVN,μ)

Or

$Diarrhea = £_0 + £_1(GC) + £_2(AC) + £_3(BO) + £_4(MAC) + £_5(MED) + £_6(ME) + £_7(K) + £_8(WS) + £_9(WT) + £_{10}(TF) + £_{11}(S) + £_{12}(HF) + £_{13}(EXM) + £_{14}(WI) + £_{15}(RGN) + £_{16}(POV) + €_0$---- (3.2)

4. Child Malnutrition

$$Stunting = X_i\ ϒ_i + \mu$$

Where Stunting = stunting will be considered as 1 if the children under five year age is stunted and 0 for otherwise

X_i = vector of explanatory variables

Υ_i = vector of parameters

μ = error term

Or

Stunting = f(GC,AC,BO,BI,NS,MAC,MED ,ME,MBMI,WS,CF, TF, D, EXM,WI,RGN,PVN,μ)

Or

Stunting = Υ_0+ Υ_1 (GC) + Υ_2 (AC) + Υ_3 (BO) + Υ_4 (BI) + Υ_5 (NS) + Υ_6 (MAC) + Υ_7 (MED) + Υ_8 (ME) + Υ_9 (MBMI) + Υ_{10} (WS) +Υ_{11} (CF) + Υ_{12} (TF) + Υ_{13} (D) + Υ_{14} (EXM) + Υ_{15} (WI) + Υ_{16} (RGN) +Υ_{17} (POV) + €$_0$ ---- (4.1)

$$\text{Wasting} = X_i\ \Upsilon_i + \mu$$

Where Wasting = wasting will be considered as 1 if the children under five year age is wasted and 0 for otherwise

X_i = vector of explanatory variables

Υ_i = vector of parameters

μ = error term

Or

Wasting = f(GC,AC,BO,BI,NS,MAC,MED ,ME, MBMI,WS, TF, D, EXM, WI, RGN, PVN, μ)

Or

Wasting = Υ_0+ Υ_1 (GC) + Υ_2 (AC) + Υ_3 (BO) + Υ_4 (BI) + Υ_5 (NS) + Υ_6 (MAC) + Υ_7 (MED) + Υ_8 (ME) + Υ_9 (MBMI) + Υ_{10} (WS) + Υ_{11} (CF) + Υ_{12} (TF) + Υ_{13} (D) + Υ_{14} (EXM) + Υ_{15} (WI) + Υ_{16} (RGN) +Υ_{17} (POV) + €$_0$ ---------- (4.2)

$$\text{Underweight} = X_i\ \Upsilon_i + \mu$$

Where Underweight = underweight will be considered as 1 if the children under five year age is underweight and 0 for otherwise

X_i = vector of explanatory variables

Υ_i = vector of parameters

μ = error term

Or

Underweight = f(GC, AC, BO, BI, NS, MAC, MED, ME, MBMI, WS, TF, D, EXM, WI, RGN, PVN, μ)

Or

Underweight = Υ_0+ Υ_1 (GC) + Υ_2 (AC) + Υ_3 (BO) + Υ_4 (BI) + Υ_5 (NS) + Υ_6 (MAC) + Υ_7 (MED) + Υ_8 (ME) + Υ_9 (MBMI) + Υ_{10} (WS) + Υ_{11} (CF) + Υ_{12} (TF) + Υ_{13} (D) + Υ_{14} (EXM) + Υ_{15} (WI) + Υ_{16} (RGN) +Υ_{17} (POV) + ϵ_0 ---------- (4.3)

3.5.3 Trend analysis

The multivariate, bivariate and LOGIT analysis are used to analyze the current situation of the child poverty and its components, especially the environmental hazards. The last tool of analysis used in this study is the trend analysis. In trend analysis the study will compare the different factors, their values and effects on the child poverty in Pakistan. For this purpose the four major PDHS surveys are used, i.e. PDHS 1990-91 PDHS 2006-07 PDHS 2012-13 and PDHS 2017-18. This analysis will not only help in understanding the current trends of different variables like child poverty, child malnutrition, infant mortality, child morbidity and child mortality, but will also help us predict the future course of action and trend of these variables.

3.5.4 Statistical Techniques

For the purpose of analysis mainly MS EXCEL and STATA are used in this study. All the cross tabulations and estimations are done with the help of STATA. The graphs and simple tabulation is done with the help of MS EXCEL. Along with these Fishers exact test is used alongside bivariate analysis. In order to check multicollinearity in the Variance Inflation Factor (VIF) is used.

Chapter 4: Bivariate Analysis of Child Poverty

4.1. Introduction

The chapter deals with the analysis of the data from PDHS 2017-18. The chapter is divided into two major parts. First part is comprised of bivariate and multivariate analysis. In bivariate analysis cross tabulations of all the dependent and independent variables is done and explained. In the second part regression analysis is covered. The results of LOGIT models are demonstrated and explained in the second part. At the end chapter summery and conclusion is given.

4.2. Bivariate analysis/ Cross tabulation

In bivariate analysis the independent variables of each dependent variable are divided into four categories on the basis of the nature of independent variable. These categories include child characteristics, mother's characteristics, household characteristics and last one is environmental characteristics. Each of these characters is analyzed and explained with the help of table.

4.2.1. Results of Bivariate analysis for Infant and child mortality

Infant and child mortality are considered as an important measure of child poverty all over the world. Infant mortality is different than child mortality but both these variables are affected by almost same set of independent variables. Due to this very reason both these variables are analyzed together. The independent variables which affect child mortality and infant mortality are divided into four categories. These categories are child characters, mother characteristics, behavior characteristics of household and the last one is household and environmental characteristics. Each of these independent variables is analyzed with the help of a table.

The first category of independent variables that affect the infant mortality and child mortality is child characteristics. For the purpose of analysis four important characteristics are considered.

There characteristics are gender of the child, and birth size of the child, preceding birth interval and child birth order. Results for all these variables are summarized in table 4.1 below.

Table 4.1: Prevalence of Child and Infant mortality by Characteristics (In %)

Child Characteristics against Infant & Child Mortality		Infant Mortality	Fisher's Exact Test	Child Mortality	Fisher's Exact Test
Gender of the Child	Male	6.0		7.7	
	Female	6.0		5.7	
	Overall	6.0	0.04	6.7	0.0009
Birth Size of the Child	Very small	6.1		10.5	
	Smaller than average	6.0		9.3	
	Average or larger	5.9		6.1	
	Don't know/missing	18.9		18.5	
	Overall	6.0	0.01	6.7	0.004
Preceding Birth Interval (Months)	Less than 17 months	11.3		15.1	
	18-23	9.3		6.8	
	24-35	3.4		4.1	
	36-47	2.9		4.6	
	48-59	4.4		3.6	
	60+	3.1		3.6	
	Overall	5.5	0.005	6.7	0.03
Child Birth Order	1st	5.9		6.6	
	2nd	6.8		7.5	
	3rd	0.0		6.1	

	Overall	6.0	0.01	6.7	0.0006
	Mother Characteristics				
Mother Education Level	No Education	6.7		8.6	
	Primary	7.6		7.5	
	Secondary	5.3		4.1	
	Higher	3.0		2.7	
	Overall	6.0	0.008	6.7	0.003
Mother Age at First Birth (Years)	12-18	8.5		8.2	
	19-25	4.7		6.3	
	26-32	7.9		6.0	
	33-39	1.0		4.4	
	40-46	0.0		27.8	
	Overall	6.0	0.02	6.7	0.0009
	Others Characteristics				
Region	Urban	4.9		5.4	
	Rural	6.5		7.3	
	Overall	6.0	0.005	6.7	0.008
Province	Punjab	6.0		7.3	
	Sind	6.4		5.9	
	KPK	5.3		5.4	
	Baluchistan	7.7		11.2	
	Islamabad	3.5		4.4	
	FATA	3.2		1.8	
	Overall	6.0	0.04	6.7	0.009
Wealth Index	Poorest	7.3		8.6	

	Poorer	8.2		8.0	
	Middle	4.0		6.6	
	Richer	5.5		4.9	
	Richest	4.6		4.8	
	Overall	6.0	0.02	6.7	0.03

Source: Calculated by the author from PDHS 2017-18

The first child characteristic which affects the infant and child mortality is gender of the child. Results for gender of the child against infant mortality and child mortality are summarized in table 4.1 above. The results show that 6 percent male and female die at infant stage. On the other hand, male child has 7 percent chances of death and female child has 5 percent chances of death in between the age of 11 months and five years. It is evident that infant mortality rate is high in female gender while child mortality rate is higher in male gender.

Size of the child at the time of birth is another important child characteristic which affects the infant and child mortality directly. The results of child size at the time of birth are summarized in table 4.1 above. The results show that if the child size is very small at the time of birth than there are 6 percent chances of infant mortality and 10 percent chance of child mortality. The results show that if the child size is smaller than at the time of birth than there are 6 percent chances of infant mortality and 9 percent chance of child mortality. The table shows that if the child size is average or larger at the time of birth than there are 5 percent chances of infant mortality and 6.10 percent chance of child mortality. The results show that if the child size at the time of birth is not known than there are 18 percent chances of infant mortality and child mortality. It is evident from the results in table 4.1 that average or large size child has greater chances of survival at infant as well as child stage.

The next variable in child characteristics which effects infant and child mortality is the preceding birth interval of the child. The results of bivariate analysis for this variable are given in table 4.1 above. The results show that if the preceding birth interval is less than 17 months than there are 11 percent chances of infant mortality and 15 percent chances of child mortality. If the preceding birth interval is between 18 to 23 months than there are 9 percent chances of infant mortality and 6 percent chances of child mortality. If the preceding birth interval is between 24 and 35 months than there are 3 percent chances of infant mortality and 4 percent chances of child mortality. If the preceding birth interval is between 36 and 47 months than there are 2 percent chances of infant mortality and 4 percent chances of child mortality. If the preceding birth interval is 48 to 59 months than there are 4 percent chances of infant mortality and 3 percent chances of child mortality. If the preceding birth interval is 60 months or more than there are 3 percent chances of infant mortality and 3 percent chances of child mortality. The results show that infant mortality rate is lowest when the preceding birth interval is between 36 to 47 months and the child mortality is minimum when the birth interval is between 48 to 59 months.

The last child character which effects infant and child mortality is the birth order of the child. The results for this variable are given in table 4.1 above. It is evident from the results that when birth order is first than there are 5 percent chances of infant mortality and 6 percent chances of child mortality. When birth order is second than there are 6 percent chances of infant mortality and 7 percent chances of child mortality. When birth order is third than there are no chances of infant mortality and 6 percent chances of child mortality. From the results above we can say that along with increase in the birth order of the child the chances of infant as well as child mortality decreases.

The first independent variable and important mother characteristic that affect the infant and child mortality is education of the mother. The results of bivariate analysis for education of mother are

summarized in table 4.1 above. The results show that if the mother has no education at all than chances of infant mortality are 6 percent and chances of child mortality are 8 percent. If the mother has got primary education than chances of infant mortality are 7 percent and chances of child mortality are 7 percent. If the mother has got secondary education than chances of infant mortality are 5 percent and chances of child mortality are 4 percent. If the mother has got higher education than chances of infant mortality are 3 percent and chances of child mortality are 2 percent. It is evident from the results that along with increase in the education level of the mother the infant and child mortality rates decrease.

The second independent variable and mother characteristic which affects child and infant mortality is age of the mother at the time of first birth. The bivariate analysis results for age of mother at the time of first birth against infant and child mortality are summarized in table 4.1 above. The results show that if the mother age at the time of first birth is between 12 to 18 years than there are 8 percent chances of infant mortality and 8 percent chances of child mortality. If the mother age at the time of first birth is between 19 to 25 years than there are 4 percent chances of infant mortality and 6 percent chances of child mortality. If the mother age at the time of first birth is between 26 to 32 years than there are 7 percent chances of infant mortality and 6 percent chances of child mortality. If the mother age at the time of first birth is between 33 to 39 years than there are 1 percent chances of infant mortality and 4 percent chances of child mortality. If the mother age at the time of first birth is between 40 to 46 years than there are no chances of infant mortality and 27 percent chances of child mortality. It is evident from the above analysis that chances of survival of infant are higher if the mother age is between 40 to 46 years at the time of first birth. On the contrary chances of survival of child are higher if the age of mother is 33 to 39 years at the time of first birth.

The first environmental characteristic is region of the household which affects the infant and child mortality. The results for region of the household are given in table 4.1 above. The results show that if the household is living in urban area then there 4 percent chances of infant mortality and 5 percent chances of child mortality. On the other hand, if a household is settled in rural area then there are 6 percent chances of infant mortality and 7 percent chances of child mortality. It is clear from the results that households living in urban areas face lowest infant and child mortality.

The next environmental characteristic is province of residence of the family. The results for this variable are given in table 4.1 above. The results show that if the household is living in Punjab then there are 6 percent chances of infant mortality and 7 percent chances of child mortality. When the household is living in Sind then there are 6 percent chances of infant mortality and 5.9 percent chances of child mortality. When the household is living in Khyber Pakhtunkwa then there are 5 percent chances of infant mortality and 5 percent chances of child mortality. When the household is living in Baluchistan then there are 7 percent chances of infant mortality and 11 percent chances of child mortality. When the household is living in Islamabad then there are 3 percent chances of infant mortality and 4 percent chances of child mortality. When the household is living in FATA then there are 3 percent chances of infant mortality and 1 percent chances of child mortality. It is evident from the above analysis that infant and child mortality rate are lowest in families living FATA.

The next environmental characteristic is wealth index of the household. The results for bivariate analysis of the variable are given in table 4.1 above. The results show that if the household has poorest wealth index then there are 7 percent chances of infant mortality and 8 percent chances of child mortality. When the household has poorer wealth index then there are 8 percent chances of infant mortality and child mortality. When the household has middle wealth index then there are 4 percent chances of infant mortality and 6 percent chances of child mortality. When the

household has richer wealth index then there are 5 percent chances of infant mortality and 4 percent chances of child mortality. When the household has richest wealth index then there are 4 percent chances of infant mortality and 4 percent chances of child mortality. It is evident from the results that the infant mortality is lowest in the middle class families and child mortality is lowest in the richest class households.

In order to cross check relationship of the variables and their impact, Fisher exact test is used. The values of Fishers test are reported in the contingency tables. It is evident from the results of Fishers test that the values for all the variables are less than 0.05 (5%) and hence all the variables are significant and positively affecting the dependent variable.

4.2.2. Results of Bivariate analysis for Child Morbidity (ARI and Diarrhea)

Child morbidity is taken as an indicator to measure child poverty in this study. The literature shows that child morbidity cannot be measured directly. For measuring child morbidity two important variables i.e. Diarrhea and Acute Respiratory Infection (ARI) are first measured. These two variables are again measured through a set of independent variables. As the set of independent variables is same for both these variables therefore both these variables are analyzed together. The independent variables are divided into four major categories. The results of bivariate analysis for all these independent variables against Diarrhea and ARI are summarized in table 4.2 to measure child morbidity and child poverty in Pakistan. The bivariate analysis is based on the data from PDHS 2017-18.

The first category of independent variables used to measure child morbidity in Pakistan is the child characteristics. In this category there are three independent variables i.e. gender of the child, age of the child and number of under five year age of children in household. The results of bivariate analysis for these variables are given in table 4.2 below.

Table 4.2: Prevalence of ARI and Diarrhea among children by Characteristics (in %)

Child Characteristics		Diarrhea	Fisher's Exact Test	ARI	Fisher's Exact Test
Gender of the child	Male	20.3		14.0	
	Female	17.8		13.5	
	Overall	19.1	0.001	13.8	0.009
Age of the child (Months)	<6	22.0		16.4	
	6-11	34.8		21.4	
	12-23	29.3		14.9	
	24-35	21.7		11.5	
	36-47	17.1		14.7	
	48-59	10.3		8.2	
	Total	21.3	0.03	13.6	0.01
	Mother Characteristics				
Mother Education	No Education	17.4		14.1	
	Primary	21.1		16.6	
	Secondary	21.5		13.6	
	Higher	18.7		9.2	
	Overall	19.1	0.02	13.8	0.05
Mother's Smoking Habit	Yes	-----		13.7	
	No	-----		16.0	
	Overall	-----		13.8	0.002
	Household Characteristics				
Sources of Drinking Water	Improved	17.6		----	
	Unimproved	18.9		----	
	Overall	19.1	0.1	----	

Type of Toilet Facility	Improved	19.3		----	
	Unimproved	19.0		----	
	Open Defection	16.4		----	
	Overall	19.1	0.09	----	
Type of Cooking Fuel Used	Electricity	----		3.2	
	LPG	----		11.5	
	Natural Gas	----		13.1	
	Biogas	----		18.0	
	Coal	----		3.3	
	Charcoal	----		8.2	
	Wood	----		14.5	
	Straw/ Shrubs	----		27.6	
	Agricultural product	----		26.4	
	Animal Dung	----		12.3	
	No Food Cooked	----		97.0	
	Total	----		13.8	0.0007
	Other Characteristics				
Region	Urban	19.1		12.8	
	Rural	19.1		14.2	
	Overall	19.1	0.007	13.8	0.06
Province	Punjab	20.5		12.9	
	Sind	14.4		14.6	
	KPK	21.3		16.3	
	Baluchistan	18.5		11.3	

	Islamabad	19.7		9.3	
	FATA	19.9		13.2	
	Overall	19.1	0.007	13.8	0.1
Wealth Index	Poorest	16.4		15.1	
	Poorer	20.2		16.7	
	Middle	21.5		13.8	
	Richer	19.1		11.3	
	Richest	18.4		11.5	
	Overall	19.1	0.04	13.8	0.003

Source: Calculated by the author from PDHS 2017-18

The first child characteristics and independent variable to measure child morbidity through diarrhea and ARI is the gender of the child. The results for this variable are given in table 4.2. The results show that there are 20 percent chances of diarrhea in male and 17 percent chances of diarrhea in female children. On the other hand, there are 14 percent chances of ARI in male and 13 percent chances on female. The results show that male children are more prone to diarrhea as well as ARI as compared to female children.

The second variable in child characteristics is age of the child. Diarrhea and ARI are checked against different age groups and the results of bivariate analysis are summarized in table 4.2 above. The results show that if the age of the child is less than 6 months then there are 22 percent chances of diarrhea and 16 percent chances of ARI. When the age of the child is between 6-11 months then there are 29 percent chances of diarrhea and 21 percent chances of ARI. When the age of the child is between 12-23 months then there are 29 percent chances of diarrhea and 14 percent chances of ARI. When the age of the child is between 24-35 months then there are 21 percent chances of diarrhea and 11 percent chances of ARI. When the age of the child is between

36-47 months then there are 17 percent chances of diarrhea and 14 percent chances of ARI. When the age of the child is between 48-59 months then there are 10 percent chances of diarrhea and 8 percent chances of ARI. The results show that the chances of diarrhea as well ARI decrease along with increase in the age of the child. It can be observed from the table above that the lowest rate of diarrhea and ARI are found in highest age group children.

The second category of independent variables is that of mother characteristics. The important mother characteristic that affect child morbidity is mother's education level. The results of bivariate analysis for mother education against diarrhea and ARI are given in table 4.2 above. It is evident from the results that when mother has no education at all then there are 17 percent chances of diarrhea and 14 percent chances of ARI. When the mother has primary level of education then there 21 percent chances of diarrhea and 16 percent chances of ARI. When the mother has secondary level of education then there 21 percent chances of diarrhea and 13 percent chances of ARI. When the mother has completed higher education then there 18 percent chances of diarrhea and 9 percent chances of ARI. It is evident from the above analysis that when mother has secondary level of education than chances of diarrhea are high and in case of ARI the rate is higher with primary level of education of mother. The next mother character that affects ARI is mother's smoking habit. The results in table 4.1 show that when the mother has smoking habit then there are 16 percent chances of ARI in a child and when the mother doesn't smoke than the chances of ARI are only 13 percent. Hence, it shows that the smoking habit of mother increases chances of ARI in children.

The next category of independent variables that affect child morbidity in the form of diarrhea and ARI are the household characteristics. The first variable in this category is sources of drinking water used by the household. The results in table 4.2 show that when improved water sources are used by the household than there are 17 percent chances of getting diarrhea and when

unimproved sources are used than there are 18 percent chances of getting diarrhea in children. The next household characteristic that affects diarrhea is type of toilet facility used in a household. The results in table 4.1 show that when the household is using improved toilet facility then there are 19 percent chances of diarrhea in children. When the household is using unimproved toilet facility than there are 19 percent chances of diarrhea and when the household uses open defecation then there are only 16 percent chances of diarrhea in children.

The next variable of child morbidity in category of household variables is the type of fuel used for cooking in a household. The results of type of cooking fuel on ARI are given in table No. 4.2 above. The results show that when electricity is used a type of cooking fuel then there are 3 percent chances of ARI. When LPG is used a type of cooking fuel then there are 11 percent chances of ARI. When natural gas is used a type of cooking fuel then there are 13 percent chances of ARI. When bio gas is used a type of cooking fuel then there are 18 percent chances of ARI When coal is used a type of cooking fuel then there are 3 percent chances of ARI. When charcoal is used a type of cooking fuel then there are 8 percent chances of ARI. When wood is used a type of cooking fuel then there are 14 percent chances of ARI. When straw, shrubs and grass is used a type of cooking fuel then there are 27 percent chances of ARI. When agricultural crops are used as type of cooking fuel then there are 26 percent chances of ARI. When animal dung is used a type of cooking fuel then there are 12 percent chances of ARI. When food is not cooked at home then there are 97 percent chances of ARI. It is evident from the results that when electricity is used as cooking fuel in a household than chances of ARI are minimum.

The next category of independent variables which affect child morbidity is the environmental factors. The first variable in this category is region of living of the household. The results for region against diarrhea and ARI are given in table 4.2 above. The results show that when the household is living in urban region then there are 19 percent chances of diarrhea and 12 percent

chances of ARI. On the other hand, if a household is living in rural areas then there are 19 percent chances of diarrhea and 14 percent chances of ARI. The results show that when the household is living in urban areas then chances of diarrhea are greater and chances of ARI are high in children of household living in rural areas.

The next independent variable of the category is province of residence of the household. The results for bivariate analysis of province with diarrhea and ARI are given in table 4.2 above. The results show that when a household is living in Punjab then there are 20 percent chances of diarrhea and 12 percent chances of ARI. When a household is living in Sind then there are 14.41 percent chances of diarrhea and 14 percent chances of ARI. When a household is living in KPK then there are 21 percent chances of diarrhea and 16 percent chances of ARI. When a household is living in Baluchistan then there are 18 percent chances of diarrhea and 11 percent chances of ARI When a household is living in Islamabad then there are 19 percent chances of diarrhea and 9 percent chances of ARI. When a household is living in FATA then there are 19 percent chances of diarrhea and 13 percent chances of ARI. The results show that chances of getting diarrhea by a child are minimum in Sind and chances of ARI of are minimum in Islamabad.

The last independent variable in this category is the combined household wealth index. The results of bivariate analysis for wealth index against diarrhea and ARI are given in table 4.2 above. The results show that when the wealth index of household is poorest then there are 16 percent chances of diarrhea and 15 percent chances of ARI. When the wealth index of household is poorer then there are 20 percent chances of diarrhea and 16 percent chances of ARI. When the wealth index of household is middle then there are 21 percent chances of diarrhea and 13 percent chances of ARI. When the wealth index of household is richer then there are 19 percent chances of diarrhea and 11 percent chances of ARI. When the wealth index of household is richest then there are 18 percent chances of diarrhea and 11 percent chances of ARI. It shows that when

wealth index poorest the chances of diarrhea are minimum and chances of ARI are minimum when wealth index is richer.

In order to cross check relationship of the variables and their impact, Fisher exact test is used. The values of Fishers test are reported in the contingency tables. It is evident from the results of Fishers test that the values for all the variables are less than 0.05 (5%) and hence all the variables are significant and positively affecting the dependent variable.

4.2.3. Results of Bivariate analysis for Child Malnutrition

Child malnutrition is calculated by calculating the impact of different independent variables for stunting, wasting and underweight children. Independent variables which affect child malnutrition are divided into three main categories. These categories include child characteristics, mother characteristics and environmental characteristics. The results of bivariate analysis for all those categories are summarized in table 4.3 below. The variables included in each category and there individual effect is explained in the next portion.

Table 4.3: Prevalence of Child Malnutrition by Characteristics (in %)

Characters/ Child Malnutrition	Stunted (Percentage)	Fisher's Exact Test	Wasted (Percentage)	Underweight (Percentage)	Fisher's Exact Test
	Child Characteristics				
	Gender of the child				
Male	37.8		7.2	23.5	
Female	36.7		6.7	21.8	
Overall	37.3	0.001	6.9	22.7	0.03
	Child Age in Months				
Less Than 6 Months	21.8		13.9	22.8	

06-11	20.0		12.5	16.5	
12-23	32.7		7.3	17.0	
24-35	47.1		5.8	26.1	
36-47	46.5		4.4	25.2	
48-59	39.3		3.9	25.1	
Overall	37.3	0.5	6.9	22.7	0.002
	Birth Interval (Months)				
Less than 17 Months	45.0		5.9	27.5	
18-23	44.2		5.4	26.7	
24-35	36.4		8.5	22.9	
36-47	39.2		8.8	21.6	
48-60 plus	32.9		5.7	20.9	
Overall	39.0	0.001	7.1	23.7	0.03
	Size of the child At the time of Birth				
Very small	56.5		19.4	40.6	
Smaller than average	44.5		6.8	26.9	
Average or larger	35.3		6.5	21.3	
Don't know/missing	49.7		0.0	20.2	
Overall	37.3	0.04	6.9	22.7	0.002
	Mother Characteristics				
	Mother Education				
No Education	47.4		8.6	31.5	
Primary	38.6		5.3	19.2	
Secondary	28.0		5.6	14.6	
Higher	15.8		5.0	8.2	

Overall	37.3	0.001	6.9	22.7	0.03
Mother BMI					
(BMI<18.5)	44.4		8.6	36.3	
(18.5-24.9)	43.5		8.8	27.2	
(BMI>=25)	29.3		4.5	14.9	
Overall	37.3	0.004	7.0	22.9	0.02
Others Characteristics					
Wealth Index					
Poorest	55.9		9.4	41.0	
Poorer	44.4		9.3	27.0	
Middle	31.1		4.8	14.6	
Richer	30.4		7.1	17.5	
Richest	22.5		3.5	11.1	
Overall	37.3	0.01	6.9	22.7	0.007
Region					
Urban	31.2		6.6	19.1	
Rural	40.3		7.1	24.4	
Overall	37.3	0.004	6.9	22.7	0.01
Province					
Punjab	29.5		3.8	13.8	
Sind	49.2		11.4	39.0	
KPK	40.2		7.5	21.8	
Baluchistan	47.1		18.3	38.6	
Islamabad	23.5		2.7	8.6	
FATA	52.3		5.3	23.1	

Overall	37.3	0.3	6.9	22.7	0.002

Source: Calculated by the author from PDHS 2017-18

The very first child character that affects malnutrition is gender of the child. Table 4.3 above shows values of stunted, wasted and underweight children on the basis of the gender of the child. It is evident from the results that 37 percent male children are stunted against 36 percent female children. Similarly, 7 percent male children are wasted as per PDHS 2017-18 against 6 percent female children in Pakistan. In case of underweight children 23 percent male and 21 percent female were found to be underweight. From the figures mentioned above it can be easily said that male children are proportionally higher in terms of malnutrition as male are more stunted, wasted and underweight as compared to their female counterparts.

The second child character to check measure malnutrition in children is that of age of child in months and its impact/ percentage share of stunted, wasted and underweight children. The age of child is divided into six groups keeping in view the age bracket. Table 4.3 shows percentage share of different age group children in stunting, wasting and underweight category. The results show that 21 percent stunted, 13 percent wasted and 22 percent underweight children belong to the category with age less than six months. In the second category containing children between the age of 06 to 11 months, 20 percent children are stunted, 12 percent are wasted and 17 percent are underweight. The third category contains children with age group of 12 to 23 months. In this category 32 percent are stunted, 7 percent are wasted and 17 percent are underweight. In category of age group 24 to 35 months 47 percent are stunted, 5 percent are wasted and 26 percent are underweight. In category of age group 36 to 47 months 46 percent are stunted, 4 percent are wasted and 25 percent are underweight. In category of age group 48 to 59 months 39 percent are stunted, 3 percent are wasted and 25 percent are underweight. From the analysis it can be established that highest rate of stunting is in the age group of 24 to 35 months, highest

rate of wasting is in the age group of children below 6 months in age and in underweight age group of 24 to 35 months is at the top.

The next child characteristic is birth interval between two children. The results for keeping different birth intervals and their impact on child malnutrition are summarized in table 4.3 above. It is evident from the table that when the family gave less than 17 months interval between two births than chances of stunting are 45 percent, wasting 5 percent and being underweight are 27 percent. . The results show that when the family gave 18-23 months interval between two births than chances of stunting are 44 percent, wasting 5 percent and being underweight are 26 percent. The results show that when the family gave 24-35 months interval between two births than chances of stunting are 36 percent, wasting 8 percent and being underweight are 22 percent. The results show that when the family gave 36-47 months interval between two births than chances of stunting are 39 percent, wasting 8 percent and being underweight are 21 percent. The results show that when the family gave 48-60 months plus interval between two births than chances of stunting are 32 percent, wasting 5 percent and being underweight are 20 percent.

The last but not the least indicator in the child characteristics which affect child malnutrition is size of the child at the time of birth. Size of child is divided into three categories. The first category where the size of new born is very small, there are 56 percent chances of being stunted, 19 percent chances of being wasted and 40 percent chances for being underweight. The second category of child size is where the new born is smaller than average size. In this category there are 44 percent chances for stunting of the child, 6 percent chances for wasting of the child and 26 percent chances for being underweight. The third category where child is average or larger in size, there are 35 percent chances of being stunted, 6 percent chances of being wasted and 21 percent chances of being underweight. The last category is not defined in terms of size as the

data is silent. However, in missing child size category there are 49 percent chances of being stunted, no chance of being wasted and 20 percent chances of being underweight.

The next category of independent variables contains mother characteristics. The first mother characteristic that affect child malnutrition is mother's education. Table 4.3 shows impact of different levels of mother education on child malnutrition. The results show that mother's with no education increases the chance of child malnutrition. In table 4.3 we see that a child has 47 percent chances of stunting, 8 percent chances of wasting and 31 percent chances of being underweight when the mother has no education. In case of mother having primary education, there are 38 percent chances of stunting, 5 percent chances of wasting and 19 percent of being underweight. In case of mother having secondary education, there are 28 percent chances of stunting, 5 percent chances of wasting and 14 percent of being underweight. In case of mother having higher education, there are 15 percent chances of stunting, 5 percent chances of wasting and 8 percent of being underweight. It shows that with increase in the education of mother the chances of malnutrition for child decreases.

The last mother character considered in this analysis is that of mother BMI. Table 4.3 shows different values of child malnutrition against mother BMI classes. The results show that when mother is underweight than the child has 44 percent chances of stunting, 8 percent chances of wasting and 36 percent chances of being underweight. In the second class when mother is normal than the child has 43 percent chances of stunting, 8 percent chances of wasting and 27 percent chances of being underweight. In the third class when mother is overweight or obese than the child has 29 percent chances of stunting, 4 percent chances of wasting and 14 percent chances of being underweight. It shows that with increase in the BMI of the mother the chances of malnutrition for child decreases and vice versa.

The next category of independent variables is environmental characteristics. The first variable in this category is the wealth index. The analysis results for wealth index are summarized in table 4.3 above. The results show that household having wealth index ranked as poorest face 55 percent stunting, 9 percent wasting and 4 percent underweight in children. The second category of poorer household show that they face 44 percent stunted, 9 percent wasted and 27 percent underweight situation. The middle class households face 31 percent stunting, 4 percent wasting and 14 percent underweight. The richer class has 30 percent chance of wasting, 7 percent chances of wasting and 17 percent chances of underweight. The last category of richest show that such household has 22 percent chances of being stunted, 3 percent chance of being wasted and 11 percent chance of being underweight. It is evident from the above explanation that household having poorest wealth index face high rate of child malnutrition and the richest face lowest rate of child malnutrition.

The next environmental characteristic is the region of the household. The results for region are summarized in table 4.3 above. The results show that people living in urban region have 31 percent chances of stunting, 6 percent chances of wasting and 19 percent chances of underweight. On the other hand, people living in rural areas face 40 percent chance of being stunted, 7 percent chance of being wasted and 24 percent chance of being underweight. It is evident from the analysis that the household living rural regions face high rate of child malnutrition as compared to the household living in urban areas.

The next environmental variable is province of residence of the household. Results for provinces are given table 4.3 above. The results shows that household living in Punjab face 29 percent stunting, 3 percent wasting and 13 percent underweight. The results shows that household living in Sind face 49 percent stunting, 11 percent wasting and 39 percent underweight. The figure shows that the household living in Khyber Pakhtunkhwa face 40 percent stunting, 7 percent

wasting and 21 percent underweight. The table shows that the household living in Baluchistan face 47 percent stunting, 18 percent wasting and 38 percent underweight. The results shows that household living in Islamabad face 23 percent stunting, 2 percent wasting and 8 percent underweight. The results show that household living in FATA faces 52 percent stunting, 5 percent wasting and 23 percent underweight. It is evident from the above analysis that stunting rate is highest in households living in FATA, wasting rate is high in households of Baluchistan and underweight is highest in households of Sind.

In order to cross check relationship of the variables and their impact, Fisher exact test is used. The values of Fishers test are reported in the contingency tables. It is evident from the results of Fishers test that the values for all the variables are less than 0.05 (5%) and hence all the variables are significant and positively affecting the dependent variable.

Chapter 5: Trend Analysis of Child Poverty

5.1. Introduction

Data on child poverty in Pakistan is available in different forms. The data has been collected by several researchers, data banks and national surveys. In this study the data on various factors determining the child poverty is used from Pakistan Demographic and Household surveys. So far total four surveys have been conducted, i.e. 1990-91, 2006-07, 2012-13 and 2017-18. Although the basic analysis is done on the data from the latest survey, but for trend analysis all the surveys are considered. However, the data of some variables is missing in 2006-07 survey. The variables causing child poverty in Pakistan are divided into two main categories. The first category is that of the major variables which are directly related to the child poverty and the second category represents those variable which in somehow indirectly effects the child poverty and directly effects the major variables of the first category.

5.2. Trend analysis of Major variables of Child Poverty in Pakistan

The first trend is checked on the major variables that cause child poverty directly. These variables include infant mortality, child mortality, child morbidity and child malnutrition. Here the last variable, i.e. child malnutrition is again checked through stunting, wasting and underweight, while child morbidity is checked and analyzed by diarrhea and ARI (acute respiratory infection). The detailed explanation of each of the major variable is given as under.

Child morbidity is considered as the major cause of child poverty in Pakistan. Here child morbidity is analyzed through diarrhea and ARI. The trend for diarrhea is shown in figure 5.1 below. It shows that if we take data for three years preceding the survey, than the percentage of diarrhea has remained low, but in data for five years preceding the survey, percentage of diarrhea has remained high. On the other hand, unlike other variables the percentage share of diarrhea has

increased 1990 to 2013. In the last survey the percentage of child suffering from diarrhea has declined from 19.1 percent. It shows that diarrhea has kept a positive increasing trend since 1990, but due to current developments in health facilities the disease is on the downfall. It can be easily said that if the health facilities are increased in the future the disease will automatically show a negative trend.

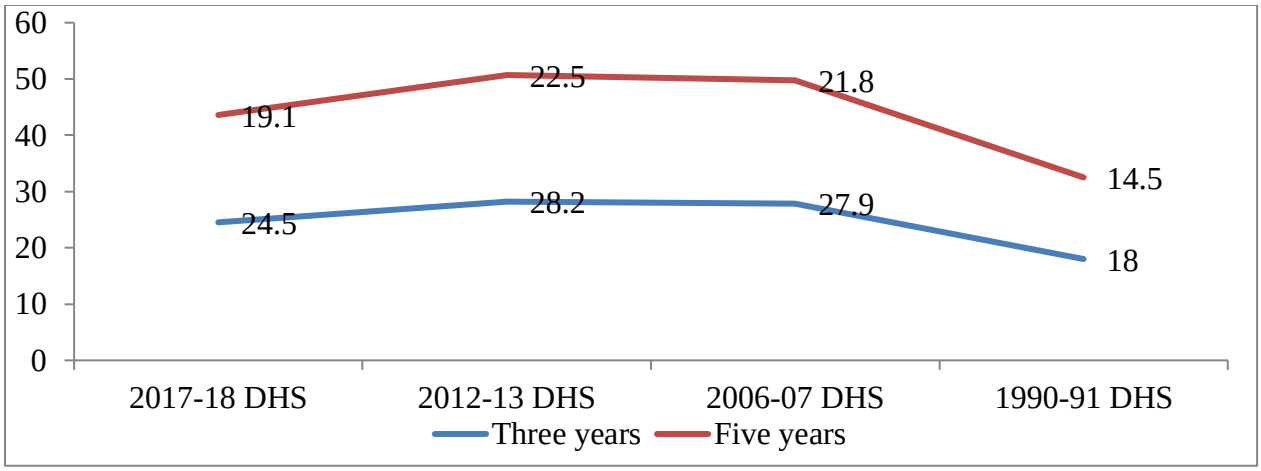


Figure 5.1: Trend of Diarrhea in Children

Figure 5.2 shows trend of ARI. In this study ARI is used as a second measure for child morbidity. It is evident from the figure that ARI has moved inconsistently over the last three decades. Initially in 1990 percentage of children suffering from ARI was 15.8 percent. A negative trend from 1990 to 2006 is observed as the disease dropped to 14.1. In the next few years the variable shows a positive trend as the percentage value increased from 14.1 in 2006 to 15.9 in 2012. The current decade again witnessed a negative trend of the variable. In a span of just 5 years the percentage value of variable dropped to 13.8 percent, which shows a negative trend.

It is observed form the figure below that ARI was at peak in 2012-13. The literature and data reported in PDHS 2006-07 and 2012-13 shows that the number of reported children with ARI was higher in 2013 as compared to 2006. In 2006-07 survey only 2508 children were included in the overall survey, while in 2012-13 survey the number of respondents increased to 3419. Hence

it also increased the total number of infected children with ARI. Another important reason for increase in ARI as reported in PDHS 2012-13 is the decrease in use of health facilities by the mothers of the newborns. Although the number of health care facilities was increased from time to time but the consultation rate had dropped.

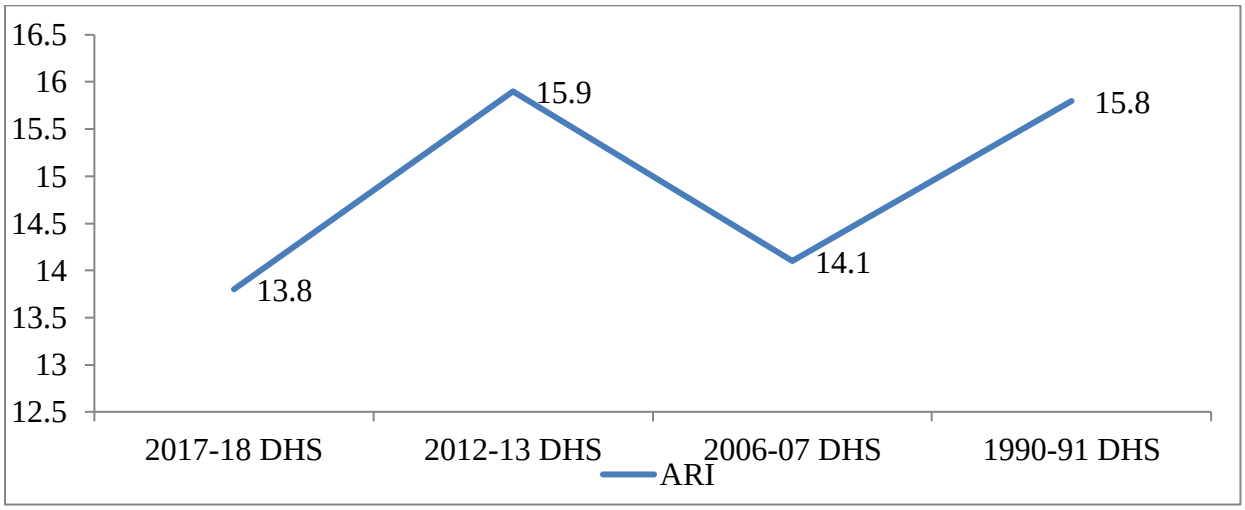


Figure 5.2: Trend of ARI in Children

The literature shows that infant mortality is the second direct measure of child poverty. Figure 3 shows that the infant mortality rate has decreased over the past three decades. Infant mortality rate was recorded 86 in 1990. It means that out of 1000 new born child 86 died at the infant stage. The infant mortality decreased to 78 in 2006 and subsequently to 74 in 2012. The rate was lately at 62 deaths per 1000 births in 2017. It clearly shows that the infant mortality rate has improved over the time since 1990 and hence shows negative trend.

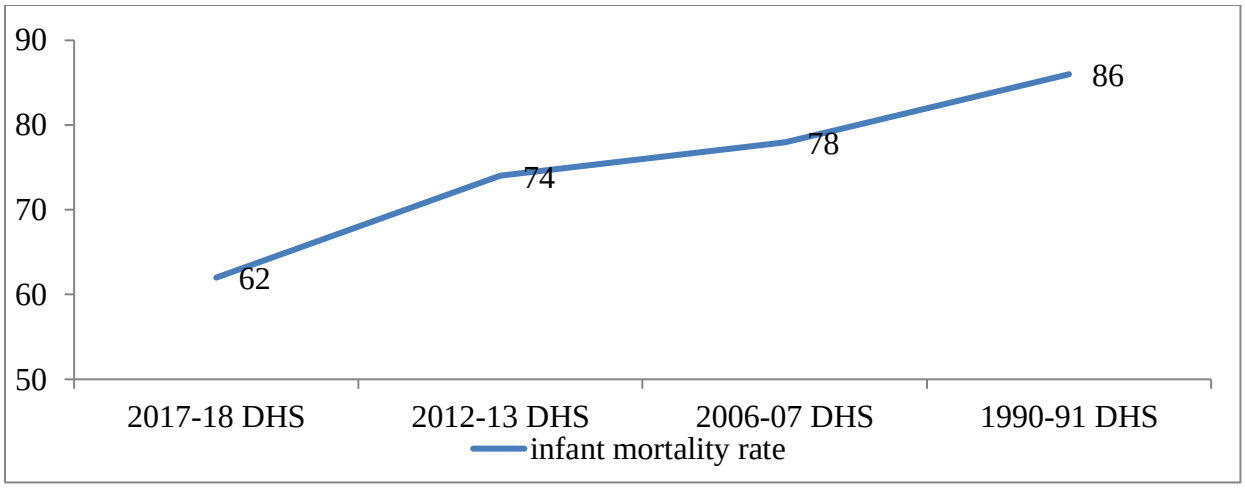


Figure 5.3: Trend of Infant Mortality Rate

The third variable to measure poverty is that of child mortality rate. Child mortality also shows negative trend in the last thirty years. In 1990 PDHS survey it was observed that 29 out 1000 live births died between the age of 11 months to five years. This rate declined to 18 deaths per 1000 live births in 2006. It further decreased to 17 deaths per 1000 live births in 2012. The latest PDHS survey show that the child mortality rate has decreased to only 13 deaths per 1000 live births in 2017. This variable also shows negative trend and has improved over the time.

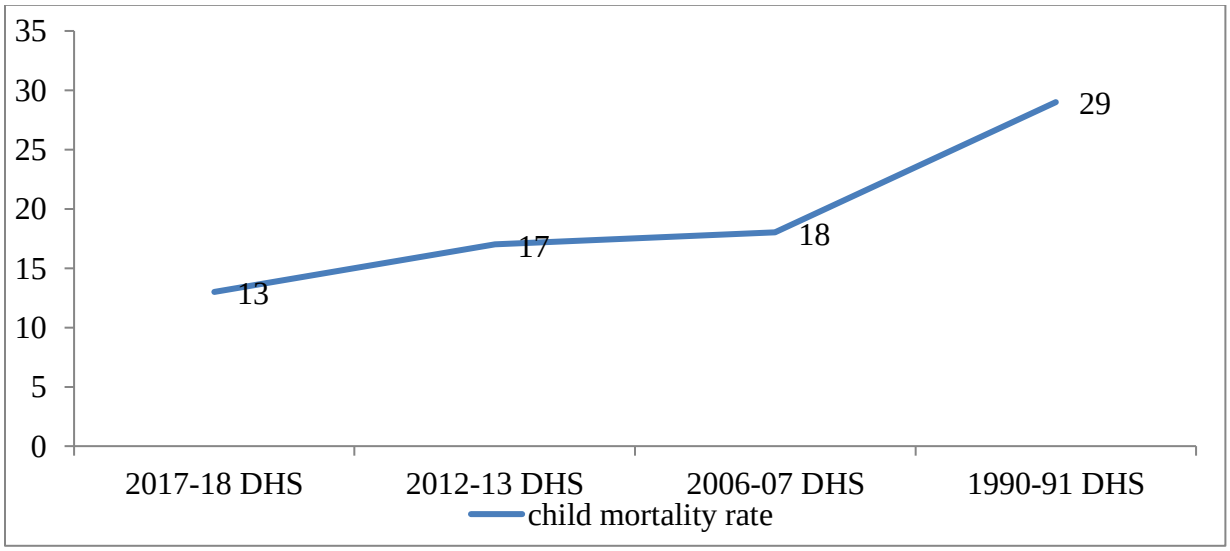


Figure 5.4: Trend of Child Mortality Rate

The last but not the least variable which is taken as the direct measure of child poverty is child malnutrition. The variable is measured from the value to stunting, wasting and underweight

children. Figure 5.5 shows trend of stunted children from 1990 to 2017. The figure shows that the variable has portrayed negative trend over the period of time. Although the value from PDHS 2006-07 is missing, still the percentage of stunted children has decreased from 54.3 in 1990 to 44.8 in 2012. Similarly, the percentage value further decreased to 36.7 in 2017 PDHS data. It shows that the variable has improved over the time and shows a negative trend. It can be said that the value of the variable has decreased due increased expenditure in the health sector and improved health facilities in the last two decades.

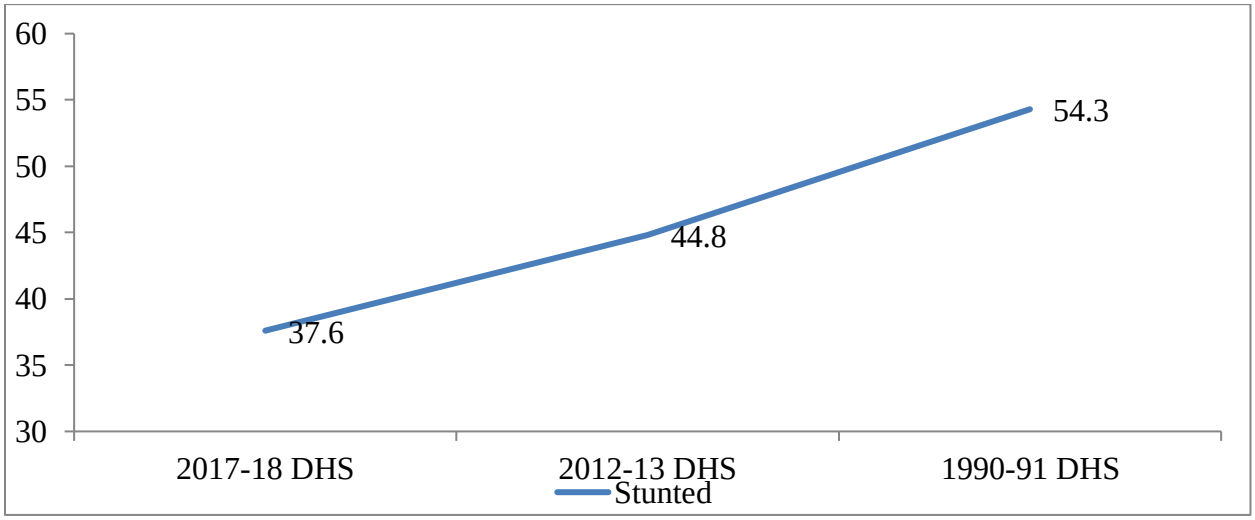


Figure 5.5: Trend of Stunted Children in Pakistan

The second variable which determines child malnutrition and child poverty is that of wasting. Figure 5.6 shows different values recorded for the variable in three different PDHS surveys. The figure below shows that the percentage of children wasted in 1990 was 12 percent, which declined to 10.8 percent in 2012. The value further decreased to 6.9 percent in 2017. The data for wasted children in PDHS 2006 is missing. Still the variable shows negative trend and has improved over the time.

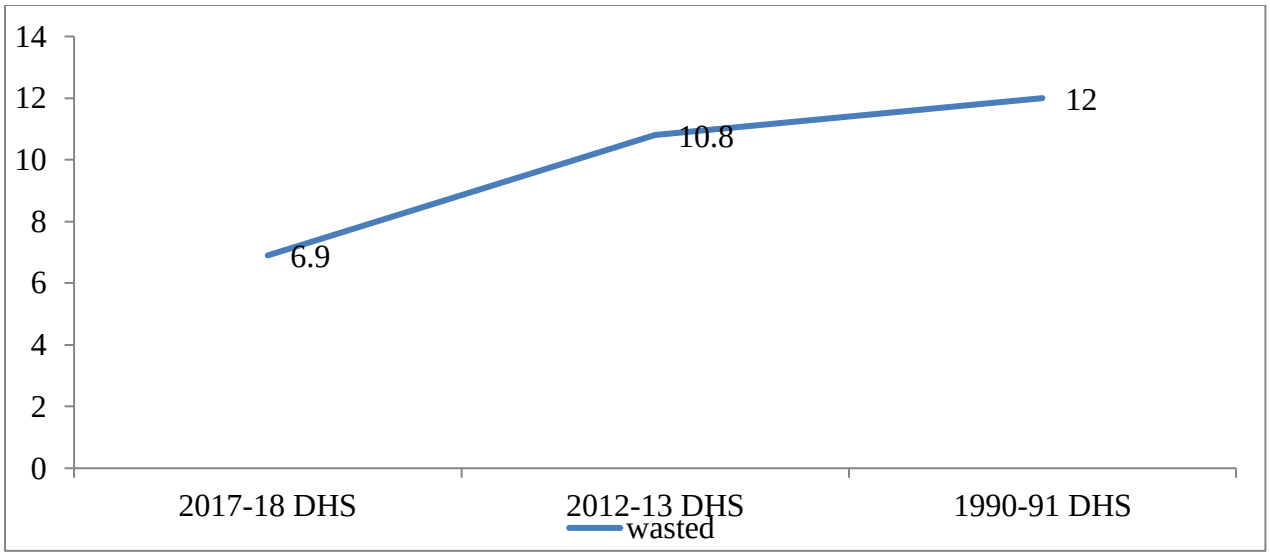


Figure 5.6: Trend of Wasted Children in Pakistan

The last direct measure of child malnutrition and child poverty is that of underweight children. Figure 5.6 show that the variable has decreased drastically in the last thirty years. The data of PDHS 1990-91 shows that the percentage of underweight children in 1990 was 35.8 percent. It decreased to 30 percent in 2012 and further decreased to 22.3 percent in 2017-18 PDHS. The variable has improved over the time and hence is showing a positive trend in the period under consideration.

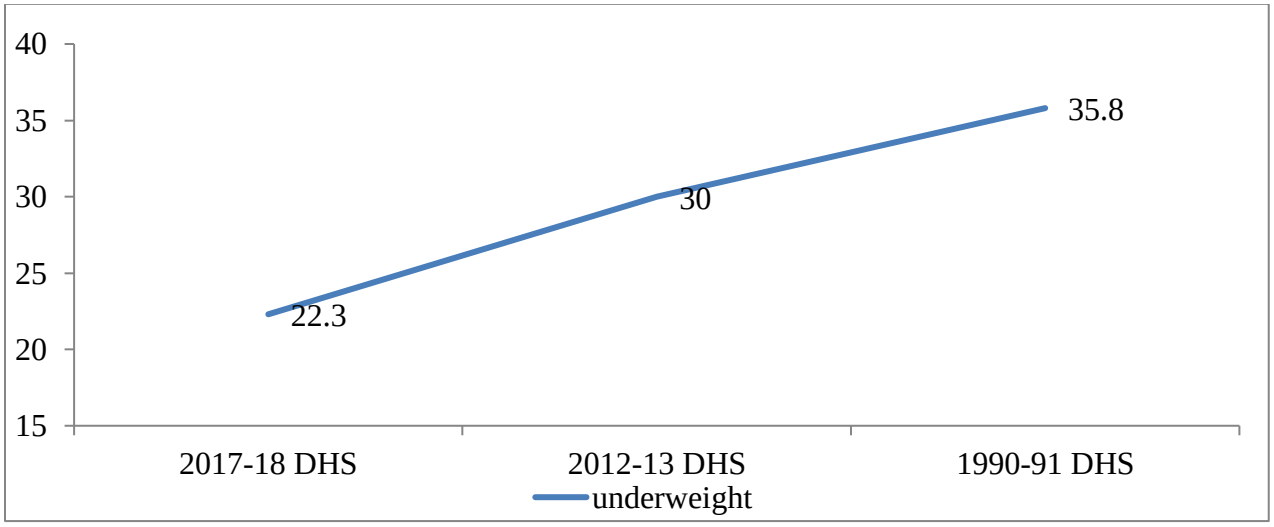


Figure 5.7: Trend of Underweight Children in Pakistan

5.3 Trend Analysis of indirect variables of Child Poverty in Pakistan

The second category of measuring child poverty is that of checking the impact of different variables on the major variables. In this category we will analyze and explain those variables which affect child mortality, child morbidity, child malnutrition and infant mortality. All the indirect variables are explained with the help of diagram below.

Figure 5.8 shows trend for size of the child at the time of birth for data collected for three years preceding the survey. This variable directly effects infant mortality. The size of the child is divided into three main categories, i.e. very small, smaller than average and average or larger. The data shows that trend in all the three categories have das declined over the last thirty years. If we look at the trend of very small size of the child we see that percentage value for the variable has increased from 7.4 percent in 1990-91 to 12.3 percent in 2006-07. However, the value has decreased to 4.2 percent in 2006-07. The variable has again showed a positive trend in 2017-18 as the value has increased to 4.8 percent. However, the overall trend of the variable is negative and has improved of the period because the beneficial category of child size, i.e. average or larger has increased over the time. The data shows that average size child birth in 1990-91 was 73.7 percent, 65.6 percent in 2006-07, 78.3 percent in 2012-13 and increased to 78.6 percent in 2017-18. The positive trend in this category has a direct relation will the survival of the child. Hence we can say that the overall trend has improved and infant mortality has decreased over the time.

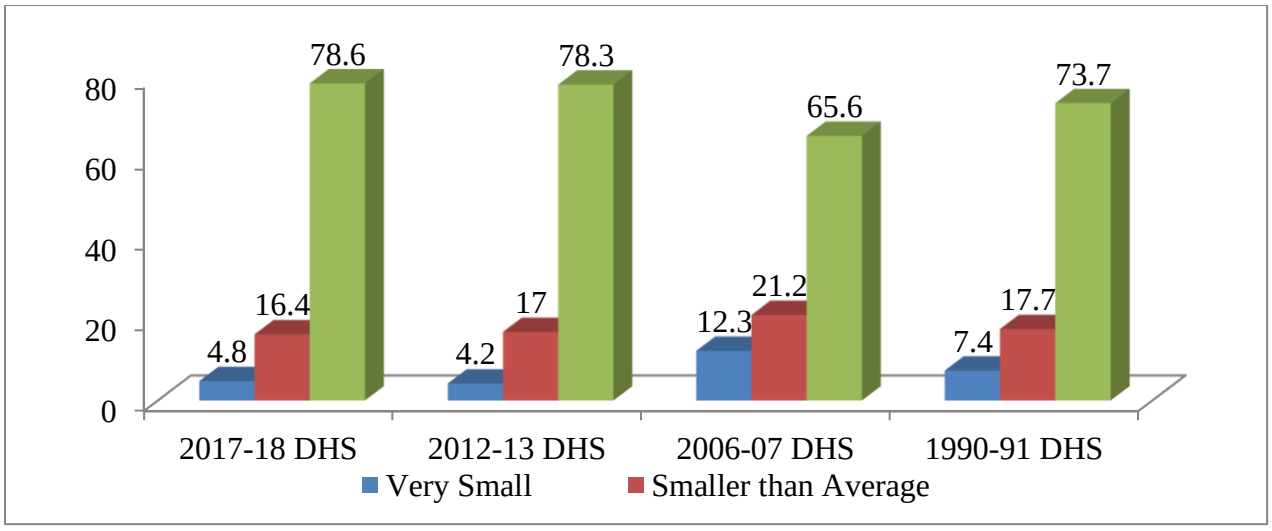


Figure 5.8: Trend of size of Child at the time of Birth

The other indirect measure of child poverty is that of education level of women in the household. Education level of women in the household affects all direct measures of child poverty, i.e. child mortality, child malnutrition, child morbidity and infant mortality. Figure 5.9 shows that the no education of women in household has declined from 79.2 percent in 1990-91 to 65 percent in 2006-07 and has further declined to 57.1 percent in 2012-13. The variable has further decreased to 49.2 percent in 2017-18. On the other hand, primary and secondary education shows positive trend. For instance primary education has increased from 11.7 percent in 1990-91 to 34.3 percent in 2017-18. Similarly, secondary and higher education has increased from 9.1 percent in 1990-91 to 16.5 percent in 2017-18. As both the education variable show positive trend in the long run, hence we can say that the variable is showing a positive trend and has improved over the time. It indirectly means that the major variables have also improved over the time.

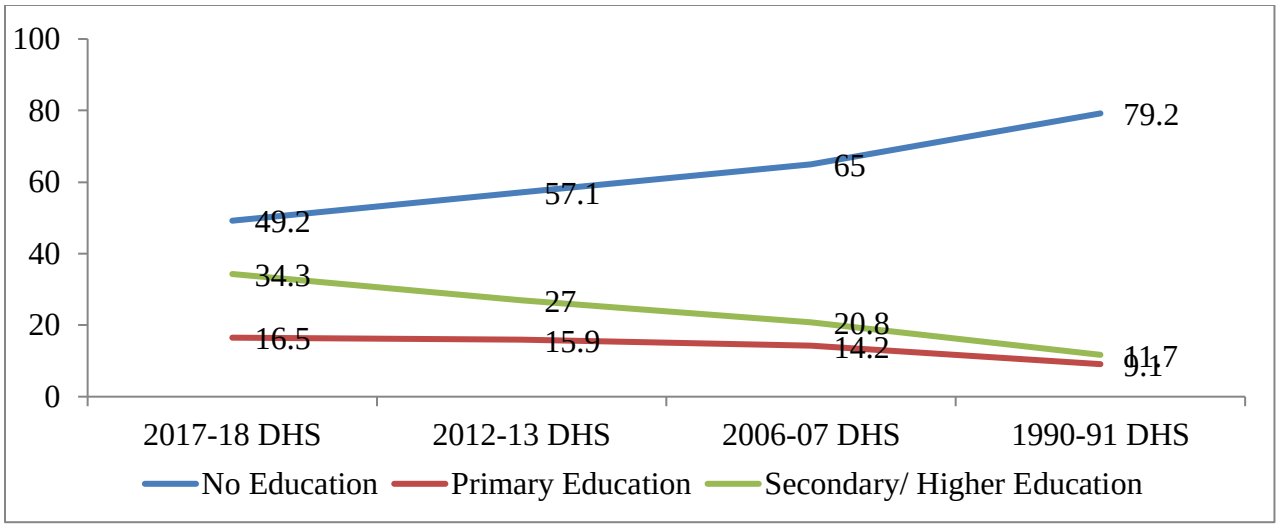


Figure 5.9: Trend of Women Education in Pakistan at different levels

Place for cooking directly affects the major variable of ARI and child morbidity. Figure 5.10 shows four different categories of cooking in house hold. All the four categories, except cooking in household, show improvement in the two preceding PDHS surveys, i.e. 2012-12 and 2017-18. For instance no cooking in household has increased from 0.3 percent to 0.5 percent. Similarly, separate building for cooking has also increased from 5.6 percent in 2012-13 to 6.4 percent in 2017-18. It means that the variable is showing a positive trend and hence improvement in the child poverty.

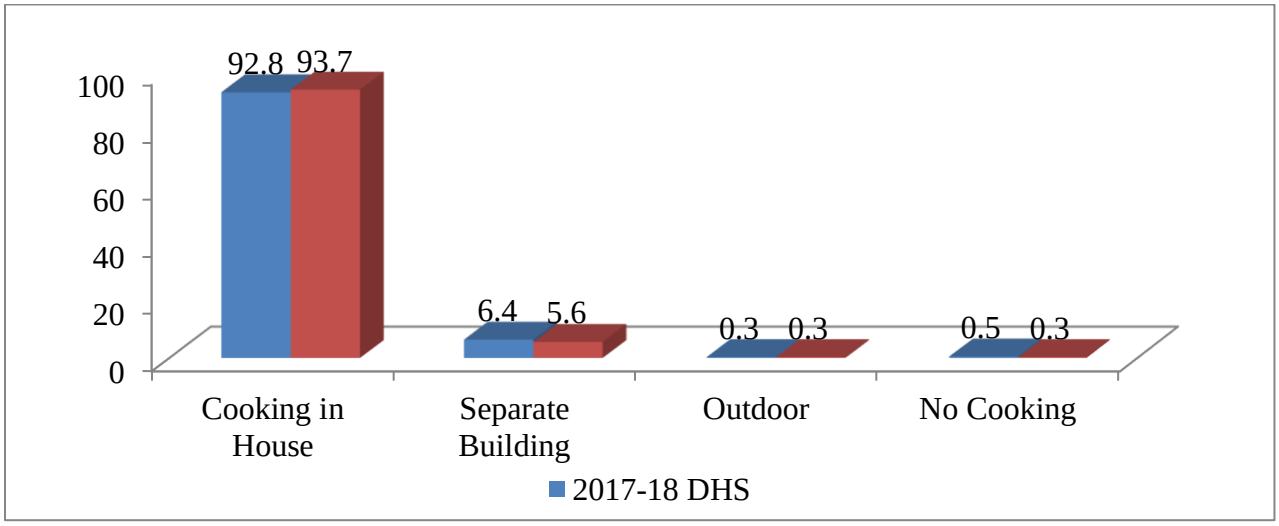


Figure 5.10: Trends of Place of Cooking in Pakistan

Toilet facility is very important variable in terms of determining child and overall family health. Figure 5.11 shows percentage values toilet facility in all the four PDHS surveys. Here the improved toilet facility has constantly increased over the time period. Initially in 1990-91 only 25.6 percent of the households used improved toilet facility. In 2006-07 the variable improved and increased to 52.3 percent of the households. Similarly, the variable kept on improving and reached to 81.2 percent in 2017-18. It means that now 81.2 percent of the population is using improved toilet facilities in the house. As the variable has improved the period under consideration, hence is showing a positive trend.

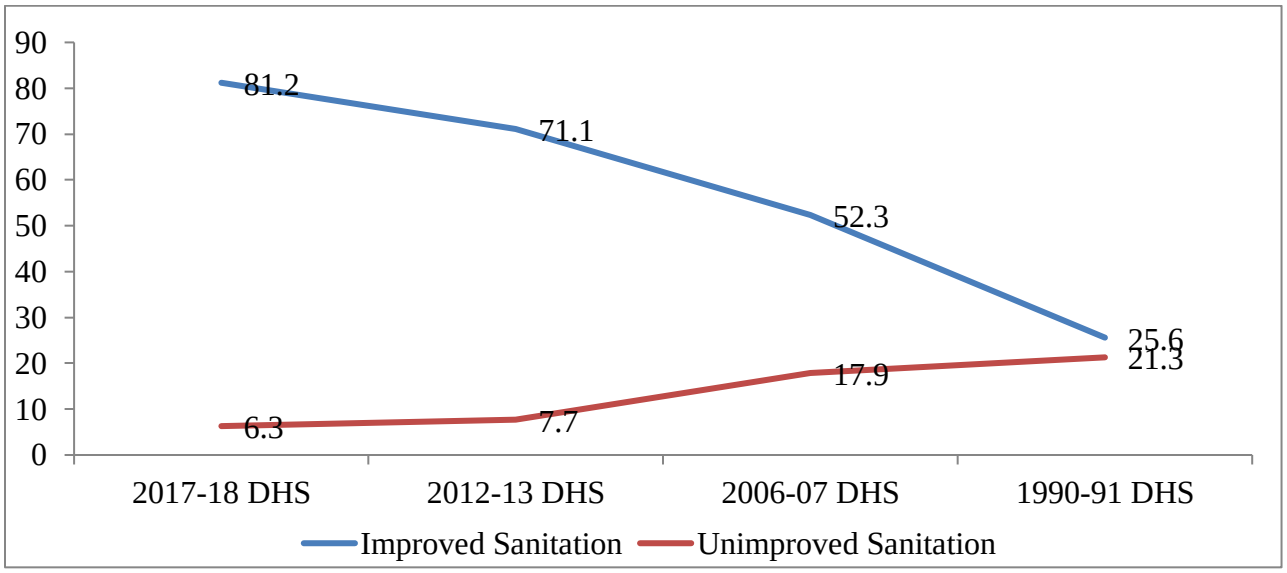


Figure 5.11: Trend of Availability of Toilet facility in Pakistan

Drinking water facility is directly related to child morbidity and diarrhea. Figure 5.12 shows values for improved drinking water facility for four PDHS surveys. It is evident from the figure below that the drinking water facility has improved and shows positive trend. In 1990-91 only 78.4 percent household were using improved drinking water facilities. The figure increased to 94.15 percent in 2006-07, 95 percent in 2012-13 and 96 percent 2017-18. As the improve drinking water facility has increased and show positive trend, hence diarrhea and child morbidity have decreased of the time.

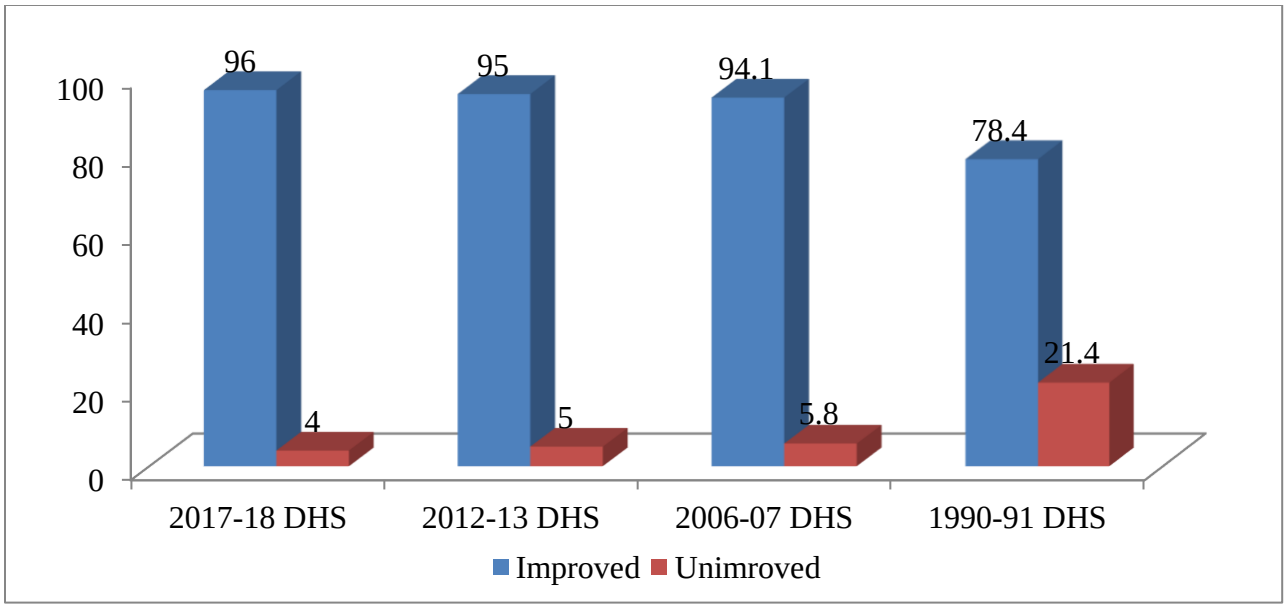


Figure 5.12: Trend of Drinking Water Sources in Pakistan

The last but not the least variable that affect indirectly child poverty is that of vaccination. Figure 5.13 shows trend of vaccination in four PDHS surveys. The vaccination percentage of new born, infant and child has gradually improved over the time. In 1990-91 only 35.1 percent of the new born got vaccinated. However, the vaccination level increased and reached 47.3 percent in 2006-07, 53.8 percent 2012-13 and 65.6 percent in 2017-18. It shows a positive trend in the vaccination level. In other words it shows increased survival chances of new born.

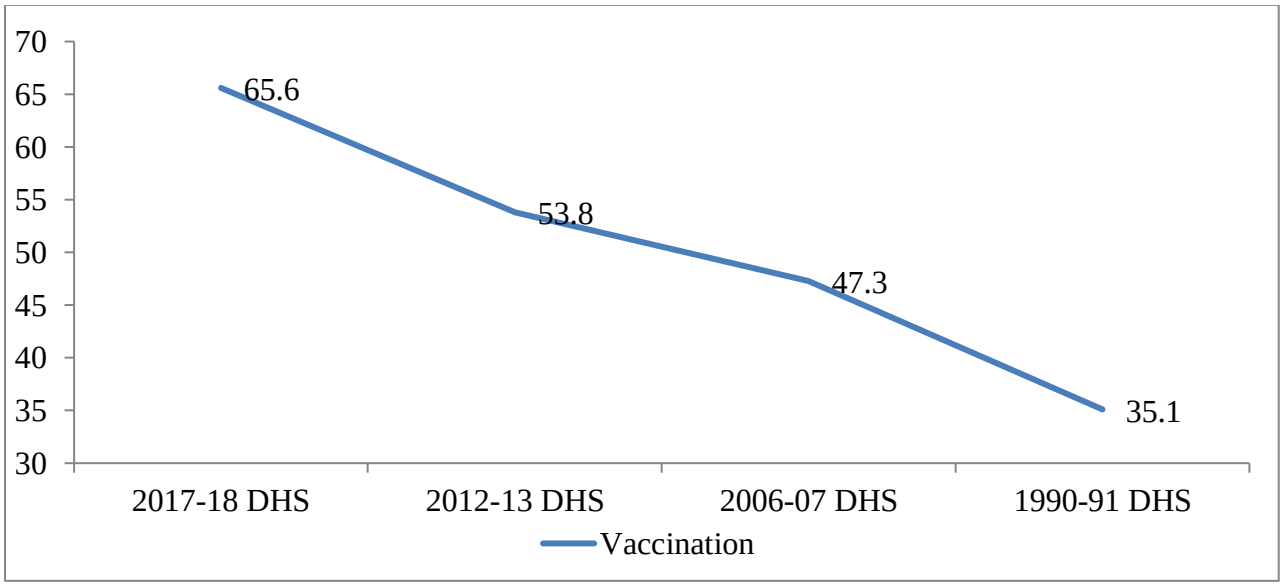


Figure 5.13: Trend of Vaccination to the Children in Pakistan

5.4 Policy Analysis

The policy can be defined as “a course of action adopted and pursued by a government”. In case of child poverty policies has been formulated from time to time at national and international level to address the issue of child poverty. The examples of these policies are health care polices, poverty reduction policies, financial aid policies, policies for achieving sustainable development goals and millennium development goals. The results of these policies are evident in this chapter but, it can be said that the goals have been achieved completely. There are two types of child poverty observed over the globe according to unicef. The first type of child poverty is that of multidimensional and the second one is monetary child poverty. The multidimensional child poverty includes health, sanitation, education, living conditions, nutrition, water and protection. Monetary child poverty determines financial barriers that prevent children from reaching their full potential.

The important points of policy formulated for SDGs 2017 were;

1. To reduce social stigma and discrimination to increase the chances of economic activity for the deprived class of the society.
2. To introduce child sensitive social protection or social welfare systems in order to formulate comprehensive programs for children facing extreme range of deprivations.
3. Inclusion of child poverty reduction in national poverty reduction programs.
4. Economic growth targeting pro-poor strata of the society to increase redistribution of income among the people. This policy goal is basically to target tax system, employment system and welfare system in a country.

In Pakistan the poverty reduction has remained a prime focus for the policy makers. In the start the financial support to reduce poverty was included in the five years developmental plans, then

it has also remained part of the annual development plans, millennium development goals and sustainable development goals. In the last three decades we see that several individual programs were initiated by the Pakistan government to address the issue of child poverty and overall poverty. These programs include Benazir Income Support program (BISP) started in the 2008 and Lady Health Workers (LHW) program started in 1994. Similarly, various programs are initiated under the Pakistan Poverty Alleviation Fund (PPAF).

In the history of poverty alleviation in Pakistan we see that most of the programs are focused on the financial status improvement of the general population. These programs include PPAF-I, PPAF-II, PPAF-III, PRISM and Microfinance Innovation & Outreach Program (MIOP). The reason for targeting financial side of the child poverty is because of the reason that the monetary child poverty bears direct impact on the multidimensional child poverty. Once the financial side of the poverty is reduced the multidimensional child poverty will automatically be reduced.

The results of the study show positive trends in terms of reduction of the child poverty in Pakistan. It is basically due to the successful implementation of the poverty reduction policies in the country. The most successful policies which bear huge impact on the reduction of the multidimensional child poverty are the health policies and LHW programs in the country. Before these policies the rural region faced a big issue of health related problems and had to travel to the urban areas to meet the needs. However, LHW program had given health services and information at the door steps in the rural areas of Pakistan specially. It on the one side has educated people in reducing population growth and on the other has given them opportunity of better health services. The success of this program can be seen from its regular expansion throughout the country.

The second and most important aspect is that of the financial help of the general public especially the poor segment of the society. For this purpose the Benazir Income Support Program has yielded maximum results. The focus of this program was to help single mothers and widows in the country. Further programs are also initiated alongside the BISP like EHSAAS program. The budget sheet of the EHSAAS program shows allocation of Rs. 1755.96 million for mother & child health in the year 2019-2020. The dedication of the government for helping the child and mother health has resulted in reduction of overall child poverty in the country.

5.5 Conclusion

This chapter analyzed the trend of different variables affecting child poverty directly and indirectly. The most important and major variables show positive trends. Some of these variables are beneficial when decrease in the value, i.e. improvement, while other are directly related and increase in their value means improvement. Hence the overall trend is positive in terms of improvement of child poverty. The improvement in reduction of child poverty is due to various reasons like improvement in the health facilities, increased level of education and increased wealth quintile of the household.

Chapter 6: The Determinants of Child Poverty: A Multivariate Analysis

The third type of analysis used in this study is multivariate analysis. Seven econometric models were formulated to analyze child poverty in Pakistan. The models were regressed on various variables via binomial logit regression as all of the dependent variables are in binary form. The results of these models are discussed as under.

6.1. Results of Multivariate analysis for Infant Mortality

The first model to analyze child poverty in Pakistan is to analyze infant mortality in the country. The results of multivariate analysis for infant mortality are given below in table 6.1.

Table 6.1: Results of Multivariate analysis for Infant Mortality

Infant Mortality	Coef.	Std. Err.	Odds Ratio	Std. Err.	VIF
Gender of Child (Male=1)	0.140	0.253	1.151	0.291	5.12
Birth Size (Small as reference)					
Average	-0.194	0.299	0.823	0.246	8.93
Large	0.576	0.458	1.779	0.815	7.55
Birth Order	0.854*	0.159	2.351	0.373	5.97
Birth Interval	-0.032	0.119	0.968	0.115	4.61
No. of Sibling (<2 as reference)					
(2-3)	-4.038*	0.387	0.017	0.006	6.23
(4-6)	-6.699*	0.644	0.001	0.007	9.41
7+	-12.131*	1.435	5.390	7.730	0.5
Mother Age (Current)	0.062	0.056	1.064	0.060	2.91
Mother Age at 1st birth	-0.033	0.059	0.967	0.057	7.42
Mother Education (No Education as reference)					

Primary Education	-0.332	0.433	0.717	0.311	3.44
Secondary education	0.083	0.401	1.086	0.436	5.39
Mother Employment (Yes=1)	0.821**	0.351	2.273	0.798	0.2
Tetanus Injection (Yes=1)	-0.297	0.295	0.742	0.219	14.45
Water Source (Improved=1)	0.184	0.398	1.202	0.478	5.34
Toilet Facility (Improved=1)	-0.228	0.348	0.795	0.277	0.6
Exposure to media (Yes=1)	-0.040	0.330	0.960	0.317	2.49
House floor (Pakka=1)	-0.309	0.359	0.733	0.264	4.33
Wealth Index (Poorest as reference)					
Poorer	0.444	0.395	1.559	0.617	4.21
Middle	0.238	0.470	1.269	0.596	7.47
Richer	0.801***	0.554	2.229	1.235	8.65
Richest	0.728	0.633	2.072	1.313	4.66
Region (Urban=1)	0.028	0.299	1.029	0.308	7.58
Province (Punjab as reference)					
Sindh	-0.089	0.405	0.914	0.370	4.57
KPK	-0.072	0.391	0.930	0.363	6.44
Baluchistan	0.367	0.451	1.444	0.651	3.87
GB	-0.236	0.660	0.789	0.521	5.41
AJK	0.315	0.457	1.370	0.627	4.69
Constant	-2.973	1.023	0.051	0.052	

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

This is the results of binary logit model also called binomial logistic regression. It is used when the dependent variable of the study is in binary form, (zero and one) (0,1) form. The results show that child mortality is positively and significantly associated with birth order of child. In other

words, the probability of child mortality is increasing with an increase in the probability of a child at first on birth order. Top order kids are first of their mothers with no practical experience before, that the reason of increasing probability of infant's death. Sibling of a child is an indicator of mother experience in raising children. It is negatively associated with infant mortality. Increasing the number siblings can be observed from the categories represented by the three dummies, increase in siblings reduces the probability of infant death because it also indicates that the mother is healthy and strong lady. The infant will survive with greater probability as compare to infant's probability of survival as the first child to his/her parents.

Study results show that the probability of infant's death occurring in a household decreases with an increase in number of survived kids to the same parents. Another important indicator, which is statistically not significant but worth mentioning is the mother age at the time of first child birth. The relationship shown in the study's results is negative, indicating the increasing age of mother at first child birth reduces the probability of Infant's death or occurring an event of infant mortality/death. This indicator has a very relevant policy outcome, in terms of marriage minimum age limits, which can help in reducing the infant mortality in future. Mother employment increases the probability of infant death because it restricts the mother's mother for child care, which can cause many deficiencies in the early age of a child and lead to infant mortality. The remaining variable are statistically not significant, which means there doesn't exist any statistical connection between infant mortality and other socio-economic characteristics of a household. Constant of the model is significant indicating the effects captured of not included variables.

The results of the study show Odd Ratios of occurring an event of infant death at a household level. Sign of odds relationship can be seen from the z value and statistical significance can be observed by looking into the value of p or (P>z), which if greater than 0.05 indicates that there is

not statistical relationship between given variables. The results indicate that Odds of infant death over the odds of infant survival, increases if the birth order declines because of low level of experience for raising first kid. Increase in number of siblings decreases the Odds of occurring infant's death over the odds of infant survival at a household level. It means that odds of survival increase with number of siblings survived before. Look at the z Value and odds carefully, it is reducing with increasing siblings across households. The odds of infant death over infant survival are more than 200 percent greater for employed females as compare to unemployed mothers and statistically significant in case of Pakistan.

In order to check multicollinearity among independent variables Variance Inflation Factor (VIF) is used. It is observed that VIF value is higher for most of the variables, i.e. greater than, which shows that there exists multicollinearity among the variables. The basic reason for the existence of multicollinearity is use of dummy variables. The binary dummies are almost same for all the variables; hence multicollinearity is inevitable in this model.

6.2 Results of Multivariate analysis for Child Mortality

The second of child poverty is child mortality. For analyzing child mortality a binomial regression analysis is carried out. The results of multivariate analysis for child mortality are summarized in table 6.2 below.

Table 6.2: Results of Multivariate analysis for Child Mortality

Child Mortality	Coef.	Std. Err.	Odds Ratio	Std. Err.	VIF
Gender of Child (Male=1)	0.115	0.104	1.122	0.117	5.22
Birth Size (Small as reference)					
Average	-0.288**	0.127	0.749	0.095	4.71
Large	-0.329***	0.218	0.719	0.156	6.49

Birth Order	0.437*	0.054	1.548	0.084	5.34
Birth Interval	-0.432*	0.046	0.649	0.030	3.86
No. of Siblings (<2 as reference)					
2-3	-2.943*	0.203	0.052	0.010	4.78
4-6	-4.772*	0.252	0.008	0.002	3.71
7+	-6.701*	0.389	0.001	0.004	8.64
Mother Age (Current)	0.056*	0.020	1.058	0.022	7.55
Mother Age at 1st birth	-0.059**	0.023	0.942	0.022	4.57
Mother Education (No education as reference)					
Primary	0.033	0.159	1.034	0.165	6.83
Secondary	-0.351**	0.172	0.703	0.121	2.55
Higher	-0.734*	0.256	0.479	0.122	0.9
Mother employment (Yes=1)	0.095	0.157	1.100	0.172	1.42
Water Source (Improved=1)	-0.062	0.162	1.064	0.173	7.69
Toilet facility (Improved=1)	-0.052	0.151	0.948	0.143	4.72
Exposure to Media (Yes=1)	0.032	0.134	1.032	0.138	6.44
House Floor (Pakka=1)	0.346**	0.153	1.414	0.217	8.91
Wealth Index (Poorest as reference)					
Poorer	-0.156	0.161	0.855	0.137	0.21
Middle	-0.267***	0.198	0.765	0.151	6.26
Richer	-0.158	0.236	0.853	0.201	7.41
Richest	-0.250	0.269	0.778	0.209	8.74
Region (Urban=1)	-0.120	0.126	0.886	0.111	7.38
Province (Punjab as reference)					
Sindh	-0.311**	0.166	0.732	0.122	0.82

KPK	-0.337**	0.165	0.713	0.117	1.66
Baluchistan	0.196	0.169	1.217	0.206	7.28
GB	-0.159	0.235	0.852	0.200	6.81
AJK	-0.025	0.203	0.974	0.197	0.01
Constant	0.292	0.445	1.340	0.597	

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

The result of the study shows that birth size is statistically a significant influencing factor of child mortality. The probability of child mortality or child death decreases with an increase in birth size of a child. The p value shows that there is significant adverse association between birth size of a child and child mortality or death before 5 years of his/her age. The probability of child death before 5 years (child mortality) increases if the child is a first kid to the mother because of lack of expertise on understanding and caring an infant or a kid with age less than 5 years. Odd ratio shows that odds of child mortality are significantly high for small size of child at birth over the odds of large size child at birth. The odds of survival over the odds of birth are greater for child with experienced mother or mothers who have gave birth to a kid before. Importantly the study found, that the interval between children birth plays important role in reducing the child mortality. Increase in birth interval reduces the probability of child death before 5 years.

The odds of child death are greater over the odds of survival for smaller birth interval. It means birth interval is important for a child to receive proper care from mother. The results show that increase in number of siblings for a child reduces the probability of child mortality or death. In other words, odds for child mortality over the child survival are greater for less number sibling's as compare to child with high number of siblings. Odds for child mortality decreases as the number of siblings increases across households. Mother current age is positive but age at the

time of first child birth is negatively associated with variation in the probability of child mortality.

The odds of Child mortality are less over the odds of child survival for mother at high age comparatively to younger ones during the birth of first child. There are several justifications for this relationship. The experience factor, body medical adjustment factor and understanding the child factor influences the odds of child mortality over survival. Increase in education is negatively influences the probability of child mortality, which means that odds of child mortality over odds of child survival are greater for less educated mothers as compare to highly educated mothers. The probability of child mortality is positively associated with pawed housing, which indicates towards deaths occurred due to child fall down from stairs, wall and the floor is pawed so chance of hurting or death increases. The odds of child death are higher over child survival in a pawed house as compared to un pawed houses. The provinces wise analysis shows that KPK residence have lower probability of child mortality as compare to other provinces. In other words, the odds of child survival over child mortality are greater in KPK as compare to Sindh, Punjab, Baluchistan and other regions. The remaining indicator doesn't exhibit any statistical relationship with child mortality in this case.

In order to check multicollinearity among independent variables Variance Inflation Factor (VIF) is used. It is observed that VIF value is higher for most of the variables, i.e. greater than, which shows that there exists multicollinearity among the variables. The basic reason for the existence of multicollinearity is use of dummy variables. The binary dummies are almost same for all the variables; hence multicollinearity is inevitable in this model.

6.3. Results of Multivariate analysis for Child Morbidity

The literature shows that child morbidity cannot be determined directly. Hence an indirect approach is used to measure child morbidity. In this approach child morbidity is analyzed through ARI and Diarrhea. The results of bivariate analysis for ARI and Diarrhea are summarized in table 6.3 and 6.4 respectively.

Table 6.3 Results of Multivariate analysis for ARI

ARI	Coef.	Std. Err.	Odds Ratio	Std. Err.	VIF
Gender of Child (Male=1)	0.088***	0.055	1.092	0.060	9.69
Child Age	-0.005**	0.001	0.994	0.001	6.39
Birth Order	0.165*	0.029	1.180	0.034	0.93
No. of Sibling (<2 as reference)					
2-3	-0.351*	0.090	0.703	0.063	0.55
4-6	-0.651*	0.133	0.521	0.069	8.51
7+	-1.026*	0.228	0.358	0.081	7.53
Mother Age (Current)	-0.016**	0.006	0.984	0.006	8.24
Mother Education (No education as reference)					
Primary	0.189**	0.087	1.208	0.105	5.44
Secondary	0.135***	0.086	1.145	0.098	6.71
Higher	-0.195***	0.112	0.822	0.092	4.29
Mother Employment (Yes=1)	0.417*	0.084	1.518	0.128	7.82
Kitchen (Yes=1)	-0.089	0.067	0.914	0.061	5.83
Cooking Fuel (Clean Energy=1)	0.108	0.084	1.114	0.093	6.42
Mother Smoking (Yes=1)	-0.110	0.166	0.895	0.149	8.69
Number of Rooms	-0.019	0.022	0.981	0.021	4.61

Water Source (Improved=1)	0.171**	0.085	1.186	0.101	7.36
Exposure to Media (Yes=1)	-0.132**	0.069	1.142	0.079	11.25
House Floor (Pakka=1)	-0.165**	0.081	0.847	0.069	4.51
Wealth Index (Poorest as reference)					
Poorer	-0.071	0.088	0.872	0.095	4.52
Middle	-0.136	0.109	0.851	0.115	2.76
Richer	-0.161	0.135	0.792	0.124	15.62
Richest	-0.233	0.157	1.222	0.084	4.61
Region (Urban=1)	0.200**	0.068	0.930	0.082	7.49
Province (Punjab as reference)					
Sindh	-0.058	0.091	0.943	0.086	5.83
KPK	0.439*	0.080	1.551	0.125	6.48
Baluchistan	0.053	0.118	1.055	0.125	1.22
GB	0.240**	0.129	1.271	0.164	0.71
AJK	0.318**	0.103	1.375	0.142	0.005
Constant	-1.55	0.197	0.212	0.041	

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

The results indicate that Rapid short breathing (RSB) among children is negatively associated with the age of children. Increase in age across children reduces the probability of RSB among children. This is a disease which occurs during early age in childhood most probably in the first year of life. The evidence of ARI decreases as the age increases across the households. P value shows that relationship is statistically significant and the odd ratio of the same indicator shown in lower part of the table. The odds of occurring RSB over not occurring are 99 percent greater for a child of one year of age as compare to two years old child. Birth order is significantly associated with the probability of RSB problem in the kids. Increase in birth order increases the probability

of RSB for the child. Odds are 118 percent greater for the first kid to get ARI problem vs not getting ARI by birth as compare to second child. Because at first birth mothers have not developed strong immunity system, which sometime cause negative externalities for newly born babies. The negative association between RSB and siblings intensifies with increasing number of siblings, it can be observed from coefficient values of sibling's dummies.

Coefficients for greater siblings are higher with negative sign, means that odds for ARI among children are 70 percent higher over no ARI among the children with zero number of siblings. Variation in probability of ARI among children is adversely explained by the variations in current age of mothers. The association is statistically significant with p value less than 0.05. Increase in age across the mothers lead to decrease the probability of ARI evidence among children. Primary education is positively and higher education is negatively influencing the probability of ARI evidence among the children. It means that higher education is helpful for reducing the probability of ARI. Odds for ARI in a child are 38 percent greater vs no ARI in primary educated mother as compare to higher educated mothers. Mother exposure to pollution and dirty environmental conditions is possible with employment because it require travels and filed work, which sometimes causes Asthma short breathing issues in adults, which are passed on to their insisters. The results indicate positive association between chances of ARI among children and mother employment. It may also be the reason traced to care time and understanding between mother and kid. Water sources contamination has positively association with increasing probability of ARI among children in their early age. Exposure to media is negatively influencing the probability of ARI among children because it helps mothers in spreading awareness about certain antenatal care and pre and postnatal care. Media exposure help mothers to reduce the probability of children getting ARI through taking specific adaptation and mitigation measures during pregnancy. Pawed house floor reduces the probability of ARI among

kids because the kids always play on floor and pawed floor has smaller amount of dust and soil, which helps in reducing the chances of ARI among the children. Odds for ARI are significantly greater vs no ARI in un-pawed houses as compared to pawed houses or floors. All the provincial dummies expect KPK, indicate positive associated with increasing probability of ARI among kids. Odds of ARI vs No ARI are greater in other provinces as compared to KPK.

In order to check multicollinearity among independent variables Variance Inflation Factor (VIF) is used. It is observed that VIF value is higher for most of the variables, i.e. greater than, which shows that there exists multicollinearity among the variables. The basic reason for the existence of multicollinearity is use of dummy variables. The binary dummies are almost same for all the variables; hence multicollinearity is inevitable in this model.

Table 6.4: Results of Multivariate analysis for Diarrhea

Diarrhea	Coef.	Std. Err.	Odds Ratio	Std. Err.	VIF
Gender of Child (Male=1)	0.129**	0.053	1.035	0.087	5.34
Child Age	-0.020*	0.001	0.980	0.002	7.61
Birth Order	0.120*	0.029	1.095	0.051	9.52
No. of siblings (<2 as reference)					
2-3	-0.264**	0.084	0.876	0.119	7.36
4-6	-0.551*	0.130	0.760	0.159	8.92
7+	-0.940*	0.232	0.680	0.248	6.99
Mother age (Current)	-0.014**	0.006	0.986	0.010	10.68
Mother Education (No education as reference)					
Primary	0.335***	0.084	1.402	0.189	0.9
Secondary	-0.230***	0.082	1.624	0.213	1.34
Higher	0.140***	0.103	1.367	0.223	4.37

Mother Employment (Yes =1)	-0.016	0.090	0.835	0.126	6.59
Kitchen Facility (Yes =1)	0.031	0.066	1.003	0.106	3.79
Water Source (Improved =1)	-0.004	0.083	1.011	0.134	7.84
Water treatment (Yes =1)	0.009	0.095	0.952	0.144	6.91
Toilet Facility (Improved =1)	-0.082	0.078	0.809	0.100	4.68
Soap Facility (Yes =1)	-0.208**	0.068	1.388	0.152	1.59
House Floor (Pakka =1)	-0.100	0.077	0.962	0.116	7.39
Exposure to Media (Yes =1)	0.097	0.066	1.036	0.106	7.41
Wealth index (Poorest as reference)					
Poor**er**	-0.120	0.090	0.812	0.118	5.01
Middle	-0.134	0.107	0.868	0.152	4.96
Richer	-0.256**	0.127	0.720	0.146	3.99
Richest	-0.387**	0.142	0.588	0.135	11.92
Region (Urban =1)	0.074	0.063	1.032	0.103	0.3
Province (Punjab as reference)					
Sindh	-0.499*	0.090	-0.645	0.091	5.41
KPK	0.068	0.075	1.270	0.154	8.94
Baluchistan	-0.097	0.107	1.281	0.208	3.77
GB	-0.484*	0.129	0.723	0.148	0.1
AJK	-0.403*	0.100	0.558	0.093	18.53
Constant	-0.563	0.185	0.545	0.162	

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

The results of the study show that the probability of occurring a diarrhea or an evidence of diarrhea disease is positively influenced by the gender and birth order of a child. This means that odds of getting diarrhea disease vs not getting diarrhea are higher among male children as

compared to female kids. Increase in age across the respondent's children decreases the probability of diarrhea vs no diarrhea among the kids and the odds of diarrhea in one-year children are 98 percent higher as compare to children at the age of two years. The probability of diarrhea decreases as the number of siblings increases because the mothers develop immunity system, which help in protection of kids during early days of life. Furthermore, the size coefficient increases as the number sibling increases across dummies created by the author. The relationship is statistically significant across all the given dummies. Mother's current age is negatively associated with dependent variable diarrhea. The probability of diarrhea among the children decreases the mother age increases across respondents. Soap use reduces the probability of kid's diarrhea infection, which means that odds of children diarrhea are greater vs no diarrhea for none users as compare to users of hand soap after or before food feeding to their kids. Rich class income group children have lower odds of getting diarrhea vs not getting it as compared to lower income groups and poorest in the population sample. Odds for diarrhea vs no diarrhea among kids is greater in other provinces as compare to KPK. Being the resident of Fata the probability of facing diarrhea is increasing, which means there are high odds that the children will face diarrhea if they are from fata.

In order to check multicollinearity among independent variables Variance Inflation Factor (VIF) is used. It is observed that VIF value is higher for most of the variables, i.e. greater than, which shows that there exists multicollinearity among the variables. The basic reason for the existence of multicollinearity is use of dummy variables. The binary dummies are almost same for all the variables; hence multicollinearity is inevitable in this model.

6.4. Results of Multivariate analysis for Child Malnutrition

The literature shows that like child morbidity child malnutrition is also difficult to calculate directly. Hence, an indirect measure by analyzing stunting, wasting and underweight is applied to measure child poverty through child malnutrition. The results of multivariate analysis for all the three measures of child malnutrition are given in table no. 6.5, 6.6 and 6.7 respectively.

Table 6.5: Results of Multivariate analysis for Stunted Child

Stunted	Coef.	Std. Err.	Odds Ratio	Std. Err.	VIF
Gender of Child (Male =1)	0.069	0.079	1.072	0.085	7.36
Child Age	0.026*	0.002	1.026	0.002	8.24
Birth Order	0.048	0.042	1.049	0.044	6.49
Birth Interval	-0.085**	0.032	0.917	0.029	5.28
No. of Sibling (<2 as reference)					
2-3	0.471	0.444	1.603	0.712	5.37
4-6	0.328	0.454	1.383	0.629	7.93
7+	0.194	0.508	1.214	0.617	5.38
Mother Age (Current)	-0.018***	0.010	0.981	0.010	6.17
Mother Education (No Education as reference)					
Primary	-0.172	0.125	0.841	0.105	4.88
Secondary	-0.324**	0.129	0.722	0.093	3.59
Higher	-0.782*	0.178	0.457	0.081	7.52
Mother Employment (Yes =1)	0.183	0.127	1.201	0.152	9.63
Mother BMI	-0.191**	0.068	0.825	0.056	1.47
Water Source (Improved =1)	-0.298**	0.123	0.742	0.091	8.49
Cooking Fuel (Clean Energy =1)	-0.081	0.117	0.922	0.108	6.39

Toilet Facility (Improved =1)	-0.074	0.110	0.928	0.102	8.58
Diarrhea (Yes =1)	0.214**	0.101	1.239	0.125	5.39
Exposure to Media (Yes =1)	-0.141	0.100	0.867	0.087	7.56
Wealth index (Poorest as reference)					
Poorer	-0.437*	0.121	0.645	0.078	4.38
Middle	-0.544*	0.148	0.580	0.086	6.38
Richer	-0.586**	0.175	0.556	0.097	8.39
Richest	-0.912*	0.213	0.401	0.085	1.22
Region (Urban =1)	0.116	0.097	1.123	0.109	0.51
Province (Punjab as reference)					
Sindh	0.569*	0.126	1.767	0.223	4.66
KP	0.234**	0.119	1.264	0.151	15.84
Baluchistan	0.317**	0.145	1.373	0.199	3.52
GB	0.283	0.180	1.327	0.239	8.51
AJK	-0.218	0.163	0.803	0.131	6.39
Constant	0.120	0.530	1.127	0.598	

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

The results of the study indicate that stunting is positively associated age because the increase let us know if the child is stunted or not, so most of stunted kids are realized as stunted after certain years of age. Results show that birth interval extension decreases the probability of being stunted for a kid, which insights to the family planning policy interventions to reduce to the stunted among the upcoming generations. In other words, the odds for stunted vs not-stunted are 99 percent high among the kids born in one-year shorter interval as compare to the kids born with one unite longer interval after his/her siblings. Current age of mother is negatively associated

with the probability of stunting at household level; however, the relationship is weakly significant.

Increase in education indicates the reduction in probability of kids stunting which can be observed from the coefficients of secondary and higher education dummies. On shifting from secondary to higher education we see that the negative effects on stunting doubles to reduce probability of stunting among the kids. Odds of stunted vs not-stunted are 72 percent lower for secondary educated mother's child as compared to illiterate mother's child. Mother BMI is negatively, associated with probability of stunting. House characteristics like water quality the use have specific implications for kids' health and growth. The study found that improved quality has adverse relationship with the probability of stunting. The odds of stunted vs not-stunted are 74 percent lower for the household whose water sources have been improved as compared to un-improved water users' households. Illness history is positively associated with increasing the probability of stunting at household level among the kids. Diarrhea effected kids are highly at risk to stunting or we can say that, odds for stunted vs not stunted are 123 percent higher for kids with illness history of diarrhea as compare to kids who have never faced diarrhea. The relationship is statistically significant with p value less than 0.05, which indicates that diarrhea increases the probability of being stunted for kids. The wealth index score exhibits negative association with stunting and the coefficient value increases with negative sign indicate that increase in wealth reduces the probability of stunting at household level. Residents of KPK have higher probability of stunted kids as compared to other regions. Odds of stunting vs not stunted are at KPK are 126 percent greater as compared to other regions in Pakistan. Odds of stunted vs not stunted are 176 and 137 percent greater in Sindh and Baluchistan as compared to control region Punjab, respectively.

In order to check multicollinearity among independent variables Variance Inflation Factor (VIF) is used. It is observed that VIF value is higher for most of the variables, i.e. greater than, which shows that there exists multicollinearity among the variables. The basic reason for the existence of multicollinearity is use of dummy variables. The binary dummies are almost same for all the variables; hence multicollinearity is inevitable in this model.

Table 6.6: Results of Multivariate analysis for Wasted Child

Wasted	Coef.	Std. Err.	Odds Ratio	Std. Err.	VIF
Gender of Child (Male =1)	0.055	0.135	1.057	0.143	5.38
Child Age	-0.019*	0.004	0.980	0.004	3.95
Birth Order	0.129**	0.069	1.138	0.079	1.04
Birth Interval	0.078	0.055	1.081	0.060	17.49
No. of Sibling (<2 as reference)					
2-3	0.942	1.036	2.567	2.662	2.61
4-6	0.673	1.052	1.961	2.063	3.72
7+	0.504	1.118	1.656	1.852	4.82
Mother Age (Current)	-0.014	0.017	0.985	0.016	1.02
Mother Education (No Education as reference)					
Primary	-0.185	0.228	0.830	0.189	19.31
Secondary	-0.063	0.232	0.938	0.218	6.81
Higher	0.004	0.307	1.004	0.308	5.18
Mother Employment (Yes =1)	-0.3711***	0.230	0.689	0.158	9.83
Mother BMI	-0.194***	0.114	0.822	0.094	10.49
Water Source (Improved =1)	-0.192	0.195	0.825	0.160	13.62
Cooking Fuel (Clean Energy =1)	0.179	0.196	1.196	0.235	6.94

Toilet Facility (Improved =1)	0.098	0.186	1.103	0.206	1.91
Diarrhea (yes =1)	-0.021	0.169	0.978	0.165	2.04
Exposure to Media (Yes =1)	0.037	0.171	1.038	0.178	9.41
Wealth index (Poorest as reference)					
Poorer	0.392**	0.201	1.480	0.298	2.71
Middle	-0.113	0.261	0.893	0.233	5.42
Richer	-0.282	0.308	0.754	0.232	9.84
Richest	-0.481	0.378	0.617	0.233	2.63
Region (Urban =1)	0.091	0.161	1.095	0.177	8.69
Province (Punjab as reference)					
Sindh	0.981*	0.237	2.667	0.632	2.51
KPK	0.537**	0.238	1.711	0.409	6.38
Baluchistan	1.589*	0.242	4.901	1.187	5.36
GB	-1.325**	0.618	0.265	0.164	2.83
AJK	0.357	0.305	1.429	0.436	6.71
Constant	-3.165	1.145	0.042	0.048	

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

The results of the research show that wasting is negatively associated with age of the child. Wasting is less intensive as compared to stunting issue among kids. It is argued that episodes of wasting are shorter as compared to stunting. Wasting can be reduced with increasing age and treatment at the earliest stage of realizing problem. Wasting is a cause and outcome of malnutrition and weak food intake. The results show that increase in age of child has negative relationship with probability of wasting among children. There are 10 percent less chances of wasting for kids with one-year older age in the data. Birth order growth increases the chances of being wasted with weak statistical significance in this case because the p value is slightly greater

than 0.05, which indicates that weak relationship is evident. Mother's BMI also helps in reducing the probability of being wasted among kids and it is also weakly significant in terms of p value greater than 0.05 but less than 0.10. Most of the indicators on coefficient list do not shows any relationship with variable wasting but wasting probability is significantly among the poor group of wealth index at household level. Odds of wasted vs not wasted are 148 percent higher among the poor income group as compare to richest income group in the data. The odds of wasted vs not wasted are 266 percent higher in KPK as compare to other provinces in Pakistan but monumentally, disaster is this percent for wasting in Baluchistan, which is 490 percent as compared to other provinces.

Table 6.7: Results of Multivariate analysis for Underweight Child

Underweight	Coef.	Std. Err.	Odds Ratio	Std. Err.
Gender of Child (Male =1)	0.186**	0.090	1.204	0.109
Child Age	0.013*	0.002	1.013	0.002
Birth Order	0.079***	0.045	1.082	0.049
Birth Interval	-0.111**	0.036	0.894	0.032
No. of Sibling (<2 as reference)				
2-3	0.644	0.571	1.905	1.089
4-6	0.419	0.581	1.520	0.884
7+	0.086	0.632	1.090	0.689
Mother Age (Current)	0.003	0.011	1.003	0.011
Mother Education (No Education as reference)				
Primary	-0.094	0.143	0.909	0.130
Secondary	-0.305**	0.156	0.737	0.115
Higher	-0.890*	0.241	0.410	0.099

Mother Employment (Yes =1)	0.267**	0.137	1.306	0.179
Mother BMI	-0.347*	0.076	0.706	0.053
Water Source (Improved =1)	-0.287**	0.131	0.750	0.098
Cooking Fuel (Clean Energy =1)	-0.081	0.137	0.921	0.126
Toilet Facility (Improved =1)	0.147	0.121	1.158	0.140
Diarrhea (Yes =1)	0.336**	0.112	1.400	0.157
Exposure to Media (Yes =1)	-0.032	0.117	0.968	0.113
Wealth Index (Poorest as reference)				
Poorer	-0.352**	0.130	0.702	0.091
Middle	-0.657*	0.168	0.518	0.087
Richer	-0.674**	0.201	0.509	0.102
Richest	-1.148*	0.265	0.317	0.084
Region (Urban =1)	0.077	0.111	1.080	0.120
Province (Punjab as reference)				
Sindh	1.166*	0.145	3.210	0.466
KPK	0.427**	0.146	1.532	0.225
Baluchistan	1.122*	0.160	3.073	0.493
GB	-0.292	0.243	0.746	0.181
AJK	-0.004	0.205	0.995	0.204
Constant	-1.310	0.655	0.269	0.176

Note: * denote significant at 1 percent, ** denote significant at 5 percent, *** denote significant at 10 percent

The results of the study indicate that male child has high probability to born underweight, in other words, the odds of underweighted vs overweighted are significantly high for male child as compare to female child. The estimation shows that increase in age of child has direct positive and statistically significant relationship with probability of underweight children at household

level. Birth order growth increases the chances of being underweight and it is statistical significance in this case because the p value is less than 0.05. Birth interval has negative impact on probability of being underweight. Increase in birth interval means taking more time after the birth of a kid for the birth of next kid, which decreases the probability of underweight child birth. Long interval helps mothers to give proper attention to their kids and take good care of their self during pregnancy. Parental characteristics are like mother education and mother BMI increase decreases the probability of underweight child birth and the association is statistically significant. Water source improvement reduces the probability of underweight child birth at household level in Pakistan. Regional wise analysis shows that household from KPK Sindh and Baluchistan residents have higher probability of underweight child birth as compare to other provinces. Odds for underweight vs normal are 300 percent greater for KPK and Sindh as compared to other provinces.

Chapter 7: Conclusion and Recommendations

7.1 Conclusion

The environmental degradation has affected the human life in various ways. The climate change is the largest outcome of environmental degradation. The children under age of five years and infant are more prone to the environmental, social and other household factors. Life expectancy, child and infant health, child morbidity and child malnutrition are analyzed in light of various factors. These factors combinedly accumulate to child poverty. Three different analysis approaches are used to examine child poverty in Pakistan. The results of all the three type of analysis show that environmental and household factors are of greater importance in determining child poverty in Pakistan.

The results of bivariate analysis show that male children in the age bracket of 6 to 11 months face high rate of Diarrhea and ARI. On the other hand, mothers having primary education and smoking habit also increase chances of both the diseases. Similarly, houses with unimproved sources of drinking water and toilet facility and using smoky material like shrubs for cooking purpose face high rates of diarrhea and ARI. The bivariate analysis show that people from urban areas, children living in KPK province of Pakistan and people with wealth index from poorest to middle income have high chances of getting diarrhea and ARI.

The results show that infant mortality rate is higher in female with very small birth size, having less than 17 months interval in between birth of two children and having being 2nd in the birth order. On the other hand, mortality rate is higher in male with very small birth size, having less than 17 months interval between the birth of two children and being 2nd in the birth order. It is evident from the results that mothers in the age bracket of 12 to 18 years at the time of first baby birth and having primary or no education face higher rates of infant and child mortality. It is also

clearly indicated in bivariate analysis that people living in urban settings of Baluchistan province and belonging to poor class of society face high rates of infant and child mortality in Pakistan.

It is evident from the bivariate results that male children in the age bracket of 24-35 months and having less than 17 months birth interval with very small birth size are highly stunted and underweight while male children less than 6 months of age and having birth interval of 24-35 months with very small birth size face high rate of being wasted. The results show that rate of stunting, wasting and underweight is higher in children when mother has no education and her BMI is less than 18.5. It can be concluded that families living in rural regions of Sind and Baluchistan having poor wealth index face high rate of child malnutrition in Pakistan.

It is evident from the results of trend analysis that overall child poverty has decreased over time in Pakistan. Two types of variables are used in trend analysis. The first type is directly related and increase in their value means direct increase in the child poverty while the second type effects indirectly and their impact is subjective. However, we can conclude that overall health conditions of children and child poverty has improved over time in Pakistan. The improvement in most of the factors is due to improvement in health and other social facilities. Along with this emergence of new technologies and modern techniques are playing very positive role in reduction of child poverty. On the other hand, various organizations are playing positive roles in spreading awareness among the masses and importance of certain variables which directly affect the child and indirectly child poverty, i.e. vaccination and education. Hence, we can conclude that since 1990 the child poverty has decreased gradually and the environmental factor are playing very positive role in reduction of child poverty in Pakistan.

The results of logit regression analysis are summarized in chapter 6 of this study. The results are in line with the theory as most of the indicators show same trend and affect as is explained in

other type of analysis in this study. However, certain variables are not significant as indicated by the theory. The reasons for these variables not attributing to the theory is because of the data thus collected. However, we can conclude that overall results of regression analysis show that the household, environmental and social factors are directly affecting the child poverty in Pakistan and are hence playing a very positive role in determining the child health and mental conditions. The improved household hygiene conditions along with improved environmental factors provide higher chances of child survival and vice versa. Similarly, social factors like wealth index of the family, region and province of residence of the family and employment of mother also play positive role in reduction of child poverty in Pakistan. Mother education and age at household level is of greater importance in determining child poverty. On the other hand, improved health facilities and increasing trend of vaccination is also adding positively to reduce child poverty in the region. The child poverty can be further reduced by formulating and enforcing new policies regarding child health. The education, awareness, health and environment sector needs special attention in addressing child poverty in Pakistan.

7.2 Recommendations

The recent trend and analysis show that the child poverty has reduced over the time but there is enough room for improvement to compete with the developed nations. For this purpose and based on the current analysis following policy recommendations are suggested to further improve and reduce child poverty in Pakistan.

1. Infant and child mortality are observed with high rates in the rural areas of Pakistan. The reason for high rates in the rural areas is unavailability of health facilities. Most of the developed health facilities are located in the urban areas of the country and hence people

from rural areas need to reach on time in such cases. The recommendation in this regard is to develop good health facilities in the rural areas of the country.

2. The second issue observed is the lake of awareness in the people belonging to the rural areas of the country. For this the vaccination is not carried out properly in the early stages. The results for being not vaccinated are observed in the form of different diseases in the early stages and ultimate expiry of the children. Hence it is highly recommended to formulate policies regarding awareness in the masses of rural areas of the country.
3. The matter of malnutrition is equally divided in the rural as well as urban areas of the country. There are several reasons for malnutrition in the children. The most important one is that of poverty. The poor class of the society is high as compared to the well-off society and cannot afford to feed the children well in the early stages. Hence proper distribution of income is recommended for this purpose. However, in the capitalist society it is not possible easily hence encouragement of small businesses and providing job opportunities is the best solution.
4. The analysis showed that education of mother plays an important role in reducing child poverty in Pakistan. Hence encouraging female education, creating awareness in the society regarding importance of female education and increasing enrolment of females should be addressed at national level.

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