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Health and Educational Status of Children: An Exploration through a Gender Lens

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Health and Educational Status of Children: An Exploration through a Gender Lens

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ABSTRACT

The health and educational status of children with respect to undernourishment (underweight, stunting and wasting), mortality (IMR and CMR) and out-of-school children in age cohort 5-14 years are quantified across gender and across household multidimensional poverty status. Multiple Indicator Cluster Survey (MICS) datasets of Punjab and Balochistan provinces are used for this analysis.

Significant differences exist in poor and non-poor households with respect to the above dimensions. However, in terms of gender disparity, the results are mixed. It is found that in general girls and boys are roughly equally deprived in poor households with respect to indicators of nutritional status. The empirical evidence in terms of the gender differential in mortality rates strongly suggests the existence of gender bias in Balochistan, while findings for Punjab reveal the absence of bias against girls with respect to mortality. Regarding gender bias with respect to out-of-school children, it is found that rural girls irrespective of poverty status and province are disadvantaged in both primary and secondary age cohorts.

JEL Classification: I32, I12, I29

Keywords: Gender, Undernourishment, Mortality, Out of Schooling, Multidimensional Poverty, Punjab, Balochistan, Pakistan

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1. PREAMBLE

Men's dominant role in the family and the lesser significance of women's roles in almost all developing countries causes a gender disparity in the acquisition of resources and opportunities. Such a gender disparity leads to a distribution of family resources that is biased toward boys, while girls are correspondingly deprived with respect to nutrition and educational opportunities.

In poor families with limited financial resources, the inequality is even worse and uneven distribution results in gender differences in human capital investment and outcomes due to intra-household gender bias. The findings of an extensive global survey on child poverty (Gordon et. al. 2003) in the developing world indicate "At the global level, the study shows significant gender discrepancies in education but not in food or health deprivation. Girls are at least 60 percent more likely than boys to be severely educationally deprived. They suffer particularly high rates of disadvantage in the Middle East and North Africa, where they are three times more likely than boys to be without primary or secondary school education. However, girls and boys are roughly equally disadvantaged with respect to severe food deprivation (15 percent and 16 percent, respectively) and health deprivation (15 percent and 14 percent, respectively). Boys are more likely to be severely food deprived in all regions, except South Asia where severe food deprivation is more prevalent in girls".

This research attempts to describe the nutritional status and access to education of children in two provinces of Pakistan. The province of Punjab is the most developed and relatively more gender equitable, while Balochistan is the most backward and the least developed province with a strong culture of gender discrimination. The diverse geographical regions will control for the provincial differences in the economy, culture, attitudes, ethnicity, health and education facilities, road infrastructure and the level of development.

It is hypothesised that "household poverty affects girls more than boys in the nutritional intake and in educational opportunities". To empirically validate the hypothesis, Multiple

Indicator Cluster Survey (MICS) datasets of Punjab and Balochistan provinces are used. The research quantifies the extent of gender bias in poor and non–poor households in the dimensions of child undernourishment (underweight, stunting and wasting), mortality (IMR and CMR) and out-of-school children in the age cohorts 5-9 (primary level) and 10-14 (secondary level). Household poverty is estimated using the globally accepted technique of multidimensional poverty.

The report is structured as follows. The next section presents a comparison of multidimensional poverty estimates for both provinces, while the methodology and deprivation indicators are furnished in Appendix-A. The subsequent three sections portray a comparison of household deprivations across provinces, regions (urban/rural), gender and household poverty status in terms of undernourishment, mortality and access to education respectively. The last section concludes the report.

2. POVERTY ESTIMATES

To establish household poverty status for this research, a multi-dimensional approach is preferred[1] which considers non-income socio-economic deprivations. The study follows a global exercise which is carried out by the Oxford Poverty and Human Development Initiative (OPHI) to develop Multidimensional Poverty Index (MPI) for more than 100 countries with the help of 10 non-income deprivation indicators (Alkire and Foster, 2007). Since 2010, the UNDP Human Development Report has been publishing the results of this exercise in terms of countries' rankings and magnitude of multidimensional poverty. Thus to estimate the household poverty score with respect to the selected deprivation indicators, the OPHI methodology[2] is applied to Multiple Indicators Clusters Surveys (MICS) data[3] of Punjab and Balochistan provinces.

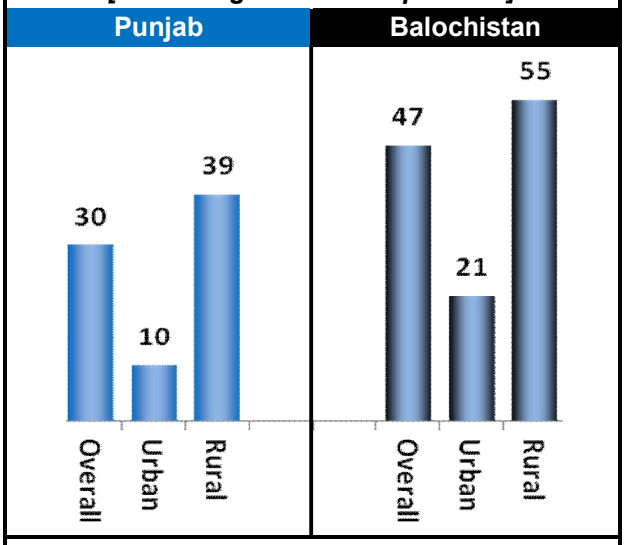
[1] The traditional uni-dimensional approach, which considers only one variable such as income or consumption, is popularly used due to its practicality and operationality. Nonetheless, it is extensively criticised in the literature of welfare and well-being. Critics argue that to understand the complex phenomenon of poverty or to evaluate household or individual well-being holistically, a multidimensional exercise is imperative.

[2] Brief note on OPHI methodology with the list of deprivation indicators is furnished in the Appendix – A.

[3] Appendix – B provides brief overview of the MICS datasets. The author is grateful to Mr. Mohammad Zaman Wattoo, Provincial Project Manager, Strengthening PRS Monitoring-Punjab (a UNDP project) for providing Punjab MICS date and permission to use for this research.

Figure-1 presents the estimates of the incidence of multidimensional poverty. According to the figure, about 30 and 47 percent population was poor in Punjab and Balochistan provinces respectively. The incidence of rural poverty in terms of multidimensional indicators is substantially high as compared with the urban incidence. Rural incidence is about 39 and 55 percent against the urban incidence of 10 and 21 percent respectively for Punjab and Balochistan provinces.

Figure 1
Estimates of Multidimensional Poverty
[Percentage of Poor Population]



Source: Estimated from Multiple Indicators Cluster Survey (MICS) data sets: Punjab 2011 and Balochistan 2010

Besides the poverty incidence or headcount, estimates of different measures of multidimensional poverty (suggested in OPHI-UNDP methodology) are furnished in Table-1. It is evident from the table that about 17 percent of the population of the Punjab is vulnerable to poverty, while 14 percent live in severe poverty conditions (with a poverty score of more than 50 percent). In contrast, the estimate of poverty severity is around 20 percent in Balochistan province. The estimated values of MPI which is a product of poverty incidence and intensity are 19 and 26 percent for Punjab and Balochistan respectively. The magnitudes of all dimensions of multidimensional poverty for rural areas are significantly higher as compared with their urban counterparts.

Table 1
Dimensions of Multidimensional Poverty
[Percentages]

	Poor Population	Poverty Intensity	Multidimensional Poverty Index	Vulnerable to Poverty	Population in Severe Poverty
Punjab Overall	***30.23***	***63.83***	***19***	***16.89***	***14.13***
Urban	9.60	49.76	5	12.34	3.12
Rural	38.80	65.28	25	18.77	18.70
Balochistan Overall	***47.29***	***55.31***	***26***	***17.18***	***19.77***
Urban	21.46	43.73	9	16.87	4.64
Rural	55.03	56.67	31	17.27	24.31

Source: Estimated from Multiple Indicators Cluster Survey (MICS) data sets: Punjab 2011 and Balochistan 2010

3. CHILD UNDERNOURISHMENT

The extent of undernourishment in children under age 5 is explored by three standard anthropometric indices: weight for age (underweight), height for age (stunting), and weight for height (wasting). Stunting and Wasting are the most frequently used measures of nutritional status of children. Stunting which is referred to as chronic malnutrition develops over a long period as a result of inadequate dietary intake and/or repeated infections. In contrast, wasting is short term (acute malnutrition) and can be reversed given favourable conditions. Underweight children are too light for their age. Children may become underweight either because of wasting or stunting or both.

Undernourishment in a population can be judged by comparing children to a reference population. The reference population used in the MICS dataset is based on the World Health Organization (WHO) growth standards[4]. Each of the three nutritional-status indicators can be expressed in standard deviation units (z-scores) from the median of the reference population. Children whose z-score in relevant nutritional indicators is more than two standard deviations below the median (-2 Standard Deviation) of the reference population are considered moderately or severely undernourished[5].

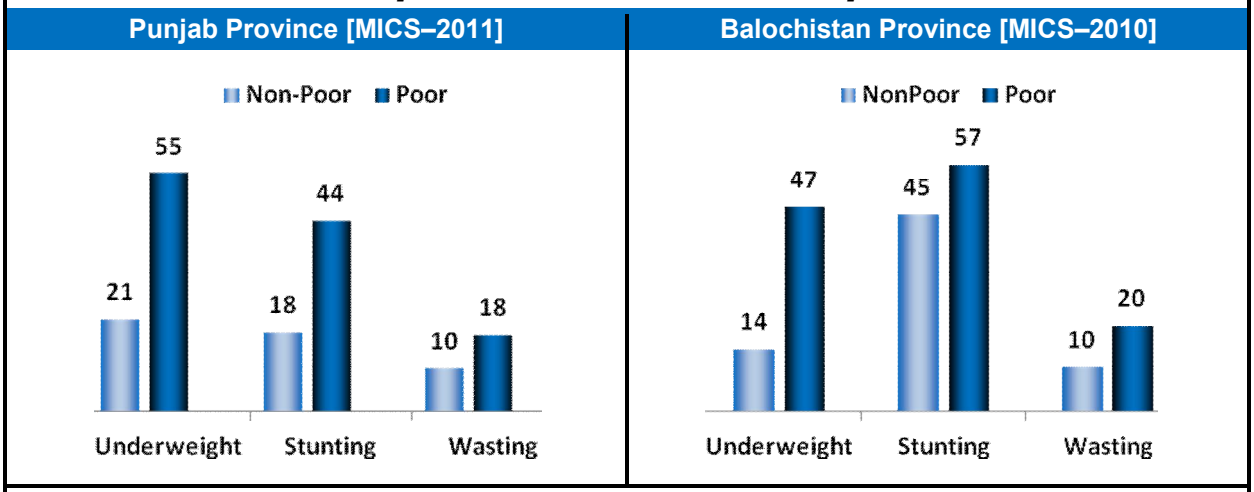
One of the major causes of malnutrition is household poverty or lack of resources needed to purchase the food items necessary for nourishment. Figure 2 furnishes percentage of under-five children who are undernourished with respect to household poverty status. The chronic malnutrition or stunting is estimated to be 44 and 57 percent in multidimensionally poor households of Punjab and Balochistan provinces respectively. It is also worth noting that the difference regarding stunting in poor and non-poor households in Balochistan is not as discriminating as in the Punjab province. The phenomenon indicates that factors other than lack of resources, such as awareness regarding nutritional values and/or deficiency of relevant micronutrients, are significant determinants of chronic malnutrition in Balochistan. Surprisingly, the percentage of underweight children is lower (47%) in poor households of Balochistan

[4] For detail, visit the link http://www.who.int/childgrowth/standards/second_set/technical_report_2

[5] Z-Score for each anthropometric indicator is provided in the MICS dataset.

than the poor in Punjab province (55%). An almost identical trend is observed in the case of acute malnutrition (wasting) in both provinces. About 18 and 20 percent incidence of wasting is observed in poor households as compared with 10 percent estimated for non-poor households.

Figure 2
Percentage of Under-Five Children Who are Severely or Moderately Undernourished
[Poor versus Non-Poor Households]



Source: Estimated from Multiple Indicators Cluster Survey (MICS) data sets.

A statistical procedure (t-test) is applied[6] to evaluate the gender disparities in the average[7] incidence of undernourishment. Table-2 and Table-3 report gender differences in poor and non-poor households of Punjab and Balochistan provinces respectively.

In poor households of the Punjab province, the gender disparity in the average incidence of stunting and underweight is not statistically significant; according to the probability (p-Value) associated with t-statistics. Table-2 also reveals that the girls are relatively less stunted and wasted and thus have a slight edge over boys in the province. However, statistically significant gender differences are evident in wasting irrespective of household poverty status and region. It is also observed that the

[6] The t-test compares sample means by calculating Student's *t* and displays the two-tailed probability of the difference between the means. A statistically significant t-value indicates that the difference between two groups/categories is significant and the groups or categories may be distinguished in terms of average characteristics (here, average undernourishment).

[7] The incidence or prevalence of malnutrition is estimated at household level, separately for boys and girls.

magnitudes of gender difference are significantly lower in non-poor households as compared with poor-households.

Table 2
Percentage of Malnourished Children - Punjab
[Boys versus Girls]

		Boys	Girls	Difference	t-Statistics	p-Value
Non-Poor Households						
Urban	Underweight	23.00	22.68	0.32	0.440	0.660
	Stunting	17.62	17.25	0.37	0.559	0.576
	Wasting	12.10	10.46	1.64	2.971	0.003
Rural	Underweight	19.99	19.92	0.07	0.123	0.902
	Stunting	18.99	18.03	0.96	1.700	0.089
	Wasting	9.50	8.63	0.87	2.099	0.036
Poor Households						
Urban	Underweight	57.05	58.16	-1.10	-0.716	0.474
	Stunting	43.35	42.24	1.11	0.718	0.473
	Wasting	20.14	17.87	2.27	1.854	0.064
Rural	Underweight	53.75	54.50	-0.75	-1.182	0.237
	Stunting	43.23	44.32	-1.09	-1.735	0.083
	Wasting	18.68	15.87	2.81	5.889	0.000

Note: p-Value of greater than 0.05 indicates that the t-statistics is **not** statistically significant at least at 95 percent confidence level and thus the gender difference **does not** exists in terms of weighted averages.

Source: Estimated from Punjab Multiple Indicators Cluster Survey (MICS) data, 2011.

In contrast, the story in Balochistan is slightly different. Average prevalence of stunting and underweight in rural poor households is statistically significant; however girls in rural poor households in these nutritional indicators are less deprived than boys. Indeed barring wasting in urban poor households and stunting in urban non-poor households, relatively low incidences for girls are observed in all nutritional indicators[8]. A look at Table-3 also reveals that significant gender disparities in non-poor households exist in the underweight category of urban and stunting in rural households.

[8] Due to law and order situation and other logistic problems and hence sampling errors, Balochistan's data always casts doubt in terms of statistical reliability. Thus the findings are tentative and should be interpreted cautiously.

Table 3
Percentage of Malnourished Children - Balochistan
[Boys versus Girls]

		Boys	Girls	Difference	t-Statistics	p-Value
Non-Poor Households						
Urban	Underweight	30.28	20.65	9.63	2.048	0.041
	Stunting	34.27	41.65	-7.39	-1.397	0.163
	Wasting	19.55	14.76	4.79	1.171	0.243
Rural	Underweight	10.15	6.60	3.54	1.678	0.094
	Stunting	56.45	39.59	16.86	4.439	0.000
	Wasting	6.07	7.10	-1.02	-0.533	0.594
Poor Households						
Urban	Underweight	56.59	55.61	0.98	0.161	0.872
	Stunting	64.23	57.39	6.84	1.148	0.252
	Wasting	27.55	28.76	-1.21	-0.220	0.826
Rural	Underweight	50.57	39.54	11.03	4.735	0.000
	Stunting	59.02	52.23	6.80	2.906	0.004
	Wasting	19.01	17.35	1.66	0.913	0.361

Note: p-Value of greater than 0.05 indicates that the t-statistics is **not** statistically significant at least at 95 percent confidence level and thus the gender difference **does not** exists in terms of weighted averages.

Source: Estimated from Balochistan Multiple Indicators Cluster Survey (MICS) data, 2010.

The empirical evidence regarding children nutritional status suggests that in general girls and boys are roughly equally deprived in urban households with respect to various indicators of nutritional status. Nonetheless, the rural trend is different. In Balochistan, generally rural girls are less deprived in poor as well as non-poor households, while in rural Punjab no statistically significant gender differences exist except for wasting indicator. The results also indicate that poverty is not the only factor which has an effect on gender disparity, as evidence of gender bias is also found in non-poor households. Moreover, the provincial differences validate the role of cultural factors and the levels of economic development in affecting the extent of gender disparity in terms of children nutritional status.

4. CHILD MORTALITY

Gender and poverty aspects of under-five child mortality in Punjab and Balochistan provinces are assessed through standard infant (less than one year) and child (less than 5 years) mortality rates per thousand live births[9]. These indicators are a part of the internationally recognised goals for general development standards and children's rights.

According to the Punjab MICS report (2011)[10], the infant mortality rate (IMR) was estimated at 82 per thousand live births, while the under-five Mortality Rate (U5MR) was around 104 per thousand. IMR and U5MR among male children was 89 and 111 respectively, while in female children was 75 and 97 respectively[11]. The findings clearly reveal that mortality rates for boys are higher than for girls in Punjab province. On the contrary, Balochistan estimates of child mortality rates are relatively lower. The Balochsitan MICS report[12] narrates "the infant mortality rate (IMR) is estimated at 72 per thousand live births, while the probability of dying under-5 (U5MR) is around 89 per thousand live births". The report also describes "the probability of dying a female infant or a female child under five in Balochistan is much higher (IMR 82 and U5MR at 107) compared to a male infant or male child (IMR 63 and U5MR at 74); a similar pattern was observed in MICS for NWFP conducted during 2008. However, the differentials are large and it is quite unusual for IMR to have such a big disparity between male and female".

A similar methodology[13] and approach is used to derive estimates of child mortality for this study. Before disaggregating the mortality rates according to the household poverty

[9] The infant and child mortality rates are the probabilities of dying before the first and fifth birthday respectively.

[10] The report is available at www.bos.gop.pk and www.pndpunjab.gov.pk

[11] These estimates have been calculated by averaging mortality rates obtained from women age 25-29 and 30-34.

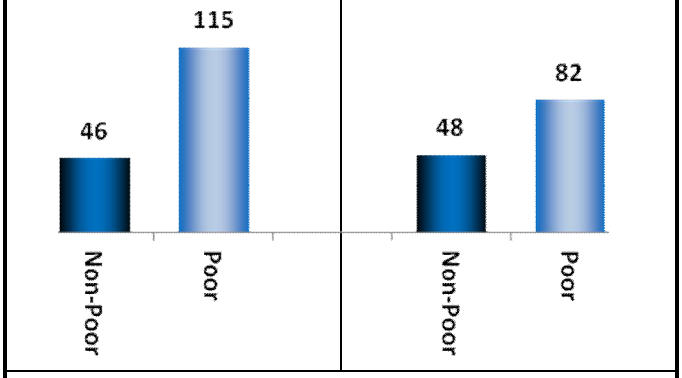
[12] To download the report, visit http://www.unicef.org/pakistan/Approved_MICS_Balochistan_Final_Report_23_November_2011(2).pdf

[13] These mortality rates are calculated based on an indirect estimation technique known as the Brass method. 'QFIVE' (Statistical programme for child mortality estimation) algorithm with South Model Life Tables is used in SPSS (Statistical Package for Social Science) for the estimation of infant and child mortality rates.

status, the aforementioned published estimates were corroborated through SPSS algorithm.

Figure 3 presents estimates of infant mortality rates per thousand live births for poor and non-poor households. As expected, sharp differences with respect to household poverty status are evident in the figure. The estimated IMR for the poor households in the Punjab is around 115 children per thousand live births as compared with 46 children which are estimated for non-poor households. In contrast, Infant Mortality Rates for Balochistan are estimated at 82 and 48 respectively for poor and non-poor households.

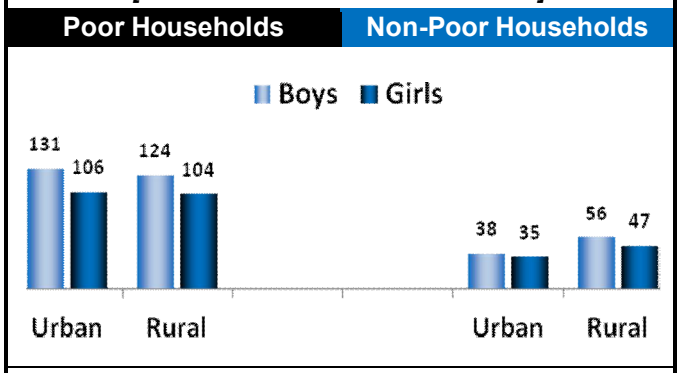
Figure 3
Infant Mortality Rate per Thousand Live Births
[Poor versus Non-Poor Households]



Source: Estimated from Multiple Indicators Cluster Survey (MICS) data sets.

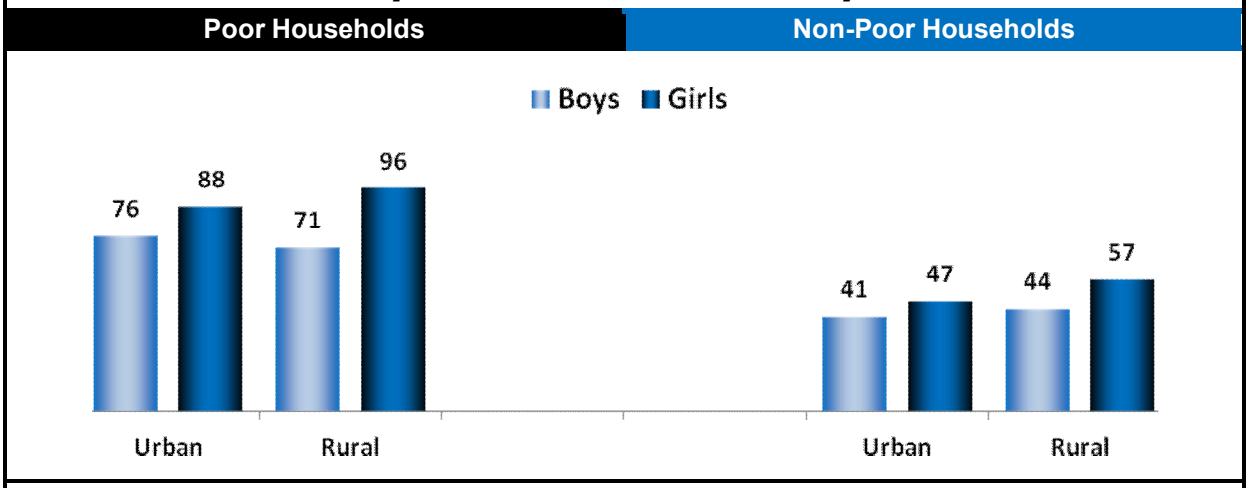
The gender disparities with respect to IMR are displayed in Figure 4 and 5 respectively for Punjab and Balochistan provinces. It may be deduced from these figures that girls are less deprived in terms of IMR in the Punjab, while boys are relatively less disadvantaged in the province of Balochistan. As evident in these figures, this phenomenon exists in households of urban as well in rural areas of both provinces. These figures also reveal the higher incidence of IMR in rural non-poor households as compared with urban non-poor households.

Figure 4
Punjab – Infant Mortality Rate
[Poor versus Non-Poor Households]



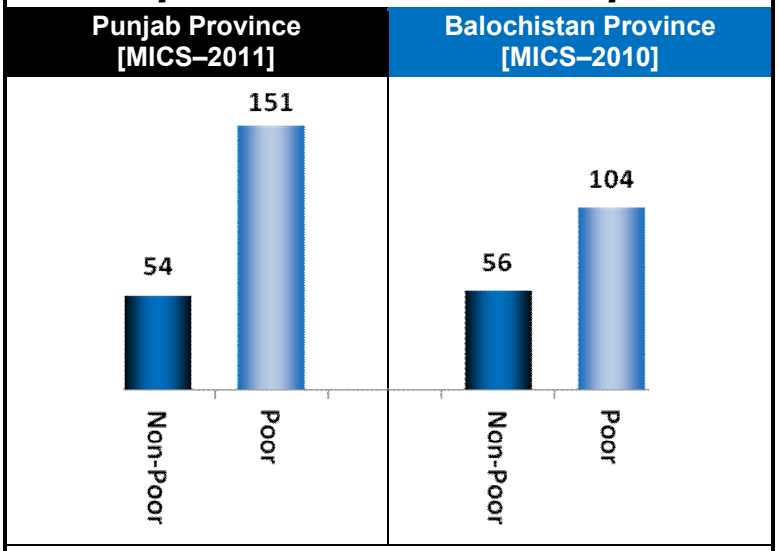
Source: Estimated from Punjab Multiple Indicators Cluster Survey (MICS), 2011.

Figure 5
Balochistan – Infant Mortality Rate
[Poor versus Non-Poor Households]



Estimated from Balochistan Multiple Indicators Cluster Survey (MICS), 2010

Figure 6
Under Five Child Mortality Rate per Thousand Live Birth
[Poor versus Non-Poor Households]

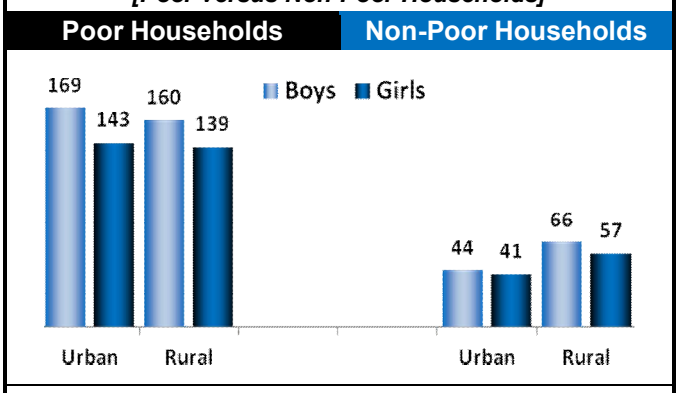


Source: Estimated from Multiple Indicators Cluster Survey (MICS) data sets.

The pertinent information regarding under-five child mortality rates (CMR) are displayed in figures 6 through 8. CMRs for non-poor households are estimated at 54 and 56 children per thousand live births, while the corresponding rates, estimated for poor households are 151 and 104 children in Punjab and Balochistan provinces respectively. In terms of gender disparities in Punjab (Figure-7), girls are less deprived as compared with boys, irrespective of poverty status. Quite the opposite, boys relatively are less disadvantaged in the province of Balochistan (Figure-8). Barring the magnitude of incidence of CMR, the provincial trend is very similar to the findings related to IMR.

The comparatively low prevalence of mortality rates in Balochistan as compared with Punjab is unpredictable and surprising because the province is the most backward in the country and ostensibly the availability of health and infrastructure facilities is less than the Punjab province. Nonetheless, the trend is in conformity with the published MICS reports of Punjab and Balochistan.

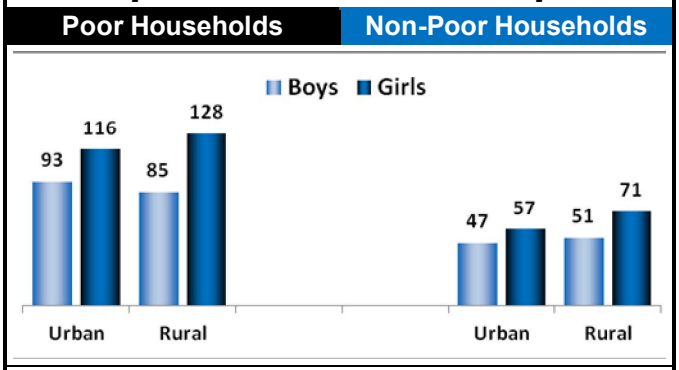
Figure 7
Punjab – Under Five Child Mortality Rate
[Poor versus Non-Poor Households]



Source: Estimated from Punjab Multiple Indicators Cluster Survey (MICS), 2011.

Another caveat which requires further examination is the contradiction between findings related to anthropometric measures and mortality rates. It was found that girls are less deprived with respect to anthropometric measures in Balochistan. Relatively low incidences for girls are observed as compared to boys in all three nutritional indicators. However, girls are relatively more deprived in terms of mortality rates in poor as well as non-poor households of Balochistan[14].

Figure 8
Balochistan – Under Five Child Mortality Rate
[Poor versus Non-Poor Households]



Source: Estimated from Punjab Multiple Indicators Cluster Survey (MICS), 2011.

The above empirical evidence in terms of gender disparities in mortality rates strongly suggests the existence of gender bias in Balochistan. Biologically girls should have a

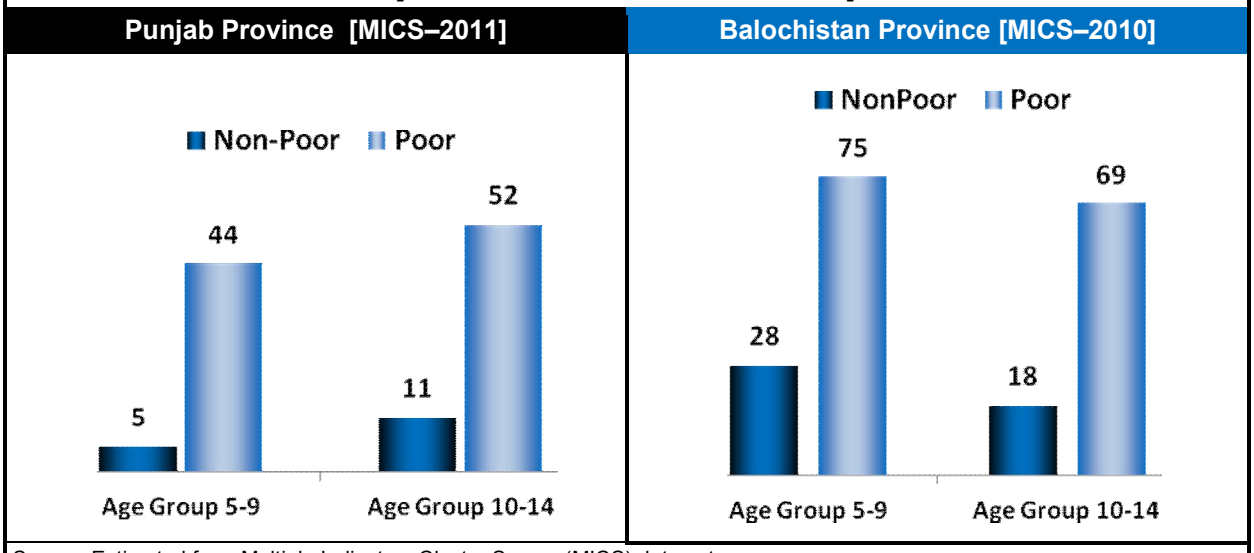
[14] The theoretical background of gender bias with respect to mortality suggests that "biologically women tend to have a lower mortality rate than men at nearly all age groups, ceteris paribus" (Sen, 1998). However, as argued by Sen that due to bias against women in developing countries women receive less attention and care than men do, and particularly girls often receive far lesser support as compared to boys. As a consequence, mortality rates of female often exceed those of males.

lower rate of mortality than boys, while the opposite is established in Balochistan. Thus, it may be deduced that the higher mortality rate of girls in Balochisatn may be due to prejudice in morbidity, nutritional status, or use of health care services. In contrast, the pertinent findings for the households in Punjab reveal the absence of bias against girls with respect to mortality.

5. CHILD SCHOOLING

Access to education is generally gauged with reference to the enrolment rates or out of schooling, based on the relevant age group. Traditionally in Pakistan, enrolment rates are calculated on the basis of age group 5-9 years and 10-14 years for primary and secondary levels of education respectively. Therefore, following the tradition, these age groups are preferred for documentation of the educational status of children with respect to out of schooling.

Figure 9
Percentage of Children Who are Out of School
[Poor versus Non-Poor Households]



Source: Estimated from Multiple Indicators Cluster Survey (MICS) data sets.

Figure-9 displays the provincial comparison of out-of-school children for 5-9 and 10-14 age groups in poor and non-poor households. In the age cohort 5-9, about 44 and 75 percent children of poor households of Punjab and Balochistan respectively were out of school. The disparity in out of schooling in terms of poverty is approximately 39 and 47

percent as only 5 and 11 percent children were out of school in non-poor households of Punjab and Balochistan provinces respectively. In contrast, for the age cohort 10-14 about 52 and 69 percent children were out of school as against 11 and 18 percent in non-poor households respectively in Punjab and Balochistan provinces.

Table 4 and 5 provide statistical evidence[15] of gender bias in poor households with respect to out of schooling respectively for Punjab and Balochistan provinces. Quick look at these tables reveal statistically significant gender disparity in education. Generally, girls in rural households irrespective of poverty status are disadvantaged with respect to out of schooling in both age cohorts. The only category where girls are less deprived than boys is the age cohort 10-14 in urban households of Punjab; however, the phenomenon is statistically not significant according to the magnitude of t-statistics. Further, no evidence of gender bias in the age cohort 5-9 is found in urban households of both provinces.

Table 4
Percentage of Children Who are Out of School – Punjab
[Boys versus Girls]

		Boys	Girls	Difference	t-Statistics	p-Value
Non-Poor Households						
Urban	Age Group 5-9	4.70	4.97	-0.27	-0.800	0.424
	Age Group 10-14	11.39	9.42	1.97	4.177	0.000
Rural	Age Group 5-9	5.16	5.95	-0.78	-2.752	0.006
	Age Group 10-14	9.47	15.06	-5.59	-14.329	0.000
Poor Households						
Urban	Age Group 5-9	35.16	37.73	-2.57	-1.737	0.082
	Age Group 10-14	50.39	47.90	2.49	1.407	0.159
Rural	Age Group 5-9	39.35	50.02	-10.67	-19.179	0.000
	Age Group 10-14	41.63	63.02	-21.39	-33.049	0.000

Note: Zero or less than 0.05 p-Value indicates that the t-statistics is statistically significant at least at 95 percent confidence level and thus the gender difference does exists in terms of weighted averages.

Source: Estimated from Punjab Multiple Indicators Cluster Survey (MICS) data, 2011.

[15] T-test is applied to determine the statistical significance in terms of average characteristics. See footnote 6 for the description of t-test

Table 5
Percentage of Children Who are Out of School – Balochistan
[Boys versus Girls]

		Boys	Girls	Difference	t-Statistics	p-Value
Non-Poor Households						
Urban	Age Group 5-9	23.55	26.98	-3.43	-1.666	0.096
	Age Group 10-14	10.81	19.36	-8.55	-5.269	0.000
Rural	Age Group 5-9	26.96	32.14	-5.18	-3.050	0.002
	Age Group 10-14	11.52	29.72	-18.21	-12.830	0.000
Poor Households						
Urban	Age Group 5-9	73.67	75.41	-1.74	-0.661	0.509
	Age Group 10-14	58.74	76.54	-17.81	-5.645	0.000
Rural	Age Group 5-9	71.70	80.01	-8.31	-8.860	0.000
	Age Group 10-14	60.67	78.17	-17.50	-15.705	0.000

Note: Zero or less than 0.05 p-Value indicates that the t-statistics is statistically significant at least at 95 percent confidence level and thus the gender difference does exists in terms of weighted averages.

Source: Estimated from Balochistan Multiple Indicators Cluster Survey (MICS) data, 2010.

6. CONCLUDING REMARKS

This research is explanatory in nature and presents the extent of gender bias in poor and non–poor households in the dimensions of child undernourishment, mortality rates and schooling opportunities. The prime objective of this research is to test the hypothesis that “girls are more likely to be neglected than boys” or more specifically, “household poverty affects girls more than boys in the nutritional intake and in educational opportunities”.

Undernourishment is represented with three standard measures; underweight, stunting and wasting, while in mortality both infants (less than one year) and child (under five) mortality rates are estimated for boy and girls. To explore access to educational opportunities, out-of-school children in the age cohorts 5-9 (primary level) and 10-14(secondary level) are considered. Multidimensional poverty is estimated for this research by applying OPHI-UNDP methodology to establish household poverty status. The study uses the Multiple Indicator Cluster Survey (MICS) unit-record datasets of Punjab and Balochistan provinces for the year 2011 and 2010 respectively.

To control for the differences in the economy, culture, ethnicity, health and education facilities, road infrastructure and the level of development, two provinces of Pakistan are covered. Punjab is the most developed and relatively more gender equitable province, while Balochistan is the most backward and the least developed province with the cultural of gender discrimination.

Poverty is definitely an important determinant for child malnutrition, mortality and out of schooling. Significant differences exist in poor and non-poor households with respect to the above dimensions. However, in terms of gender disparity, the results are mixed. It is found that in general girls and boys are roughly equally deprived in poor households with respect to indicators of nutritional status. The phenomenon is evident in both provinces with varying cultural factors and the levels of economic development. The empirical evidence in terms of gender differential in mortality rates strongly suggests the existence of gender bias in Balochistan, while findings for Punjab reveal the absence of bias against girls with respect to mortality. Regarding gender bias in poor households with respect to out-of-school children, it is found that rural girls irrespective of poverty status and province are disadvantaged with respect to out of schooling in both age cohorts 5-9 and 10-14. No evidence of gender bias with respect to out of schooling in urban poor households is found in the age cohort 5-9 years (primary level) in both provinces.

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APPENDIX A

METHODOLOGICAL BRIEF FOR MULTIDIMENSIONAL POVERTY

This subsection is largely verbatim of Technical Notes of UNDP Human Development Report (2011), while details of conceptual and other related issues in measurement of multidimensional poverty may be acquired from various OPHI[16] working papers. UNDP cited Alkire and Santos (2010) for the preparation of the Technical Note.

The Multidimensional Poverty Index (MPI) identifies multiple deprivations at the individual level in education, health and standard of living. Each person is assigned a deprivation score according to his or her household's deprivations in each of the 10 component indicators. The maximum score is 100 percent; with each dimension equally weighted (thus the maximum score in each dimension is 33.3 percent). The education and health dimensions have two indicators each, so each component is worth 5/3 (or 16.7 percent). The standard of living dimension has six indicators, so each component is worth 5/9 (or 5.6 percent). Table 3.1 furnishes the deprivation indicators and their thresholds.

Table 3.1
Indicators of Household Deprivation

Education	Years of Schooling	If no household member has completed five years of schooling
	Child Enrolment	If any school-aged child is not attending school in years 1 to 8
Health	Child Mortality	If any child has died in the family
	Under-nutrition	If any adult or child is malnourished
Standard of Living	Electricity	Deprived if the household has no electricity
	Drinking water	Deprived if the household does not have access to clean drinking water
	Sanitation	Deprived if they do not have access to adequate sanitation
	Flooring	Deprived if the household has dirt, sand or dung floor
	Cooking Fuel	Deprived if they cook with dirty fuel (wood, charcoal or dung)
	Assets	Deprived if the household does not owning car, truck or similar motorised vehicle while owning at most one of these assets: bicycle, motorcycle, radio, refrigerator, telephone or television.

[16] http://www.ophi.org.uk/

To identify the multi-dimensionally poor, the deprivation scores for each household are summed to obtain the household deprivation, *c.* A cut-off of 33.3 percent, which is the equivalent of one-third of the weighted indicators, is used to distinguish between the poor and non-poor. If *c* is 33.3 percent or greater, that household (and everyone in it) is multi-dimensionally poor. Households with a deprivation score greater than or equal to 20 percent but less than 33.3 percent are vulnerable to or at risk of becoming multi-dimensionally poor. Households with a deprivation score of 50 percent or higher are severely multi-dimensionally poor.

The MPI value is the product of two measures: the multidimensional headcount ratio and the intensity (or breadth) of poverty. The headcount ratio, *H,* is the proportion of the population who are multi-dimensionally poor:

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

Where *q* is the number of people who are multi-dimensional poor and *n* is the total population. The intensity of poverty, *A,* reflects the proportion of the weighted component indicators in which, on average, poor people are deprived. For poor households only, the deprivation scores are summed and divided by the total number of poor persons:

$$A = \frac{\sum_1^q c}{q}$$

APPENDIX B
THE DATASETS

Multiple Indicator Cluster Survey (MICS) is a household survey programme developed by UNICEF in the mid nineties to assist countries in filling data gaps for monitoring the situation of children and women. The MICS was originally developed in response to the World Summit for Children (WISK) held in1990 to measure progress towards an internationally agreed set of mid-decade goals. In this sense, MICS was basically developed to fill existing data gaps and to inform and complement existing data collection methods and instruments. The MICS surveys are typically carried out by government organisations, with the support and assistance of UNICEF and other partners. Technical assistance and training for the surveys is provided through a series of regional workshops, covering: questionnaire content, sampling and survey implementation, data processing, data quality and data analysis.

Generally, three sets of questionnaires are used in the survey:

- Household questionnaire is used to collect information on all household members, household socio-economic characteristics and to identify eligible women and individuals for detailed interviews.
- Woman questionnaire is designed to collect information from all women aged 15-49 years registered in the household questionnaire. The women questionnaire includes various modules such as Woman's Background, Marriage, Child Mortality, Maternal and Newborn Health, Illness Symptoms, Contraception etc.
- A questionnaire for under 5 children is administered to mothers or caretakers living in the household and comprise of modules: Birth Registration, Early Childhood Development, Breastfeeding, Care during Illness, Malaria, Immunisation, and Anthropometry.

Punjab Multiple Indicators Cluster Survey (Punjab, 2011) data for the year 2011 is utilised for this study which covers more than 100 thousand households. It was the biggest survey in the history of Punjab in terms of indicators and sample size. The

Survey was carried out in 2011 by the Bureau of Statistics, Government of the Punjab in collaboration with United Nations Children's Fund (UNICEF) and United Nations Development Programme (UNDP).

The sample for the MICS Punjab, 2011 was designed by Pakistan Bureau of Statistics (PBS), to provide estimates on a large number of indicators on the situation of women and children including the socio-economic indicators at the provincial level for 9 divisions, 36 districts and 150 tehsils/towns. The sample design was reviewed for adequacy and soundness by international consultants engaged by UNICEF Pakistan. The sample was selected in two stages. Within each of the 287 sampling domains, Enumeration Areas (EA) (enumeration blocks in urban areas or village/ mouzas/ dehs in rural areas) were selected with probability proportional to size. Prior to the survey implementation, a complete listing of households in all the selected EAs was conducted. Based on the total number of households in each EA a systematic sample of 12 households in urban and 16 households in rural areas was randomly drawn. This formed the second stage of sampling. In selected households, all females aged 15-49 years and children under five years were identified for individual interviews. The total sample size for the survey was 102,0485 households. The sample was not self-weighting and sample weights were used to report results.

In Balochistan, the second round of the MICS series was conducted in 2010 by the Planning and Development Department of the Government of Balochistan (Balochistan, 2010). The primary focus of the Balochistan MICS was to provide estimates of key population and health indicators for the province as a whole, urban and rural area, six regions and 31 districts. A two-stage stratified sample design was used for the survey which was designed and provided by the Pakistan Bureau of Statistics. At the first stage of sampling, 844 primary sampling units (241 urban and 603 rural) were selected. The clusters in each district of a region were selected with probability proportional to their size. At the second stage, 12 households from each urban PSU and 16 households from each rural PSU were selected using systematic random sampling procedure. A total of 12,378 households were sampled, 12,069 were found occupied during the data collection and 11,612 households were successfully interviewed.

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