



RESEARCH ARTICLE

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Measurement Of Acute Poverty in Achini Bala-Peshawar, Pakistan; A Multidimensional Poverty Index (MPI) Approach

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Abstract

Poverty measurement and analysis have been a key aspect of the world for years, especially the developing countries, including Pakistan. Knowledge and precise methods for measuring poverty more accurately and efficiently is the key tool. Hence, by using MPI as a basis, this study presents the measure of acute poverty in Union Council Achini Bala, Peshawar, Pakistan. It is a quantitative research study that is based on the primary data collected through the questionnaire adopted by the Oxford Poverty and Human Development Initiative (OPHI). Simple Random Sampling technique is used to collect the data, 350 Households have been selected as sample size from the total population. The obtained results showed that the population is multidimensional poor in 42% of the indicators out of all the respective indicators of MPI. The people suffering from poverty out of the whole population (*H*) are 65%, whereas the intensity of poverty (*A*) is 64%. It is also found that health is an alarming issue in the research area because this dimension contributes the most to overall poverty than other dimensions. Key policies should be formulated to tackle these issues and overcome the persisting poverty accordingly.

Keywords: Acute Poverty, Multidimensional Poverty Index (MPI), Oxford Poverty and Human Development Initiative (OPHI), Poverty measurement, Peshawar Pakistan, Achini Bala.

INTRODUCTION

The "Elimination of Poverty" is the first goal of the Sustainable Development Goals (SDGs) established by the United Nations. Therefore, the goal of the world's leaders is to end extreme poverty for everyone by the year 2030 (Tladi, 2022).

Poverty exists when people lack the means to satisfy their basic needs. It is a state when one lacks a usual or socially acceptable amount of material possessions and money. It is much more than just not having money; but it is about not having enough money to meet basic needs, including food, shelter, clothing, etc, (Pamela et al., 2020).



Poverty has been associated with low levels of education or skills, poor health, an inability or unwillingness to work, improvidence, and high rates of disruptive or disorderly behavior. All these attributes have often been found to exist with poverty, so their inclusion in the definition of poverty would obscure the inability to provide for one's basic needs and the relation between them. Although poverty is discussed in terms of dollar amounts, but the quality of life is a part of the conversation as well. Living in poverty means a life of deprivation and struggle. It can be concluded that poverty is harmful to both individuals and society due to its undesirable effects (Augustyn et al., 2020).

Inevitable consequences come with poverty. Sometimes, there are not enough quality schools, or the parents cannot afford school dues, or impoverished families need their children to work, which reflects that the children living in poverty often lack access to quality education. This creates a generational cycle of poverty because, without quality education, children grow up unable to provide for their children. In impoverished countries where many people lack access to sanitation and clean water, poverty causes the spread of preventable diseases, resulting in unnecessary deaths of children. Living in poverty also means not being able to afford medical treatment. It also means little to no food on the table, no electricity, and limited shelter. For young children, improper nutrition can mean stunting that permanently impacts their development (Peer & Omer, 2021).

Absolute poverty and acute poverty are the two main types of poverty. One is uni-dimensional, while the other is multi-dimensionally.

Absolute poverty analyzes poverty uni-dimensionally; when a person's income is below a necessary level to maintain the basic living standards i.e., he/she cannot afford minimum nutrition, clothing, or shelter needs in his/her country. Whereas acute poverty (also called relative poverty) inspects poverty multi-dimensionally; it is a serious shortage of income or shortage of access to a range of resources that usually provide the basic necessities of life for humans, such as clean water, shelter, medical care, food, education, and sanitation, it means that the household income is below a certain percentage, typically 50% or 60%, of the median income of that country. It is helpful in considering income inequalities (Pettinger, 2019).

Also, absolute poverty is losing its status in the world of economics, especially in those countries where the living standards are rising and the economy is growing. As acute poverty uses the current data and statistics, hence it is considered a more useful and better approach to measure poverty. It indicates the number of households that have been left behind “relatively” from the households that have a better living standard (Peer & Omer, 2021).



Although data on income poverty is undoubtedly very helpful, but poverty could also be defined much more broadly to include factors like lack of access to housing, employment, personal security, health, and other resources. No single indicator, like income, can adequately capture all factors contributing to poverty. A basket of goods and services is considered the minimum requirement to live a life free from poverty. Those who cannot cover or afford that basket due to insufficient income are considered poor (Alkire & Santos, 2011).

Since 1997, the Human Development Report (HDR) has used alternative methods to traditional income-based measures to measure poverty. The multidimensional poverty index (MPI) replaced the Human Poverty Index (HPI) as the initial indicator of poverty in 2010. However, relatively new measures such as the Global Multidimensional Poverty Index include health, education, and living standards as signs of poverty. The multidimensional poverty index is a tool for measuring extreme poverty.

A severe lack of income or access to various resources, such as those that typically provide humans with their basic needs for food, shelter, education, health care, clean water, and sanitation, is called acute poverty. First, people living below the minimum standards for basic functioning, such as being educated, well-nourished, or drinking clean water, as set by international agreements, are considered to be in poverty. Second, it refers to people living in situations where they cannot simultaneously meet the minimum requirements in several areas. In other words, the MPI measures those people who are under-nourished, and those who do not have adequate sanitation, clean fuel, and do not have clean drinking water. Simply, it measures those people who are experiencing multiple deprivations (Alkire & Santos, 2011).

The COVID-19 pandemic threatened the future of a young generation and threatened to reverse the years of progress in the fight against global poverty and income disparities. However, COVID-19 has already pushed 97 million more people into extreme poverty by 2020 (Peer & Omer, 2021).

Poverty in Pakistan

Pakistan is also a developing country, and the total population of Pakistan is more than 211 million out of which 9 million people are living in extreme poverty, which makes up about 4.3% of the total population and it increased to 5.4% in 2020 due to Covid-19 (World Bank, 2021).

According to the national MPI (2014-15), the multidimensional poverty in Pakistan was 39%. About 59% of the households in rural areas of Pakistan are below the poverty line and about 43% are multi-dimensionally poor (Ministry of Planning Development & Reform, 2016).



Poverty in Khyber Pakhtunkhwa province

In almost all countries, there is a higher incidence of poverty in rural areas than urban ones, and the condition of the rural areas is far worse than urban areas in terms of housing, transport and communication, personal consumption levels, potable water and sanitation, access to education, and health. According to the estimates of 2018-19, there exists a 40% incidence of poverty in rural Khyber Pakhtunkhwa (KP), and about 35% incidence of poverty was observed in urban KP. There are 26 districts in Peshawar and there exists an incidence of poverty in almost all of them. There are clear rural-urban disparities visible among all the districts. Also, out of all the districts, Kohistan and Shangla are the ones where there is a higher incidence of poverty. Peshawar is also included in those districts with an incidence of poverty, and the estimated poverty in KP is 32.5% (Jamal, 2021).

Problem Statement

Poverty is one of the significant obstacles faced by developing countries. Poverty leads to increased crime, extremism, homelessness, poor nutrition or malnutrition, food insecurity, unemployment, domestic violence, child labor, etc. Most developing countries, including Pakistan, suffer from severe poverty, which affects the overall well-being or standard of living of the people living there.

“Achini Bala,” a Union Council located in the West of Peshawar, Pakistan - is also considered among those regions or areas with severe poverty. In this research study, we will calculate the acute poverty levels (the intensity of poverty) in Achini Bala. We will examine poverty multi-dimensionally, which will be a more comprehensive extent of poverty and deprivation.

Objectives of the Study

1. To calculate the acute poverty among the households in UC Achini Bala through the Multidimensional Poverty Index (MPI).
2. Investigate the specific dimensions where households experience the highest levels of deprivation, contributing to the multifaceted nature of poverty.

The study examines the acute poverty situation in Union Council Achini Bala, Peshawar, Pakistan. It measures the prevalence and intensity of poverty, focusing on the percentage of households deprived and the severity of deprivation experienced by impoverished individuals. The Multidimensional Poverty Index (MPI) is introduced as a novel application, providing a comprehensive understanding of poverty beyond



traditional income-based measures. The study's empirical data collection, locally/regionally tailored questionnaire, geographical focus, and policy recommendations contribute to a new perspective of poverty measurement and analysis, enabling targeted interventions and informed policy decisions for sustainable development and poverty alleviation.

LITERATURE REVIEW

There are many approaches other than MPI that help to measure poverty. Some of these approaches analyze poverty by income-based approaches, food caloric values, international poverty lines, purchasing power parity, and social discrimination as a basis. Some of those approaches include the Headcount Index, Poverty Gap Index, Squared Poverty Gap Index (Poverty Severity Index), Sen Index, Sen-Shorrocks-Thon Index, Asset-based measures, poverty lines etc. These approaches skip some of the areas while measuring poverty.

Sokolin and Bryseva (2019) provided basic conceptual notions to measure non-monetary and monetary poverty. They determined the role of income and expenditures in measuring poverty. They suggested the unification of certain poverty measuring concepts, including absolute, relative, and subjective poverty. They formulated ways to improve poverty statistics determined to measure poverty not only on the basis of income and expenditures but also by taking into account the factors that affect the population's quality of life.

Beilock and Freeman (2006) studied that the existing approaches for calculating poverty give unrealistically high rates of poverty because of the inappropriate questionnaire designs and methods, which give or show the poverty rates two to three times higher than the actual existing poverty.

Income-based approaches to poverty focus solely on income, while purchasing power parity and food caloric value focus on inflation and deflation. These approaches overlook education, health, and overall living standards. Income-based poverty lines are still considered a significant tool for measuring poverty, but they lack subjectivity and relativity with housing-related indicators, focusing on poor people as passive end-users rather than necessary or unavoidable parties. Alternatives, such as vulnerability, the Entitlement perspective, and sustainable livelihood theories, offer a more subjective perspective on poverty and its causes (Hasan, 2002).



The MPI examines poverty in specific dimensions, it gives a broader and clear picture of poverty. To improve livelihoods, community-led efforts should consider other indicators and the interconnectedness of poverty with indicators other than income (Hasan, 2002).

When poverty is measured multi-dimensionally, we clearly can see the area that needs more attention, and based on the results, the required strategy to remove that issue is prescribed. The MPI uses non-monetary variables to measure or identify the poor/poverty. It considers both the proportion of the population that is deemed poor and the breadth of the poverty experienced by the HHs.

Unlike other approaches, it is a flexible approach or index that could be modified according to the targeted area or observable deprivations. It enables the patterns of poverty i.e., how much each dimension and which indicator contributes to the overall poverty, making it a more preferable approach than others (Peer & Omer, 2021).

Oshio and Kan (2014) examined the relationship between multidimensional poverty and health variables in Japan using microdata from a nationwide population survey. It focused on four poverty dimensions (social protection, income, housing condition, and education) and three variables (self-rated health, psychological distress, and current smoking). The analysis found that intersections of poverty dimensions reduced coverage, while unions of multiple poverty dimensions helped identify individuals in psychological distress or poor self-rated health distress more than income (as a single dimension).

Abu-Ismaïl et al. (2015) used the Multidimensional Poverty Index and introduced two additional poverty measures to capture less extreme deprivations in living standards, health, and education in middle-income countries. These measures were applied to three Arab countries (Jordan, Morocco, and Iraq) to show the overall poverty ranking. The results showed a significant reduction in headcount poverty spread, with empirically robust findings based on factors like family size, asset ownership, and place of residence. The results were positively correlated with money metric power indicators.

Hameed and Karim (2016) estimated and mapped multidimensional poverty in rural Pakistan using household survey data to create a Multidimensional Poverty Index with Human Development Indicators. The results showed that 59% of the rural population in Pakistan is poor, with Dera Ghazi Khan, Nowshera, and Thatta having the highest Multidimensional Poverty Index. However, no districts from Balochistan were included in the study.



Altamirano and Teixeira (2017) used the Alkire and Foster Multidimensional Poverty Index to study bi-parental and single-mother families in Nicaragua. The index was modified to address structural problems and used the Demographic and Health Survey 2011/2012. Results showed that income poverty overestimates the number of poor people. Female-headed bi-parental families had less poverty than male-headed families, contradicting the notion of women being more vulnerable. The urban-rural gap was reduced, with living standards and education being the most deprived dimensions.

Khan and Akram (2018) estimated the multidimensional poverty in Pakistan by following the Alkire-Foster methodology and the analysis of their study was based on Pakistan Social and Living Standard Measurement Survey 2004-5 and 2014-15. For the provision of estimates of Multidimensional Poverty Index at provincial and national levels, they adopted the frequency-based weights, equal weights, and expert opinion weights. The obtained results at the national level showed that the estimates of Multidimensional Poverty Index ranged from 14 % to 20% and these estimates are quite sensitive to the choice of weights. It was revealed that the intensity of poverty has lower contribution in the reduction of multidimensional poverty in Pakistan, through the inter-temporal analysis. Therefore, it was concluded that for measuring poverty is a complex phenomenon and it is sensitive to the choice of weights. Hence the researchers should be careful while providing estimates of multidimensional poverty regarding the choice of weighting scheme.

Abbas et al. (2018) analyzed the multidimensional poverty through qualitative and quantitative approach by using the Alkire and Foster methodology for district Sargodha, Punjab, Pakistan. They used the three global dimensions for measuring the Multidimensional Poverty Index in Sargodha. By adopting the probability proportional to size technique of sampling, they surveyed 200 households of district Sargodha. The results revealed that about 18.6 percent population is multidimensional poor out of which, education contributes 39% while almost 75% population is deprived of sanitation facilities and the health indicators were improved in rural settlement than in urban. It was concluded that improved health facilities and provision of quality education are the key factors to eradicate poverty in the future.

Adepoju (2018) analyzed multidimensional poverty transitions in rural Nigeria using Markov models, Alkire and Foster methodology, and Multinomial Logistic Regression Model. Results showed 46.5% of multidimensional poverty was mainly chronic, with asset dimensions and education being the main contributors. Household size, educational status, land ownership, and number of assets influenced transient poverty, while land ownership, assets owned, and marital status influenced chronic poverty.



Khan et al. (2020) compared multidimensional poverty in the Punjab province of Pakistan between 2010 and 2014 using Foster, Greer, Thorbecke, and Alkire-Foster Methods. Results showed an increase in poverty levels in 2014, with multidimensional poverty in household assets increasing over time. However, educational and health poverty towards MPI remains higher. The study called for a holistic approach to identify multidimensional poverty and a comprehensive policy dossier for effective poverty alleviation and social welfare programs.

Mumtaz et al. (2022) examined the micro determinants of poverty eradication in Pakistan using data from the Pakistan Standard Living Measurement Survey 2019-20. Results showed that access to water, sanitation, agricultural land, livestock, household size, and being a native reduce poverty probability. Other factors like cash transfers, foreign remittances, and self-employment positively impact poverty eradication. The study suggested increased government spending on socio-economic programs, particularly land distribution in rural areas, and social safety nets like cash transfers and foreign remittances would support the vulnerable in the event of external shocks.

Saddique et al. (2023) explored multidimensional poverty in Pakistan by analyzing household demographic characteristics. It was found that 22% of Pakistanis are multidimensionally poor in terms of health, education, basic living standards, and monetary status. This poverty is more common in rural areas and Balochistan. The study recommended policies that consider the needs of multidimensionally poor households across various regions and demographic characteristics and showed the percentages of Pakistani households deprived of each of the 11 indicators. Most of the households are deprived of basic health facilities (56.06%), followed by cooking fuel (55.09%), years of schooling (39.51%), and asset ownership (34.91). Cooking with dung, charcoal, wood, or coal produces considerable volumes of indoor air pollution, resulting in health problems, particularly for rural females. The deprivation percentages of households in terms of child mortality (9.13%) and access to electricity (11.04%) were quite low, indicating that Pakistan has improved significantly in terms of child health and the power sector.

Rani et al. (2023) focused on the prevalence and socioeconomic determinants of multidimensional poverty in Behram Dheri, a Union Council in Charsadda district. The Alkire-Foster approach was used to estimate the prevalence and severity of multidimensional poverty, with ten indicators. The binary-logit model was used to determine the impact of contributory determinants on multidimensional poverty. The results showed that 84% of households are multidimensionally poor, with an average of 56% deprived. The multidimensional poverty index prevalence rate is 0.4712. The results also revealed that non-ownership of agricultural land and livestock, female-headed households, and nuclear families are more vulnerable to



multidimensional poverty. The study recommends implementing anti-poverty programs, quality education, training, and awareness at the grass-roots level to ensure rural households' socio-economic empowerment.

Theoretical Framework

The MPI combines two key pieces of information to measure acute poverty i.e. the incidence of poverty, and the intensity of poverty. The incidence refers to the proportion of people within a given population who experience multiple deprivations, and the intensity refers to the intensity of deprivations the average population is experiencing.

The dimensions and indicators of MPI include:

Table 1 shows the dimensions and indicators of MPI

Dimensions	Indicators
Education	<ul style="list-style-type: none"> • Years of schooling: deprived if no household member has completed five years of schooling • School Attendance: deprived if any school-age child is not attending school in years 1 to 8.
Health	<ul style="list-style-type: none"> • Child Mortality: deprived if any child has died in the family. • Nutrition: deprived if any adult or child for whom there is nutritional information is malnourished.
Living Standard	<ul style="list-style-type: none"> • Electricity: deprived if the household has no electricity • Drinking water: deprived if the household does not have access to clean drinking water or clean water is more than 30mins walk from their home (roundtrip) • Sanitation: deprived if the households lack adequate sanitation or if their toilet is shared • Flooring: deprived if the household has a dirt, sand or dung floor • Cooking: deprived if the household cooks with wood, charcoal or dung • Asset ownership: deprived if the household does not own more than one of: radio, television, telephone, bicycle, motorcycle, or refrigerator, and does not own a car or a tractor.



Two steps are followed to calculate the multidimensional poverty index:

Step 1: The deprivation of each person is weighted by the indicators' weight. If the sum of the weighted deprivations is 33% or more of possible deprivations, the person is considered to be multi-dimensionally poor (Alkire & Santos, 2011).

Step 2: Each person is assessed based on household achievements to determine if he or she is below the deprivation cutoff in each indicator. People below the cutoff are considered deprived in that indicator.

The multidimensional poverty index is used in this study because it moves from the uni-dimensional space of income (or consumption) to a multidimensional space. In the uni-dimensional space, someone is poor if she is deprived of income alone, while the multidimensional poverty index considers someone poor if she/he is deprived in several indicators at the same time. There is a two-step procedure involved in moving to this multidimensional space; first, it determines whether each person is below the deprivation cutoff of each indicator; and second, determines whether each person is below the cutoff in a sufficient proportion of indicators to be considered multi-dimensionally poor.

The multidimensional poverty index is chosen in this study because it moves from means to ends. It does so imperfectly due to insufficient data, but it is a step forward. The multidimensional poverty index examines whether there is someone undernourished in the household and whether someone has died. Both are clear functions (ends rather than means to ends). So, it considers indicators of resources too, such as the indicators of living standard and education, but they are more direct indicators of deprivation than income that's why we chose the Multidimensional Poverty Index in our study (Alkire & Santos, 2011).

The MPI is the product of two measures i.e. H (multidimensional Headcount ratio) and A (intensity of poverty). The Headcount Ratio (H) is the proportion of the population that is multi-dimensionally poor, which means that they are in acute poverty. It indicates that either the population is deprived in all the indicators of a single dimension or maybe they are deprived in a combination across the dimensions.

$$H = \frac{q}{n}$$

Where,

q = The number of people who are multi-dimensionally poor

n = Total population

However, A reflects the average deprivation score of the multi-dimensionally poor people.



$$A = \frac{\sum_{i=1}^n c_i(k)}{q}$$

Where,

$c_i(k)$ = censored deprivation score of individual i

q = No. of people who are multi-dimensionally poor

The deprivation score of each person is calculated by taking a weighted sum of the number of deprivations.

So,

$$c_i = w_1I_1 + w_2I_2 + w_3I_3 \dots \dots \dots w_dI_d$$

Where,

i = indicator

w = Weight attached to the indicator

The numbers lie between 0 and 1. However, 1 indicates deprivation, while 0 indicates non-deprivation. Hence, the deprivation scores of the poor HHs are summed and then divided by the total number of multi-dimensionally poor people.

The weightage is distributed evenly among each dimension's indicators so that all the dimensions have equal representation. The given weightage for each indicator is mentioned in the table below:

Table 2 shows the weightage of all the indicators based on the deprivation score

Indicators	Weightage (k)
Education	
Years of schooling	1/6=0.167
School Attendance	1/6=0.167
Health	
Child Mortality	1/6=0.167
Nutrition	1/6=0.167
Living Standards	
Electricity	1/18=0.056
Drinking water	1/18=0.056
Sanitation	1/18=0.056
Flooring	1/18=0.056
Cooking	1/18=0.056
Asset ownership	1/18=0.056



Summing up, the deprivation score assigned to each indicator of every dimension gives the same result for all the dimensions.

k is the poverty cut-off, which shows the share of (weighted) deprivations a person must have in order to be considered poor. A person is considered poor if his deprivation score is equal to or greater than the poverty cut-off.

$$c_i \geq k$$

In the MPI, a person is identified as poor if he or she has a deprivation score higher than or equal to 1/3 or 0.333. For the people having lower than the corresponding poverty cut-off, it is replaced by "0", called censoring in poverty measurement (Alkire & Santos, 2011).

Lastly, the MPI equals the product of H and A . So,

$$MPI = H \times A$$

METHODOLOGY

To calculate the acute poverty in the respective research area and to analyze the deprivations of the households in specific dimensions, this study has adopted the methodology given by Alkire-Foster in 2011 for calculating Multidimensional poverty.

Achini Bala is a Union Council located in the West of Peshawar. Hayatabad is located on its western side and Pishtakhara Bala is located on its eastern side, while on the southern side of Achini Bala, Bara agency is situated.

The Union Council Achini Bala (UC 51) has two villages i.e. "Achini Bala" and "Haji Pandu". It is only 12 km away from Peshawar City center. Hayatabad is only a kilometer away from the center of Achini. Phase 2 of Hayatabad is nearest to this area. Due to its location near Ring Road and Hayatabad and other reasons like the availability of certain facilities, it could be classified as a sub-urban or partially urbanized region/UC. With time, the prices of properties in Achini are booming due to its nearness to these areas.

There is severe poverty, and the condition of the households is not good in Achini Bala as well. Surviving there is very difficult, and the people's living standard is very low. So, we are trying to calculate



the multidimensional poverty among the households of Achini and also observing in which dimension the households are deprived the most.

Data Collection

Primary Data has been collected through the questionnaire adopted from Alkire and Santos (2011). The questionnaire had ten (10) close-ended questions. The data is collected by asking questions from the heads of the households, which were randomly selected.

Data Collection Instrument (Questionnaire)

Modification:

According to UNDP, since the need for comparability constrains the global MPI, we can use the weights and indicators more appropriate for the country or regional levels or at the national level. We can modify or adapt the MPI indicators in order to assess the deprivations of HHs in order to provide/get a richer and more accurate picture of poverty in a given area (United Nations Development Programme, 2021).

The estimated literacy rate in Achini Bala is about 30%, which involves both men and women (Pakistan Bureau of Statistics, 2017). As the literacy rate is very low in the research area, hence for convenience, the questionnaire was translated into Urdu to make the questions clear to the audience so that they could give the response properly. So, an Urdu-translated questionnaire was used to assess education, health, and living standards for this study.

Hence, the following modifications were made to the adopted questionnaire; ¹

Table 3 shows the modified questionnaire adopted for the study

MPI Questionnaire		
<i>(Descriptive) Number of people in the HH: _____ . (Open-ended)</i>		
1. Education		
1.1	Is there any family member who has not completed five years of schooling?	YES/NO
1.2	Is there any school-age (1 to 8 years) child who is not attending school?	YES/NO
1.2*	<i>Is there any child in the house who is capable of attending school, but not attending it?</i>	
2. Health		

¹ The modified questions are written in Italic with (*) on the question number in the table.



2.1	Has any child died in the family under the age of five (5) years?	YES/NO
2.2	Is there any child who is underweight in the family?	YES/NO
2.2*	<i>It was observed through general observation (through their overall appearance) and also, the houses with disabled children were considered deprived in this indicator.</i>	
3. Living Standards		
3.1	Is there a load shedding of electricity in the house for more than 6 hours?	YES/NO
3.1*	<i>Is there a load-shedding of 10-12 hours in the house? If yes, then does your Household have an alternative resource in the form of solar panels or glass that could at least provide the facility of light and fan?</i>	
3.2	Does the family have access to soft drinking water?	YES/NO
3.3	Is there any proper sanitation system available?	YES/NO
3.4	Is the floor made up of sand, dirt, or dung?	YES/NO
3.5	Does the household cook with wood, charcoal, or dung?	YES/NO
3.6	Does the household have any of the five assets? Television, Radio, Refrigerator, Telephone, Motorcycle, Car/Tractor	YES/NO
3.6*	<i>Does the household have any of the five assets? Television, Radio, Refrigerator, Mobile phone or Telephone, Motorcycle, Car/Tractor</i>	

- i. We modified question 1.2 of the questionnaire by removing the age limit to include children who are capable of attending school but were not attending school.
- ii. Question 2.2 is observed through general observation, identifying underweight children and households with children with disabilities as deprived.
- iii. Also, as the mobile phone is a necessity these days so we added it as an option for the availability of assets in the house in question 3.6.
- iv. However, there is an issue of power outages or load-shedding/breakdown of electricity for long periods in Achini. Electricity is a basic necessity these days as most of our chores depend on it. Finding an alternative for it will solve many problems which its outage causes. The alternatives that could be used for electricity are wind power, geothermal power, hybrid power, a generator, and a UPS battery. In contrast, the most commonly used alternative for electricity is solar power.

Solar power reduces energy costs, improves socio-economic well-being, and enhances the quality of life for remote communities. It benefits disadvantaged groups, particularly women and children, by enabling them to perform household chores, study, and use their time more productively during



electricity breakdowns and sunsets. Remote villages have installed solar power systems like light and fans for basic needs. Some households use AC/DC batteries for light bulbs and fans to store energy. These affordable alternatives aim to cope with electricity shortfalls (Jansen, 2019).

We have considered the household as deprived based on not being able to afford an alternative for electricity shortfall to cope with such a long outage of electricity. Otherwise, all the HHs in the targeted area are deprived of that indicator because of extreme electricity breakdown for more than 2-3 days or more. Hence, we have modified Question 3.1 as mentioned in the table.

Sampling Technique

In this study, a simple random sampling technique is used in order to select the sample size. We have selected this technique because it ensures that the results obtained from our sample should approximate what would have been obtained if the entire population had been selected. It also allows all the units in the population to have an equal chance of being selected (Reeger & Aloe, 2019).

The population of the targeted area is mostly illiterate. So, the researcher collected the data by visiting the respondents' homes and filling out the questionnaires by the researcher by explaining the questions to them.

Sample Size

According to the census of 2017-18, the population of UC Achini Bala is approximately 29,872, out of which the population in the village Achini Bala is 23,817 and the population of Haji Pandu is 6,055 (Politicpk, 2023).

The estimated number of households in Achini Bala is 2,521 and the households in Haji Pandu are about 656 so, the total estimated HHs in the UC are 3,177. Each household has (on average) 7-8 people living (Pakistan Bureau of Statistics, 2018).

We have randomly selected the households from the respective area. The total estimated households in Achini Bala are about 3,177. We rounded these off and made them 3,200. We have calculated the sample size through Yamane's formula/method, which (according to the total households) gave 350 as an ideal sample size for this research study. So, 350 households from UC Achini Bala were randomly selected for data collection.



Yamane's Sample Size Method

This method for sample size calculation was formulated by a Statistician, Taro Yamane, in 1967 to determine the sample size of a given population (Yamane, 1973). The formula is stated as;

$$n = \frac{N}{(1 + Ne^2)}$$

Where,

N = Total population, n = Sample size, e = Margin of error

In the sample size calculation, we have taken;

Confidence level = 95%

Margin of error (e) = 5%

Total Population/HHs (N) = 3200

Which gave an ideal sample size, n = 350

Analysis techniques

The acquired data is calculated through Microsoft Excel (Version 2019)² to attain the requirements of the adopted Method.

RESULTS AND DISCUSSIONS

The data was collected from 350 households. The primary respondent on behalf of most HHs was the head of HH.

Descriptive statistics:

Table 4 represents the mean(average) HHs size of 350 HHs.

Table 4 shows the average HH size in the study area is 13. However, 21 is the maximum size while 5 is the minimum HH size.

Variable	Minimum size	Maximum size	Mean (Average)
HH Size	05	21	13

The obtained data showed that (on average) in the research area, each household has 13 people living.

² Microsoft® Excel® 2019 MSO (Version 2307 Build 16.0.16626.20170) 64-bit



Factors

The following table represents the number of HHs that are deprived in each indicator.

Table 5 shows the number of HHs deprived in each indicator

Indicators	No. of deprived households (Total HHs: 350)
Years of schooling: deprived if no household member has completed five years of schooling	255
School Attendance: deprived if any school-age child is not attending school in years 1 to 8.	143
Child Mortality: deprived if any child has died in the family.	198
Nutrition: deprived if any adult or child for whom there is nutritional information is malnourished.	235
Electricity: deprived if the household has no electricity	236
Drinking water: deprived if the household does not have access to clean drinking water or clean water is more than 30mins walk from their home (roundtrip)	297
Sanitation: deprived if the household lacks adequate sanitation or if their toilet is shared	321
Flooring: deprived if the household has a dirt, sand, or dung floor	179
Cooking: deprived if the household cooks with wood, charcoal, or dung	139
Asset ownership: deprived if the household does not own more than one of; radio, television, telephone, bicycle, motorcycle, or refrigerator, and does not own a car or a tractor.	148

The above Table 5 shows the HHs that are deprived in the respective indicators. The obtained results show that 255 HHs are deprived of Years of schooling, 143 HHs are deprived of School Attendance, 198 HHs of Child Mortality, 235 HHs of Nutrition, 236 HHs of Electricity, 297 HHs of Drinking water, 321 HHs of Sanitation, 179 HHs in Flooring, 139 HHs in Cooking, and 148 HHs in Asset ownership.

On Dimension Level

Based on the weightage assigned to the indicators, the following table shows how much is the targeted population deprived in each dimension:



Table 6 shows dimension-wise deprivation of the HHs (by considering the deprivation score)

Dimensions	Deprivation (% wise)
Education	74%
Health	88%
Living standards	51%

Out of all the dimensions, the population is deprived the most in the health dimension. If we compare the dimensions for all the deprived HHs, the percentage of HHs deprived in the health dimension is over the top out of the other two dimensions in the research area, which shows its highest contribution to overall poverty.

The total population (HHs) that is deprived in the indicators of health dimension is 267; out of this, the population/HHs with a deprivation score equal to or greater than 0.33 are 236. By evaluation, the results showed that about 88% of the total population is deprived in this dimension.

The total population considered deprived in the Education dimension due to having an equal or greater deprivation score than 0.33 are 260 out of the total population/HHs i.e. 509. The calculations determined that about 51% of the population is deprived in this dimension.

For Living Standard, the total population deprived in this dimension is 788, while the population/HHs with a deprivation score equal to or greater than 0.33 are 585. The acquired results showed that 74% of the population is deprived in this dimension.

Hence, the results determined that Health is the dimension that contributing the most to the poverty of the people living in the sampled area by showing the highest percentage of the population being deprived in this dimension. Based on these findings, this dimension needs more attention than the other two.

The MPI

After analyzing the data, the acquired results showed that the calculated Headcount Ratio (H) in the sampled area is 65 percent, meaning that 65% of the people live in acute poverty or are MPI poor. The results are acquired from the following step;

$$H = \frac{2646}{4019}$$

$$H = 0.6583727$$

The calculated intensity of poverty (A) is 64 percent, which shows that an average poor person in the sampled area is deprived in 64% of the weighted indicators.



$$A = \frac{1699.749}{2646}$$

$$A = 0.6423844$$

The MPI describes the share of the multi-dimensionally poor population adjusted by the intensity of the deprived suffered. This adjustment is necessary because if we conclude the poverty by looking at *H* only, so it won't give a thorough view of the poverty and won't describe whether the people are 100% deprived in all the considered indicators or are all equally poor. So, to acquire these elements, the MPI analyzes the share of the population, which is multi-dimensionally poor, adjusted by the intensity of the deprived suffer.

In this area, the average poor person is deprived in 64% of the weighted indicators, so the intensity of poverty is 64%.

Table 7 shows the Headcount Ratio, Intensity of Poverty, and MPI

Headcount Ratio (H)	65%
Intensity of Poverty (A)	64%
MPI	42%

For finding the MPI, we took the product of both *H* and *A*, which showed that the population is deprived of 42% of the total potential deprivations it could experience overall, which means that the population is multidimensional poor in 42% of the indicators out of all the respective indicators of MPI.

$$MPI = 0.6583727 \times 0.6423844$$

$$MPI = 0.4229283$$

DISCUSSION

The findings of this study revealed that out of all the respective indicators of MPI, the population is multidimensional poor in 42% of the indicators. The intensity of poverty (*A*) is 64%. However, people suffering from poverty out of the whole population (*H*) are 65%. By considering the deprivation score, it was found that health is an alarming issue in the research area because this dimension contributes the most to overall poverty than other dimensions.

The results of this study match some of the recent studies. One study in Pakistan revealed that 22% of Pakistanis are multidimensionally poor in terms of health, education, basic living standards, and monetary status, particularly in rural areas and Balochistan, and recommended policies that consider the needs of multidimensionally poor households across various regions and demographic characteristics. The majority of households are deprived of basic health facilities, cooking fuel, years of schooling, and asset ownership (Saddique et al., 2023).



However, in Behram Dheri, a Union Council in Charsadda district, a study analyzed that 84% of households are multidimensionally poor, with an average of 56% deprived. The multidimensional poverty index prevalence rate is 0.4712. The study recommended implementing anti-poverty programs, quality education, training, and awareness at the grass-roots level to ensure rural households' socio-economic empowerment (Rani et al., 2023).

CONCLUSION

By measuring poverty in multiple dimensions, it can be easily attained in which dimension the HHs or people are deprived of the most. The multidimensional framework inspects poverty, which is based on the economic well-being, social inclusion, and capability of the people, which gives a more comprehensive and accurate picture of poverty. Poverty is indeed multidimensional and measuring poverty is an instrument of pursuing a policy, not a representation of an objective situation. Measuring poverty is more than identifying the people living beyond the poverty threshold (\$ 2.15 per person per day). The problem is not just to know if somebody is poor, but to know what we can do in order to allow him not to be poor in the future.

To get a thorough image or results of poverty, we have adopted the methodology and analysis of MPI in this study. We examined the acute poverty among the HHs of UC Achini Bala by adopting the method given by Alkire-Foster for calculating the MPI.

The objectives of the study were to measure the acute poverty among the HHs in Achini Bala and also, to determine the dimension in which the population of the sampled area is deprived the most.

The results found that the population is multidimensional poor in 42% of the indicators out of all the respective indicators of MPI. The people suffering from poverty out of the whole population (H) are 65%, whereas the intensity of poverty (A) is 64%, which shows that an average poor person in the sampled area is deprived in 64% of the weighted indicators. Deprivation of HHs in all the indicators of MPI are the reasons/factors of poverty in the sampled area.

However, the deprivation score is considered a basis for examining poverty on a dimensional level. The obtained results showed that the population in the sampled area, which is deprived of education is 74%. While 51% of the population is deprived of living standards, and about 88% of the population is deprived of Health, showing the highest contribution to the poverty of the people in the sampled area.



LIMITATIONS OF THE STUDY

This study could possibly have certain limitations. Using a sample size of 350 households may limit the generalizability of the findings to the entire Union Council Achini Bala population. The sample might not fully capture the diversity and complexities of the entire population.

While simple random sampling is commonly used, it may still introduce bias if certain households are inadvertently excluded, leading to potential underrepresentation or overrepresentation of specific groups.

Relying solely on a questionnaire adapted from the Oxford Poverty and Human Development Initiative (OPHI) may limit the depth of understanding and exclude certain nuances that could arise from more qualitative or mixed methods approaches.

The chosen MPI indicators may not fully capture all relevant dimensions of poverty specific to the area's cultural, social, and economic context.

Potential errors or inaccuracies in data collection, entry, or analysis might have impacted the reliability and validity of the results.

FUTURE STUDY

Some of the following studies could be conducted based on the results/findings of this paper. A comparative study could be conducted across multiple Union Councils or regions to identify variations in poverty patterns, shedding light on the role of local context in shaping poverty dynamics. A comprehensive study could focus solely on the health dimension of poverty, examining factors such as healthcare access, disease prevalence, and the impact of health interventions. We can compare the findings from Union Council Achini Bala to global MPI data and experiences from other regions to identify commonalities, differences, and potential lessons for poverty reduction efforts.

RECOMMENDATIONS

According to the study results, the following recommendations (if adopted/followed) could benefit the people of the sampled area. As the health dimension contributes significantly to overall poverty, it is crucial to prioritize and invest in targeted health interventions. Initiatives such as improving access to healthcare services, enhancing medical facilities, and increasing awareness about health issues could help alleviate poverty in the area. Education is a key driver of poverty reduction. Programs aimed at improving educational opportunities, reducing school dropouts, and enhancing vocational training should be



implemented. Empowering individuals with education and skills can lead to better employment opportunities and improved socio-economic conditions.

Furthermore, encourages and support livelihood diversification strategies to reduce dependence on a single source of income. Promote entrepreneurship, micro-enterprises, and small-scale industries to create additional household income streams. Establish social safety net programs to provide basic financial support to vulnerable and impoverished individuals and families. These programs can help mitigate the immediate impact of poverty and provide a safety net during economic hardship. Also, focus on empowering women through access to education, healthcare, and economic opportunities. It can have a multiplier effect on poverty reduction, as empowered women often invest in the well-being and education of their families. All these factors will contribute to alleviating poverty in the area and might help achieve sustainable development.

Authors contribution: In order to fulfill the partial requirement of BS Degree, Ms. Rubab Khaleel (as a research student) worked under the supervision of Mr. Ashtar Hussain. She collected the primary data and reviewed the literature for this research study. However, the overall methodology and analysis were undertaken per the supervision guidelines provided. So, this work is a product of the combined efforts and mutual work of both authors.

Data availability: In line with the principles of open science and transparency, all relevant data supporting the findings of this research are openly available. Interested parties, including researchers and scholars, can access it by contacting the corresponding author for further details.

Ethical Statement: This research adheres to the highest ethical standards in all aspects of data collection, analysis, and reporting. All procedures were conducted in strict accordance with the ethical guidelines provided by Islamia College Peshawar, KP, Pakistan. The research strictly complies with ethical norms to responsible and respectful research practices.

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