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Child Health and Poverty in Pakistan

G. M. ARIF

This study examines the health status of Pakistani children using two important indicators, morbidity and malnutrition measured by weight-for-age and height-for-age. The demand for medical services has also been determined. The main data source used in this study is the 2000-01 Pakistan Social-Economic Survey (PSES), which provides sufficient information on child health and poverty. Findings of the study show that both exclusive breastfeeding during the first 4-5 months of life and immunisation can help control the occurrence of illness significantly among the young children (0-5 months). These also reinforce the role of mother's education in the production of child health (nutritional status). This role of mother's education is found to be more pronounced in the poor families than in the non-poor families. The rise in poverty since the mid-1990s has adversely influenced the nutritional status of children. The basic issue is about how to reduce the household food insecurity. The benefits of recent high GDP growth may be transferred to the poor through employment generation, which has been slow in the past decade. Real incomes of the poor and the vulnerable segments of the population may also be protected against the rise in prices of essential food items. At present, the health and nutrition sector is getting only 0.7 percent of the GDP. Health care facilities in the country are curative in nature, and are heavily skewed in favour of the diagnostic and treatment side, not preventive healthcare aspects. More resources should be made available for preventive healthcare aspects. Coverage of child immunisation should be enhanced, and the provision of safe drinking-water may be given high priority in the social sector policies.

1. INTRODUCTION

Two major socio-demographic developments have been witnessed in Pakistan during the last two decades. First, poverty, which declined rapidly in the 1980s because of high economic growth particularly in the agriculture sector and large inflow of remittances from the Middle East, increased in the 1990s. The rise in poverty was primarily the result of the slowing down of economic growth in the 1990s, fluctuations in crop production (particularly cotton), decline in the inflow of

G. M. Arif is Chief of Research at the Pakistan Institute of Development Economics, Islamabad.

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foreign remittances, drought, economic sanctions after Pakistan's nuclear explosions in 1998, and probably frequent changes in government.[1] No effective policy could be designed and implemented in the 1990s to protect real incomes of the poor and the vulnerable segments of the population against rise in prices of essential food as well as non-food items.

Second, Pakistan has been experiencing a health and fertility transition in the last two decades. The fertility transition has been rapid, with fertility decline proceeding at an unprecedented rate in the 1990s even in relation to the rest of Asia [Feeney and Alam (2003); Sathar, *et al.* (2003)], child mortality levels have also been declining steadily but slowly. The progress in the improvement in the nutritional status of children has also been slow. In fact, over the past twenty years there has been little overall change in the prevalence of child malnutrition [World Bank (2002)].

Infant and Child mortality has been thoroughly investigated in Pakistan. Child morbidity and malnutrition have also been the subject of several recent studies. Like the studies in other developing countries, most of these studies have focused on diarrheal diseases, the most important cause of child morbidity and malnutrition [Arif and Ibrahim (1998); Mahmood (2001); PIDE (2004)]. Significant negative association has also been noted between growth retardation and communicable and other diseases.

Malnutrition is also the result, at least in part, of low income (or poverty), which limits the capacity of families to purchase sufficient food [Alderman (1993); Martorell and Ho (1994); World Bank (2002a)].[2] However, little work has been done in Pakistan to study the relationship between poverty and overall child health, particularly malnutrition. Among the recent studies, only the World Bank (2002) has examined the correlation between poverty and child malnutrition, using the Pakistan Rural Household Survey (PRHS). It found a positive relationship between the household income and nutritional status of children although it pointed towards the presence of strong externality effects within communities in the child's well-being.[3] These findings need to be substantiated since they are based only on a rural sample where more than 50 percent of the sampled children were dropped from the analysis due to lack of identifiers and/or reliable information on height and weight of children [World Bank (2002)]. Schlichting and Ahmadi-Esfahani (2004) has recently focused on northern areas of Pakistan to study the relationship

[1]Approximately one-third of the total population in 2001-02 was below the official poverty line, based on the last Pakistan Integrated Household Survey. For detailed discussion on reasons for the rise in poverty in the 1990s, [see Amjad and Kemal (1997); Amjad (2003); Malik (2004)]. Iqbal and Sattar (2005) discussed the contribution of remittances in economic growth.

[2]The causality between malnutrition and poverty also runs in the other direction [World Bank (2002a)].

[3]After controlling for the average per capita income of the community, the study found no impact of household expenditure on z-scores of height and weight-for-age.

between food security and income. Overall, their estimates of nutrient demand indicate disagreement on the role of income in determining the demand for nutrients. However, Schlichting and Ahmadi-Esfahani's study is based on the household-level data rather than information on individual children. Earlier, Haddad, *et al.* (1996) have linked food security and inequalities with child malnutrition in several developing countries including Pakistan. They found that increased availability of calories and decreased probability of diarrhea both increase the probability of improvement in preschooler's z-scores of weight-for-age. While linking poverty with child morbidity and health seeking behaviour, Mahmood and Ali (2004) have recently shown that the most common illnesses among children from poor families are intestinal infections including diarrhea, fever and viral diseases. Lack of affordability of medical treatment was among the main reasons for not visiting any health facility during the child illness.

It appears from this brief review of the recent literature that the effect of recent rise in poverty on child health has not been thoroughly examined. Moreover, the commonly used health status measures like self-reported morbidity and weight/height for age, are inherently imperfect, suggesting the advantages of using a multiplicity of them to represent health status in empirical analysis [Behrman and Deolalikar (1988)]. This study is an attempt in this direction. It contains several unique features that distinguish it from the early literature on the relationship between child health and socio-economic factors including poverty. It has used the Pakistan Socio-Economic Survey Round II (2000-01) data that provides sufficient information on child health and poverty (consumption expenditure). Health production functions are estimated, with health being measured by whether the child has been ill during the past two weeks and also by weight-for-age and height-by-age. The former is a measure of morbidity (the absence of health), and the latter are standard anthropometric measures. Demand for medical care function is also estimated in which the child's health (weight/age or height/age) is one factor that affects the decision to seek medical assistance. Although the focus of the study is on poverty and child health, the impact of other socio-demographic factors, such as child's age and sex, birth order, breastfeeding, mother's age at the time of birth and education, housing and sanitation, has also been analysed.

The rest of the paper is organised as follows. The next section examines the trends in poverty and health indicators in the 1990s, followed by a discussion on data sources and methods of analysis in Section 3. Sample characteristics and differentials in the prevalence rates of child morbidity and malnutrition are examined in Section 4, while determinants of child health have been explored in Section 5. Demand for medical care is the subject matter of the penultimate section, followed by the conclusion in the final section.

2. POVERTY AND HEALTH INDICATORS IN PAKISTAN IN THE 1990s

Pakistan has experienced wide fluctuations in the GDP growth during the 1990s. For example, in 1990-91, GDP grew by 5.6 percent while in 1992-93, 1996-97 and 2000-01 it was around 2 percent or even lower (Table 1). However, the economic growth performance during the last two years was impressive; the real GDP grew by 5.1 and 6.4 percent respectively in fiscal years 2003 and 2004. The growth in agricultural production was also not sustained consistently during the 1990s. One or two good years in agriculture production, particularly in the case of cotton, a major cash crop, were generally followed by bad year(s). Poor agricultural production may have pushed several rural households into poverty. The emerging consensus in the recent poverty literature, despite some methodological differences is that the percentage of population living below the poverty line has increased over time, especially since the mid-1990s. In 2000-01, around one-third of the total population was below the official poverty line (Table 1).[4] Income distribution has also worsened [Jamal (2003)]. Moreover, poverty in Pakistan has historically been higher in rural areas than in urban areas. Within rural areas there is a concentration of poor in southern Punjab and Sindh [Malik (1994); Arif and Ahmad (2001); Malik (2004)].

Table 1

Poverty and Health Indicators in the 1990s

Indicators	1990-91	1992-93	1993-94	1996-97	1998-99	2000-01
GDP Growth (%)	5.6	2.1	4.4	1.7	4.2	2.2
Poverty Incidence (%)	26.1	26.8	28.7	29.8	30.6	32.1
Infant Mortality Rate	105	102	100	86	82	77
Total Fertility Rate	6.0	5.7	5.6	5.0	4.5	4.3
Calories per Capita Availability	2534	–	–	2522	2728	2708
Protein per Capita Availability	65.5	–	–	67.4	71.9	71.2
Health Exp. as % of GDP	0.7	0.7	0.7	0.7	0.7	0.7
Underweight	40.4[a]	–	–	–	–	41.5[b]
Stunting	50.0[a]	–	–	–	–	31.0[b]
Wasting	9.2[a]	–	–	–	–	11.6[b]

Source: Pakistan Economic Survey (Various Issues).

[a] *Demographic and Health Survey, 1990-91*; [b] *National Nutrition Survey, 2001-02*.

[4]Data on poverty incidence presented in Table 1 are based on the official poverty line that has utilised the Pakistan Integrated Household Survey data, with a threshold of 2350 calories per capita alike for rural and urban areas.

Overall, availability of calories as well as protein has increased over time in Pakistan (Table 1). However, it is affordability rather than availability that is the core issue in food security. Household income and prevailing food prices are two essential elements that determine affordability at the household level. The rise in poverty in the 1990s is likely to have reduced affordability. At present about two-thirds of the total districts in Pakistan are ranked as food insecure. According to a recent study, 61 percent of households in Northern areas of the country consume less than 2100 calories per person daily [Schlichting and Ahmadi-Esfahani (2004)]. A household in Pakistan on average spends 50 percent of the total monthly income on purchase of food, and little remains for meeting health, education, and other needs which puts poor in disabling environment.

The major demographic development in the 1990s was the onset of fertility decline. Total fertility rates have substantially declined from more than 6 children per women in the 1970s to 4.1 children per women in 2001. Major factors contributing to this decline are rising age at marriage, increase in use of contraceptives and a rising trend of terminating unwanted pregnancies [Sathar, *et al*. (2003)]. According to the latest fertility survey, 28 percent of all pregnancies in Pakistan are unwanted [NIPS (2001)]. A substantial proportion of these unwanted pregnancies are believed to be terminated through induced abortion. According to a recent study of the Population Council (2004), based on four data collection exercises in all four province, health professional survey, health facility survey, in-depth interviews with health service providers and women who had experienced an induced abortion and post-abortion survey, there were in total 890,000 induced abortions occurring during 2002. The estimated annual abortion rate was 29 per 1000 women aged 15–49. The estimated abortion ratio, defined as the number of abortions per 100 births, was 20 abortions per 100 births in 2002. The rate of induced abortions is considered high, higher than previously thought [Population Council (2004)]. Economic crisis of the 1990s and rise in poverty seem to be the major forces behind attitudinal change towards the small family norm.

Although child mortality is declining, it still remains high by all standards compared with an average of South Asian as well as low income countries [World Bank (2003)]. Malnutrition, diarrhoea, respiratory illnesses, and other communicable and vaccine-preventable diseases account for two-thirds of the child mortality. Moreover, prevalence of bad practices due to ignorance and illiteracy of mothers have hampered achieving a significant reduction in child mortality [Khan (2003)]. Over the past twenty years there has been little overall change in the prevalence of child malnutrition. Public expenditures on health remained constant in the 1990s, 0.7 percent of GDP (Table 1). In short, the rise in poverty in the 1990s is likely to have adversely affected the child health, particularly their nutritional status.

3. DATA SOURCE AND METHOD OF ANALYSIS

3.1. Data Sources

As noted earlier, the main data source used in this study is taken from Round II of the PSES carried out in 2000-01. It created a nationally representative sample of 2577 rural and 1444 urban households. PSES is a panel data set, and its Round I was conducted in 1998-99. Households covered during the Round I were revisited during Round II in 2000-01, after a gap of about two years.[5] Out of the total sample of 3564 households interviewed during the Round I, 2862 households were successfully traced in Round II.[6] To make the PSES Round II data representative at the national as well as at the rural/urban level, more than 1000 new households were included in the sample by using the sampling frame of the Federal Bureau of Statistics, thus making the total sample for Round II of the PSES 4021 households [Arif and Bilquees (forthcoming)].

The PSES is a multi-purpose survey and its Round II questionnaires contain modules on illness of all household members during two weeks preceding the survey, anthropometry for all children 5 years and younger, household expenditure, labour force participation, housing and education of all household members.[7] It is worth noting that female enumerators were used only in Round II of the PSES to administer a separate questionnaire to female respondents to gather data on several modules including illness, birth history, children education, female employment and earnings and household consumption on food and non-food items, excluding information on consumer durable, which was part of the male questionnaire. Anthropometric data, height and weight of children, was actually measured by the female enumerators who were given a comprehensive training for this measurement.

In conventional health, demographic and nutritional surveys, usually data on household consumption, which is commonly used for poverty estimation, are not collected. This scarcity of income/consumption data has hampered inclusion of poverty in the health and demographic research in Pakistan. This is one reason that earlier studies have used indirect measures of poverty such as 'wealth index', constructed from the data on the household ownership of different assets [Mahmood (2001); Sathar, *et al.* (2003); Ibrahim (2004)]. The PSES had a household expenditure module which collected data in detail on food and non-food items. Regarding the food items information was collected on each food item listed in the questionnaire including cereals (wheat, maize, rice, etc.), pulses, meat, fish and poultry, vegetables (potato, onion, tomato, cauliflower, carrot, tinda, peas, etc.), fresh and dried fruits, milk (and

[5]For sample detail of the PSES I, see Arif, *et al*. (2001).

[6]The attrition rate for the second round of PSES was 20 percent. These households could not be interviewed because few households could not be traced and some households simply refused to be part of the panel; and it happens in all longitudinal surveys. Households that moved out of the sampled PSUs between the 1998-99 and 2000-01 period were not traced due to cost constraints.

[7]The other recent survey, NSS does not provide information on income or consumption data to examine the relationship between poverty and malnutrition.

milk products), edible oil/ghee, sugar, tea, etc., with a reference period of one month. Moreover, data on the food items own produced and consumed by households was also collected in the PSES. Information on non-food items includes housing, education, health, transport, recreation etc. There is always a recall problem in reporting the data on the consumption of food and non-food items. However, comprehensive training of enumerators, a well-structured questionnaire and effective field supervision helped produce the good quality data. It is important to report that the household consumption module of the PSES was comparable with the module included in the household integrated economic surveys (HIES). Results of the PSES on consumption behaviour are largely comparable with the HIES results [Qureshi and Arif (2001); Arif (2003)].

3.2. Methods of Analysis

In this study, child health has been measured by two indicators; whether the child has been ill during the past two weeks, and child's weight-for-age and height-for-age. Following the methodology used by Senauer and Kassouf (2000), demand for medical care function is also estimated in which the child's health (weight/age or height/age) is one factor that affects the decision to seek medical assistance.

Following the recommendation of the World Health Organisation (WHO), heights and weights of the children were standardised using the median and standard deviation of an international reference standard of children of the same sex and age [Onis, *et al.* (2000)]. The PSES questionnaire asked, as noted above, about each household member whether he or she had suffered from illness during the two weeks preceding the survey. With respect to a child, the answer to this question reflects the mother's perception of whether the infant showed any symptom of illness. Respondents were also asked about the nature of illness and whether medical assistance had been sought for the child from a doctor, clinic, or other health care provider because of symptoms of these illnesses. Following Marini and Gragnolati (2003), in the health models, per capita consumption expenditure is used as the proxy of household income (poverty). Poverty status of the sampled households has also been determined. The poverty lines estimated by Qureshi and Arif (2001) for the 1998-99 period has been adjusted for the 2000-01 period by the Consumer Price Index (CPI).[8]

[8]Qureshi and Arif (2001) used the Food Energy Intake (FEI) method to compute the poverty lines separately for rural and urban areas. The cost of food component of this basket was equal to the food poverty line determined by estimating the cost of food consistent with a calorie intake of 2550 per adult equivalent per day for rural areas and 2295 calories per adult equivalent for urban areas. For the cost of non-food elements of the basket, it was assumed that those households whose food expenditures were equal to the food poverty line would also satisfy their other basic needs. The average expenditure of these households on non-food components of the basket was taken as the estimated cost of non-food items. Food and non-poor expenditures were added up to get the poverty lines. The main drawback of the FEI method, according to Kakwani (2001), is that "since the regions can differ with respect to their standard of living, their food preferences will also be different…The FEI method cannot separate the effect of regional costs of living differences from the differences in the living standards across the regions. To separate the two effects, one requires the regional costs of living indices".

Health production function is commonly used to analyse the health behaviour and outcomes, based on the new theory of home production. The application of this model to children's health status is well known, and is discussed in detail by Behrman and Deolalikar (1988). The health production function will depend on market-purchased inputs such as food (or nutrients) and health services, the time and characteristics of the main household worker, environmental features of the household such as sewerage and sanitation facilities, as well as the endowment of the child. The demand equation for child health status is specified as:

$$H = h(x_j, x_h, x_e, u)$$

where x_j are child characteristics such as age, sex, birth order and parental characteristics: x_h are household-level influences including income (expenditure), housing, and sewerage services; and x_e are community level variables such as distance to health services and regions of residence; u is a random error term, and is assumed to have a normal distribution.

The only available direct observations on the health variable (H) were: (a) whether the child was ill during the previous two weeks, and (b) child's height and weight. Illness is a dichotomous variable and the computed z-scores of height-for-age and weight-for-age are continuous variables. Least square regression is used for stunting (height/age) and underweight (weight/age) equations, while logit model is used for illness.

The following demand function for medical care, as specified by Senauer and Kassouf (2000), has been used to analyse the possible impact of the child's health on whether medical assistance was sought. The predicted value for the child's health from the production function is a variable in the medical care demand equations.

$$m = a\hat{h} + \delta' z + \mu,$$

where $\hat{h}$ is the child's predicted health from weight-for-age or height-for-age production functions and z is a vector of exogenous factors, some of which are also included in x in the production function. The error term (μ) is assumed to be normally distributed. The demand for medical care functions are also estimated with logit regression, since the dependent variable is either $m = 1$ if medical assistance was sought, or $m = 0$ if not.

4. SAMPLE CHARACTERISTICS AND DIFFERENTIALS IN THE PREVALENCE OF CHILD MORBIDITY AND MALNUTRITION

The anthropometric and health modules of the PSES 2000-01 contain information on approximately 3000 children. Table 2 shows that the sample was equally represented by male and female children. At the time of survey, approximately one-tenth of the children were less than six months old (0-5 months), and same percentage of children comprised the next age group, (6-11 months). The share of children in higher age groups was between 19 and 25 percent.

Table 2

Percentage Distribution of Children: Sick, Stunted, and Underweight by Socio-demographic Characteristics

Characteristics	Distribution of Children (0-59 Months)	% Sick (Two Weeks) (0-5) (Months)	% Sick (Two Weeks) (0-59) (Months)	% Stunted (0-59) (Months)	% Underweight (0-59) (Months)
Total Sample	100	18.3	17.4	49.7	48.2
Child Sex					
Male	50.3	21.0	19.1	51.1	51.0
Female	49.7	15.3	15.8	48.2	45.4
Child Age					
0-5 Months	9.0	18.3	18.3	32.6	21.0
6-11 Months	8.5	–	24.8	50.5	43.7
12-23 Months	18.5	–	22.6	54.9	58.6
24-35 Months	25.7	–	17.0	51.2	56.0
36-47 Months	19.2	–	13.7	48.5	46.8
48-59 Months	19.5	–	12.8	51.4	43.2
Birth Order					
1	19.5	8.6	16.2	43.8	46.0
2	17.5	23.5	16.7	45.3	46.0
3	14.4	11.9	17.1	50.0	48.5
4	12.2	14.3	17.5	50.5	46.5
5	36.4	29.7	18.7	54.2	51.0
Ever Breastfed					
Yes	87.0	8.0	16.5	45.3	46.1
No	13.2	20.8	17.6	50.4	48.6
Child Immunisation					
Yes	72.7	17.2	16.0	47.4	47.1
No	27.3	20.0	21.4	55.8	51.5
Mother Age at the Time of Birth					
15-19 Years	13.9	10.0	17.1	57.1	53.3
20-24 Years	30.3	12.1	15.9	47.3	47.5
25-29 Years	26.2	24.7	17.6	46.9	48.4
30-34 Years	17.0	24.3	20.4	52.5	47.2
35-39 Years	9.0	23.1	18.8	48.1	45.8
> 40 Years	3.6	33.3	13.6	52.6	43.6
Total Number of Children Born					
1-2	29.5	18.1	17.1	46.7	50.2
3-4	29.1	16.4	12.3	46.3	43.7
5-6	20.4	16.2	26.7	53.9	50.2
7 and more	21.0	21.1	30.3	54.7	48.6
Mother's Education					
Illiterate	75.5	23.7	18.1	54.7	50.8
Primary	8.8	5.0	16.5	39.6	40.5
Middle	5.5	13.6	15.0	35.1	41.7
Secondary	6.1	–	16.8	32.5	39.7
Higher	4.1	–	12.2	29.1	38.5
Poverty Status					
Poor	48.7	21.9	17.6	54.6	52.6
Non-poor	51.3	14.9	17.3	44.6	43.7
Place of Residence					
Urban	32.6	11.7	17.1	43.5	41.7
Rural	67.4	22.6	17.6	52.7	51.4
Province					
Punjab	51.8	19.1	17.5	44.5	46.3
Sindh	23.5	8.7	14.2	52.4	57.5
NWFP	13.1	24.3	15.3	57.8	40.7
Balochistan	11.6	22.2	26.2	58.2	48.4

Source: PSES 2000-01.

Breastfeeding was universal, and three-quarters of children had been vaccinated. However, the prevalence of exclusive breastfeeding during the first few months of life was low, less than 20 percent (not reported in Table 2). More than 70 percent of the children were born to mothers aged between 20 and 35 years. It is worth noting that in case of 14 percent of children the age of mother at the time of birth was in the 15-19 years age group, and only a small percentage of the mothers was literate (25 percent). The birth order of more than one-third of children, 36.4 percent, was 5 or higher. On average 4.5 children were born to their mothers (Appendix Table 1). Two-thirds of the sampled children were recorded in rural areas, and more than half of the children were from the province of Punjab, followed by Sindh (23 percent), NWFP (14 percent) and Balochistan (12 percent).

More than 17 percent of the children (0-59 months) were reported sick during the two weeks prior to the survey; this percentage was slightly higher in the case of infants (0-5 months old). With respect to malnutrition, the PSES showed that 48 percent of the children (0-59 months old) were underweight at the time of survey and approximately half of the children were stunted.[9] Table 2 also sets out data on prevalence rates of child morbidity and malnutrition controlling for four sets of characteristics: child, mother, regional and poverty status. Male children were in general more likely to be sick than female children. This difference was relatively high in the case of less than six months old children. However, no significant gender bias was evident in stunting (height-for-age), although the proportion of underweight was higher among male children than among females.

The morbidity rate peaked at age 6-11 months, while peak in case of malnutrition was found in the 12-23 months age group. In case of underweight the prevalence rates declined after the age of two years. It appears that the largest increase in malnutrition occurs between 6 and 24 months while children are being weaned. These findings regarding the age pattern of morbidity and malnutrition are consistent with studies conducted in Pakistan as well as other developing countries, which showed relatively high prevalence of illness as well malnutrition in the first two years of life [Martorell (1995); World Bank (2002); Marini and Gragnolati (2003)].[10]

[9]These results differ considerably from the estimates of malnutrition based on the National Nutrition Survey (NSS) 2001-02 and PRHS, 2000-01. In the NSS, the prevalence of underweight and stunting was 38 and 37 percent respectively while the corresponding figures in PRHS were 62 and 45 percent. There are few methodological differences between the PSES, PRHS and the NSS that explain these differences. The PRHS is a rural survey conducted in 14 districts across the four provinces of the country while both NSS and PSES are nationally representative surveys covering rural as well as urban areas. The NSS excluded the children less than six months old from the analysis. The PRHS collected data on height and weight of children born in 6 years preceding the survey; it means that children 0-71 months old were included in the analysis. Thus ages of the index child vary considerably across these surveys.

[10]The age pattern of morbidity could be due to exogenous factors such as increased exposure to contaminated weaning foods in the second year of life, at an age when immune system is weaker in younger children than in older children. The weaning period, when infants make the transition from being exclusively breastfed to a diet of solid and liquid foods (often contaminated and of poor quality), is a critical period for the baby's nutritional status. The risk of malnutrition increases during this period, especially if children come from poor families, because the babies may not get enough nutrients from the food they are given, either because they are not given enough food or because the food they are given is of poor quality.

The data in Table 2 shows that the incidence of stunting increased monotonically with the child's birth order in the family. This relationship, however, was week in the case of underweight children. Children born to high parity women were likely to be stunted.

Differentials in children's malnutrition levels vary quite significantly by mother's educational levels. The prevalence of malnutrition is much lower among children whose mother has more than primary education. Furthermore, mother's primary education is associated with lower child malnutrition rates than father's primary education. Table 2 shows a difference in morbidity, particularly among less than six months old children, as well as malnutrition between rural and urban areas. Prevalence rates were relatively higher in rural areas. Urbanisation could reflect a number of positive factors, such as proximity to medical assistance and infrastructure, in addition to piped water, sewers, and paved streets, but population density and pollution in urban areas might also have a negative impact on health. Balochistan had the highest prevalence of morbidity as well as stunting while proportion of underweight was highest in Sindh.

The prevalence of malnutrition is higher among the poor children than among the non-poor sample of children (Table 2). Figures 1 and 2 plot the children z-scores, weight-for-age and height-for-age, against the log per capita household expenditure. There was a positive correlation with income (expenditure): an increase in the log of per capita expenditure from 7 to more than 8 improves z-score of weight-for-age and height-for-age substantially.

Fig. 1. Underweight (z-score) by Log per Capita Expenditure.

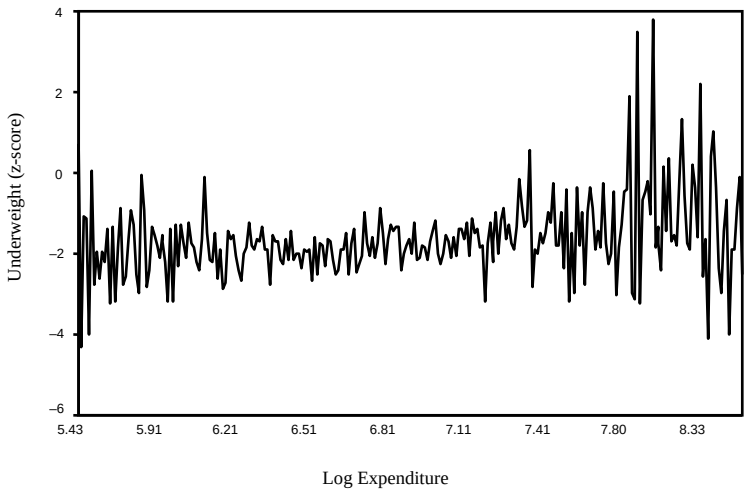
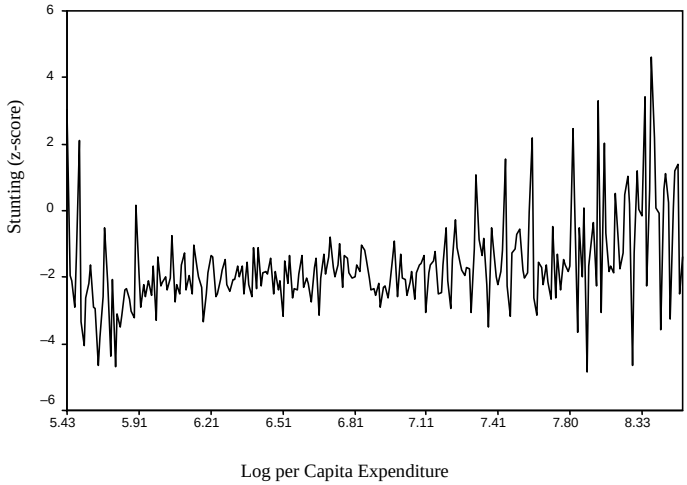


Fig. 2. Stunting (z-score) by Log per Capita Expenditure.



Source: PSES 2000-01.

5. DETERMINANTS OF CHILD HEALTH

The descriptive analysis presented in the previous section highlights some of the differentials in the prevalence of morbidity and malnutrition rates. This section presents results of the multivariate analysis to shed light on the relative importance of individual, household, and community factors that influence child's health. In five morbidity models, illness is the dependent variable while in the malnutrition models height-for-age and weight-for-age (z-scores) are the dependent variables. In both morbidity and malnutrition models, same set of independent variables has been used. Breastfeeding is assumed to have a positive effect on child health, and hence decreases the probability of illness. Consistent with the WHO breastfeeding recommendations, for infants less than 6 months old (model 1), the effect of exclusive breastfeeding is studied while for children 0-23 months old (model 2) a dummy variable for 'currently breastfeeding' (exclusive or supplemented) is included in the analysis. In the third model specified for children 25-59 months old (model 3) the dummy variable 'ever breastfed' is used. Morbidity models 4 and 5 are for the poor and non-poor sub-samples of children aged 0-59 months.

Appendix Table 1 provides a detailed description of the dependent and independent variables and their means, and standard deviations separately for 0-5 and 0-59 month old children. Gender and age of children, child's birth order and total number of children born to their mothers are included in all health models. In order to control for the availability of household resources, per capita household consumption has been included in these health models. Since the care of young children is very time intensive especially of the mother's time, economic activity

might have a negative impact on child health. Hence mother's working status is also included in the health models. Many past studies have examined the effect of parents' educational attainment, especially mother's education on children's nutritional status. Dummy variable for either parent having completed primary education is included in the multivariate analysis. Family size is also included in the analyses. Dummy variables for access to safe drinking water, sanitation and flush toilet are used to proxy the sanitary conditions of the households and community in which the child grew up. House type (*Pakka*), number of persons per room, access to electricity and telephone availability at residence are included in the health models to account for the fact that households vary in terms of economic status and their access to information. Household's access to health services in the community is approximated by the distance to the nearest health centre. The reported average distance is around 5 kilometres. Rural-urban and provincial dummies are entered into the analyses to capture regional variations.

5.1. Child Morbidity[11]

Results (odds ratios) of the five morbidity models are presented in Table 3. Based on the *maximum likelihood ratio*s, all five equations are significant overall rejecting the null hypothesis that the equations have no explanatory power. Results of the first three morbidity models are discussed simultaneously. First, take age of the sampled children. This variable turned out to be statistically significant in models for 0-5 and 0-23 months old children, suggesting that until the age of 23 months, for each additional month of age, a child is more likely to be sick. However, model 3 shows that age is not significantly associated with illness for children older than 23 months. Birth order is significant only in model 1, where children born in the middle-order were less likely to be sick than the earlier born children.

Table 3 shows that for infants age 0-5 months, exclusive breastfeeding is statistically significant, but the impact of current breastfeeding on older children (0-23 month) did not turn out to be statistically significant. In the case of Brazil, Senauer and Kassouf (2000) found the influence of exclusive breastfeeding to be significant on infants, but at the same time 'currently breastfeeding' dummy was also found to be effective in preventing illness for children up to 20 months old. Optimal breastfeeding—defined as exclusive breastfeeding for the first six months and continued breastfeeding for two years of age or beyond—has identified as the single most effective intervention with the potential to substantially prevent infant mortality. But in Pakistan less than one-fifth of the infants (younger than 6 months) are breastfed exclusively [Wagner-Rizvi (2005)].

Children who had immunisation were less likely to be sick as compared to children who did not have the immunisation (models 3 and 4). The gender variable

[11]The determinants of malnutrition are presented in the next sub-section.

Table 3

Correlates of Child Health (Morbidity), Odds Ratios

Correlates	Model 1 0-5 (Months)	Model 2 6-23 (Months)	Model 3 24-59 (Months)	Model 4 0-59 (Months) Poor	Model 5 0-59 (Months) Non-poor
Log per Capita Expenditure	0.751	1.146	0.838	–	–
Child Sex	2.401*	1.598*	1.137	1.358*	1.172
Child Age	3.440*	1.231*	0.961	1.006	0.990
Child Age^2	0.852**	0.991*	1.000	1.000	1.000
Birth Order of the Child					
1	0.427	0.944	0.945	1.260	0.818
2	–	–	–	–	–
3	0.231**	0.859	0.925	1.013	0.795
4	0.242**	0.875	1.151	1.062	0.952
5 and High	0.966	0.698	1.145	0.952	0.976
Mother's Age at the Time of Birth	1.080**	0.976	1.016	1.010	0.993
Number of Children Born	0.886	1.71*	0.949	1.033	1.009
Breastfeeding Exclusively	0.279**	–	–	–	–
Ever Breastfeeding	–	1.280	1.433	1.458	0.999
Child Immunisation	0.460	0.884	0.525*	0.654*	0.752
Mother's Education	0.202*	0.900	0.932	0.733	1.074
Father's Education	1.007	0.948	1.055	1.123	0.911
Working Status of Mother	4.827*	0.981	0.971	0.899	1.044
Father's Occupation	1.242	0.939	0.787	1.219	0.722
Family Size	0.878**	0.932*	0.935*	0.937*	0.932*
House Type	0.897	1.313	1.165	1.144	1.354
Electricity	3.548*	0.910	0.768	0.793	0.829
Persons per Room	0.979	0.985	1.061**	0.998	1.093*
Telephone	0.301	0.774	0.820	0.815	0.846
Piped Water	0.846	0.917	0.755	0.780	0.830
Toilet with Flush	1.116	0.952	0.785	1.048	0.718
Drain Underground	0.297	0.901	1.460	0.902	1.310
Distance	0.993	0.960*	0.969*	0.977	0.965*
Place of Residence	0.897	0.844	1.185	1.096	0.846
Province					
Punjab	–	–	–	–	–
Balochistan	2.322	1.479	2.770*	1.384	3.118*
Sindh	0.333	0.805	0.747	0.592*	1.093
NWFP	1.003	0.872	0.838	0.872	0.950
Constant	0.121	0.161	2.825	0.394	0.912
–2 log Likelihood	160.947	984.585	1334.765	1225.321	1137.065
N	235	969	1687	1349	1308

Source: PSES 2000-01.

* Statistically significant at the 0.5 level.

** Statistically significant at the 0.1 level.

had a positive and significant effect on the probability of being sick in models 1 and 2, suggesting that males under two years of age were more likely than females to be sick. Odds ratios for male infants (model 1) were relatively higher, which may primarily be attributed to biological differences. Age of the children's mother at the time of birth turned out to be statistically significant only in model 1 (0-5 months old). The total number of children born had a negative influence on the probability of being sick in model 2 (6-23 months old).

Infants (0-5 months old) of working mothers were at greater risk of being sick probably these mothers may have less time for childcare. For older children, there was no significant relationship between the working status of mother and illness; rather it is likely that income of working mothers contribute positively to child health by raising households' living standard. In large families, young children are likely to be looked after adequately. Access to electricity had a negative influence on the probability of being sick for 0-5 month old children (model 1). It is hard to explain this positive relationship, although it is possible that access to electricity has an association with the economic activity of mothers, hence they may have less time for childcare.

Among housing variables, persons per room turned out to be statistically significant in model 3, (24-59 months old children). The variable persons per room is commonly used as the indicators of crowding, which in turn has adverse impact on child health. It is surprising that relatively safe source of drinking water, piped/motor pump, inside the house, did not show significant association with morbidity in all three models. It may be the quality and usage pattern of water in home, not the purity of water at its source that largely determines the impact on morbidity [Arif and Ibrahim (1998)].

'Distance to the nearest health facility' had significantly negative influence on child morbidity, implying that longer the distance less the possibility of being sick. This negative relationship between child morbidity and distance needs some explanation. Reporting of the incidence of child morbidity is based on the mother's perception. In the case of longer distance to nearest health facility, the child is less likely to be taken there unless he or she has some serious illness and/or the household has sufficient resources. This may in turn have influenced the reporting of sickness. Children living in Balochistan were more likely to be sick than children living in the reference category, Punjab.

Models 4 and 5 are estimated separately for poor and non-poor categories of the sampled children. These models add nothing new but the high significance of immunisation in the poor category gives a strong message about the benefits of immunisation for children particularly in poor households. Poor children who had immunisation were less likely to be sick than those who did not have immunisation. The role of immunisation in child mortality reduction in Pakistan is well established. It appears from the present analysis that immunisation reduces the risk of illness among poor children, and it helps improve their health status.

5.2. Child Malnutrition

For the analysis of the determinants of child malnutrition, z-scores of two anthropometric measures, weight-for-age and height-for-age, have been used as the dependent variables in the OLS regression. Results are presented in Table 4. The values of R^2 are low, however, the F-statistics indicate a high level of overall significance. In a cross-section data, as is the case for the present study, low R^2 value may occur even if the model is satisfactory, because of the large variation across individual units of observation, as has been observed in many recent malnutrition studies [Handa (1999); World Bank (2002)].

No gender bias is observed either for underweight or for stunting. The absence of any significant gender effect is consistent with findings of other recent studies in Pakistan [World Bank (2002); PIDE (2003); Ibrahim (2004)]. The child age coefficients (age and age^2) imply that nutritional status of children first declines, probably until about 3 years of age, and then increases. These findings are also consistent with other recent studies [Alderman and Garcia (1994); World Bank (2002); PIDE (2004)].

The effect of birth order is significant, with children from later birth orders being worse nourished. Horton (1988) found similar results in the case of Philippines. Birth order effects are due to strains on household resources. 'Although in theory households could allocate financial resources intertemporally to offset the disadvantage to later-born children, this is unlikely for developing countries and low-income households' [Horton (1988)]. Table 4 further shows that mother's age at the time of birth is significant and positively associated with the nutritional status of children (stunting and underweight), suggesting that the marriages of women at young ages may be detrimental to the child growth. In addition to

> 'physiological mechanisms, there are socially mediated mechanisms that can account for association of both young motherhood and primparity with poor health of infant in poor and rich countries alike. Young mothers and first time mothers are often at a disadvantage because of their poverty and lack of knowledge about, and access to health facilities' [Haaga (1995)].

Mother's education (at least primary) has a positive and significant effect on children's nutritional status, but father's education is not significant. It has recently been investigated that how mother's education influences the child health (weight-for-age and/or height-for-age). Handa (1999) argues that mother's education helps to understand how to manage nutrition and disease most effectively, and increases the knowledge of appropriate sanitary behaviour. Education also influences other socio-economic characteristics like the age at which women marry, the number of children they have, and their status within the community. A correlation of education with unobserved household heterogeneity such as taste, knowledge of symptoms of illness and health, and food preparation methods have also been discussed in the literature. Finally, education allows women to process information from media (television) more efficiently and to identify better quality health care.

Table 4

Correlates of Child Malnutrition

Correlates	Underweight	Stunting
Log per Capita Expenditure	0.279*	0.038
Child Sex	–0.095	–0.112
Child Age	–0.060*	–0.041*
Child Age2	0.001*	0.001*
Birth Order of the Child		
1	0.003	0.102
2	–	–
3	–0.060	–0.158
4	–0.121	–0.241
5 and High	–0.344*	–0.423*
Mother Age at the Time of Birth	0.023*	0.030*
Number of Children Born	0.025	0.022
Ever Breastfeeding	0.162	–0.009
Child Immunisation	–0.141**	0.032
Mother's Education	0.156**	0.474*
Father's Education	0.060	–0.039
Working Status of Mother	0.024	–0.090
Father's Occupation	0.095	0.151
Family Size	–0.001	–0.004
House Type	–0.021	0.303*
Electricity	0.151**	0.068
Persons per Room	0.007	–0.005
Telephone	–0.092	0.014
Piped Water	–0.126	–0.058
Toilet with Flush	0.162**	0.256*
Drain Underground	0.001	0.083
Distance	–0.017*	–0.010
Place of Residence	0.098	–0.156
Balochistan	0.002	–0.483*
Sindh	–0.398*	–0.120
NWFP	0.308*	–0.282*
Constant	–3.669*	–2.362*
R^2	0.063	0.060
F-stat	7.038*	6.255*
N	2385	2385

Source: PSES 2000-01.

* Statistically significant at the 0.5 level.

** Statistically significant at the 0.1 level.

Table 4 shows that having access to flush toilet has a significant positive effect on the nutritional outcome of children perhaps due to smaller incidence of diseases. This variable contributes to a healthier environment by reducing exposure to pathogens [Burger and Esrey (1995)]. *Pakka* (cemented) residential house also has a positive and significant impact on height-for-age indicator of the nutritional status of children. Child health is not correlated significantly with urbanisation, however, provincial differences do exist. For example, children from Sindh are more likely to be underweight as compared to the children from Punjab. In terms of general nutrition, weight-for-age, children from NWFP seem to be better than children from other provinces. In height-for-age (stunting), children from Punjab are better than children from other provinces. The distance to the nearest health facility is also included in the analysis to measure access to health care services. Long distance to health facility is negatively associated with nutritional status of the children.

Poverty is one of the major concerns of this study. Like other studies [Handa (1999); World Bank (2002); Marini and Gragnolati (2003) log per capita consumption is entered into models to see the impact of poverty on malnutrition. It has a significant and positive effect on children's general malnutrition (weight-for-age), signalling the importance of the availability of resources and confirming the relationship between poverty and nutrition. However it does not turn out to be statistically significant in case of stunting, suggesting that the effect of rise in poverty in the 1990s is relatively more on general malnutrition (underweight). Deficits in weight-for-age represent composite of height-for-age, an index of chronic malnutrition, and weight-for-height, an index of acute malnutrition [Pebley and Goldman (1995)]. Persistence of poverty in the 1990s has therefore adversely affected the child nutritional status.

To get more insights into the relationship between poverty and child malnutrition, health models are estimated separately for the poor and non-poor categories of the sampled children. Results are presented in Table 5. Importance of mother's education seems to be more pronounced for the nutritional status of the poor children than the non-poor sub-sample, as indicated by its significance in both models specified for the sub-sample of poor children. Father's occupation has also turned out to be statistically significant in height-for-age model of the poor sample of children.

'Distance to the nearest health facility' is also an important variable for the nutritional status of the poor children. Better-off households can afford the travel to the health facility, but it may not be always possible for the poor to visit the facility located at long distance. This can prolong the illness, affecting adversely the nutritional status of the children. Finally, family size has negative effects on the nutritional status of children in the non-poor households. This correlation shows that even non-poor large families may not have sufficient resources to provide food to all members, particularly the children. In short, the present analysis reinforces the

Table 5

Correlates of Child Malnutrition, By Poor and Non-poor Categories of the Sampled Children

	Underweight		Stunting	
Correlates	Poor	Non-poor	Poor	Non-poor
Child Sex	–0.186*	–0.026	–0.200**	–0.026
Child Age	–0.047*	–0.072*	–0.036*	–0.048*
Child Age2	0.001*	0.001*	0.001	0.001*
Birth Order of the Child				
1	–0.017	–0.009	–0.149	0.301**
2	–	–	–	–
3	–0.122	–0.074	–0.199	–0.091
4	–0.058	–0.192	–0.317	–0.131
5 and High	–0.264	–0.433*	–0.626*	–0.100
Mother Age at the Time of Birth	0.017*	0.032*	0.027*	0.029*
Number of Children Born	0.036	0.010	0.042	–0.001
Ever Breastfeeding	0.195	0.117	–0.132	0.055
Child Immunisation	–0.123	–0.076	0.145	–0.002
Mother's Education	0.361*	0.025	0.623*	0.400*
Father's Education	–0.075	0.025	0.113	–0.056
Working Status of Mother	–0.036	0.114	–0.209	–0.049
Father's Occupation	0.042	0.169	0.500**	0.044
Family Size	0.018	–0.022*	–0.026*	–0.030*
House Type	–0.022	–0.033	0.087*	0.490*
Electricity	0.146	0.192	0.056	0.063
Persons per Room	–0.018	0.018	–0.038	0.015
Telephone	–0.143	0.047	0.403	0.026
Piped Water	–0.258*	–0.069	–0.088	–0.064
Toilet with Flush	0.171	0.214**	0.277**	0.185
Drain Underground	–0.137	0.073	–0.137	0.218
Distance	–0.022*	–0.012	–0.010	–0.006
Place of Residence	0.114	0.101	–0.127	–0.173
Balochistan	–0.039	0.140	–0.321	–0.586*
Sindh	–0.232**	–0.439*	–0.061	–0.182
NWFP	0.232**	0.399*	–0.349**	–0.202
Constant	–2.047*	–1.703*	–2.077*	–2.160*
R^2	0.037	0.072	0.040	0.085
F-stat	2.832*	4.548*	2.781*	4.917*
N	1326	1286	1210	1186

Source: PSES 2000-01.

* Statistically significant at the 0.5 level.

** Statistically significant at the 0.1 level.

importance of access to health facilities, women's education, and provision of better job opportunities for the improvement of nutritional status of children, particularly for those living in poor households.

6. MEDICAL CARE DEMAND FUNCTION

In this section the demand for medical care equation is estimated, where whether the child required medical attention (visit of a health facility) during the two weeks preceding the survey for the reported illness symptoms is the dependent variable. The analysis includes the same set of independent variables used in the health models, with the addition of the child's predicted health status (z-scores) variable. The child's predicted z-scores of weight-for-age and height-for-age are the proxies for health [Senauer and Kassouf (2000)]. The predicted values are derived from the health models in Table 4.

Mention of the one limitation of the study is appropriate here. The quality of health services used during the recent episode of illness is not explored in this study. The dependent variable takes the value one if a visit was made to any health facility, modern or traditional. Health care facilities in Pakistan are curative in nature and vary in quality of services they deliver. Because of a general perception of the poor quality of services in public health facilities, people prefer to visit private doctors/health facilities. However, it is also not uncommon among the poor rural households to visit traditional healers, who usually do not provide good quality health services.

Results of the demand equation are presented in Table 6. Health status of the child (z-scores of weight-for-age and height-for-age) is not significantly related to the demand for medical facilities. Senauer and Kassouf (2000), who also could not find a significant influence of height-for-age on the demand for medical care of Brazilian children, attributed this lack of significance to the low predictive performance of the health production functions.

However, Table 6 shows that immunised children have lower odds of receiving medical care during two weeks preceding the survey. This is an important finding of the present analysis. As noted earlier, much reduction in infant mortality in Pakistan during the last two decades is attributed to the child immunisation. It appears from the analysis that the immunised children have relatively low requirement of seeking medical assistance. Government already has an extensive and successful child immunisation programme. An improvement in this programme in terms of coverage and regularity can contribute significantly to better child health.

Most of the preferred modern health facilities are located primarily in urban centres. Average distance, as reported in Section 5, to the nearest facility is about 5 kilometres. In rural areas, particularly in the remoter regions, residents are less likely to have a ready means of transportation to take the sick child to the nearest health facility. Table 6 shows that the distance to the nearest health facility has a significant

Table 6

Demand for Medical Services (Odds Ratios)

Correlates	Model 1	Model 2
Z-score (Weight-for-Age)	0.759	–
Z-score (Height-for-Age)	–	0.884
Child Sex	1.133	1.127
Child Age	0.980	0.994
Child Age2	1.000	1.000
Birth Order		
1	0.850	0.842
2	–	–
3	0.854	0.845
4	1.030	1.014
5 and High	0.872	0.873
Number of Children Born	1.045	1.039
Child Immunisation	0.752**	0.768*
Mother's Education	1.061	1.067
Father's Education	1.115	1.101
Working Status of Mother	1.018	0.988
Father's Occupation	1.003	0.991
Family Size	0.933*	0.932*
Female Headed Households	0.857	0.848
Log per Capita Expenditure	1.149	1.084
House Type	1.297**	1.353*
Zakat	0.911	0.904
Electricity	0.899	0.889
Distance	0.967**	0.969*
Persons per Room	1.024	1.023
Telephone	0.914	0.954
Piped Water	0.764	0.755**
Toilet with Flush	0.955	0.940
Drain Underground	1.032	1.040
Place of Residence	1.098	1.050
Balochistan	1.643*	1.534*
Sindh	0.697	0.746**
NWFP	0.708	0.620*
Constant	0.162	0.252
–2 log Likelihood	2083.541	2081.990
N	2655	2655

Source: PSES 2000-01.

* Statistically significant at the 0.5 level.

** Statistically significant at the 0.1 level.

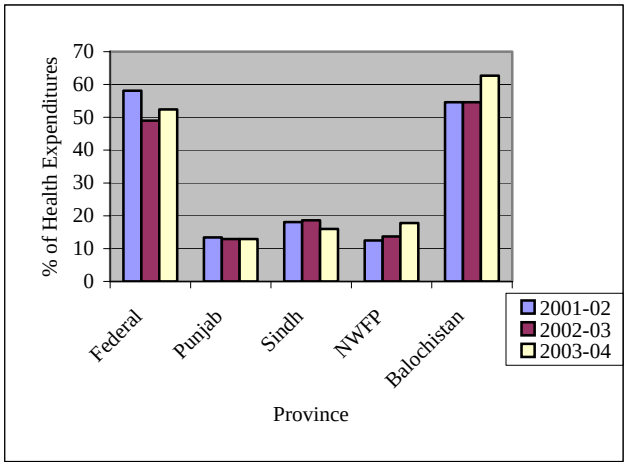
and negative effect on seeking medical assistance. Longer the distance the lower the probability of visiting a health facility. There is also a significant and negative relationship between the need for visiting a health facility and availability of the piped water inside the residential house. Table 6 shows further that larger the family size the lower the probability of visiting a health facility. It seems to be an issue of allocation of limited resources available to the household for the child's medical care. Log per capita expenditure, used as the proxy of household income, did not show a significant correlation with the demand for medical care. However, the *pakka* (cemented) residential house, is used as the indicator of wealth, and it has a positive correlation with the demand for medical assistance. It is worth noting that the affordability of child medical care for most families may be largely dependent on father's earnings—determined by his actual wage and hours worked. This issue will be explored in future work.

The significant correlation between the demand for medical assistance and three policy variables—child immunisation, distance to the health facility and availability of piped water—has important lessons for improving the performance of the health sector. Health is considered as one of the major sources of poverty generation particularly in rural areas [Hussain (2003)]. However, only 0.7 percent of the GDP is used for the health and nutrition sector out of which more than 80 percent of the health budget is used on hospitals/clinics, which are curative in nature (Figure 3). Little is left for the provision of preventive services. According to data presented in Figure 3, Balochistan seems to be very different in terms of health expenditure used on non-hospital/clinic sector of health. It is a sparsely populated province. Hospitals are usually located at the district headquarters, which are not easily accessible to population living at long distances. In this scenario, probably more resources are being used by the government on the non-hospital sector. While no recent data are available to see the impact of health expenditure in Balochistan, a progress in immunisation coverage and prenatal care during the last decade has been observed [OPM (2003)].

In terms of expenditures, 'provision of safe drinking water' is also a neglected sector [Pakistan (2004)]. There is a need to allocate sufficient resources for the preventive health facilities and 'water supply and sanitation' sector to increase the access of people, particularly of the poor. There is a recent success story of Lady Health Workers (LHWs) Programme, where one LHW registers approximately 200 households or 1000 individuals in her community to whom she offers a range of preventive services including family planning. There is evidence from the independent evaluation that the LHWs reach to most of the target population, and it has positive effects on women as well as child health [OPM (2002)]. However, 'it is the more remote and poorer rural areas where the LHW programme has not yet reached. These areas are least likely to have a functional health facility and where it would be most difficult to recruit suitable educated women to work as a LHW. The

LHW programme needs to develop a targeted expansion strategy in rural areas if it is to counteract this problem and ensure that it serves the rural poor at least as much as it serves the rest of the rural population' [Pakistan (2004)].

Fig. 3. Percentage of Health Expenditures Used on Non-hospital/ Clinic Sectors of Health.



Source: GOP (2004).

7. CONCLUSIONS

Child malnutrition is a multifaceted problem and the nutritional status of children depends largely on food, health and medical care. The major challenges in health and nutrition sector in Pakistan are poverty, household food insecurity, infectious diseases and lack of nutrition education. This study has made a contribution to the existing literature in understanding the relationship between child health, poverty and the utilisation of medical services. It has focused on two important indicators of child health; illness, and malnutrition measured by weight-for-age and height-for-age. The demand for medical services has also been examined.

When the health outcome represented whether the child had been sick during the two weeks preceding the survey, logit models were estimated separately for three age groups, 0-5, 6-23 and 24-59 months. Several explanatory variables, including child age, breastfeeding, and immunisation were entered into these models. Child age has a positive correlation with illness, and the results strengthen the compelling care for exclusive breastfeeding by documenting its significant beneficial effects on reducing illness among young children (0-5 months old). But in Pakistan less than one-fifth of young children are breastfed exclusively. This percentage should be gradually increased to achieve a reasonable reduction in mortalities and prevalence

of child malnutrition. The other major finding of this study is the strong correlation between immunisation and child health. Immunisation reduces the risk of being sick. Both exclusive breastfeeding during the first 4-5 months of life and immunisation can help control the occurrence of illness significantly among the young children.

The findings of this study have reconfirmed the positive role of mother's education with respect to child health (nutritional status). In general the children of at least primary school educated mothers are healthier than the children of illiterate mothers. The study has also found that the role of mother's education in improving the child health is more pronounced in poor families than in non-poor families.

The present analysis has also determined that poverty has adversely influenced the nutritional status of children. The basic issue is how to reduce household food insecurity. There are several ways. Firstly, Pakistan has sustained high GDP growth for the consecutive second year; the real GDP grew by 5.3 and 6.4 percent respectively in FY03 and FY04. The immediate economic outlook is also good. The benefits of this growth may be transferred to the poor through employment generation, which has been slow in the past decade. Secondly, the poor households may be protected from the rise in prices, particularly in basic food. The government of Pakistan has initiated some target programmes to transfer cash benefits directly to the poor including Zakat and food support programme. But there is a need to improve the target efficiency of these programmes. Thirdly, on-going nutrition programmes for micronutrient deficiencies may be strengthened.

The negative effect of birth order on nutritional status of children has some possible policy implications for family planning programmes and for human resource interventions. Family planning programmes that reduce the size of the very largest families will reduce the numbers of disadvantaged children from later birth orders. Family planning efforts to increase spacing between children should alleviate some of the strain on resources that results in adverse effects [Horton (1988)].

In the medical care demand functions predicted values from the production functions for health were treated as the endogenous determinants. The child's predicted health did not have a significant impact on the demand for medical care. However, there were three significant factors: immunisation, distance to the nearest health facility, and safe drinking water. It appears from these findings that the present health system in Pakistan has not provided services to adequately meet the requirements of the population, particularly the children. At present, health and nutrition sector is getting only 0.7 percent of the GNP. Within this sector, the allocation for nutrition is very low. Health care facilities in the country are curative in nature, and are heavily skewed on the diagnostic and treatment side and not on preventive healthcare aspects. Lady health workers programme is a step in the right direction to promote the preventive health facilities in the country. More resources may be made available for the preventive healthcare aspects. Coverage of full child immunisation may also be enhanced, and the provision of safe drinking water should be given priority in the social sector policies.

Appendix Table 1

Description of Variables

Variables	Child 0-5 Months Old		Child 0-59 Months Old	
	Mean	S.D.	Mean	S.D.
Child was Sick during Last Two Weeks: Yes=1, Otherwise=0	0.183	0.388	0.174	0.379
Underweight (z-score Weight-for-Age)	–	–	–1.933	1.610
Stunting (z-score Height-for-Age)	–	–	–1.988	2.020
Demand for Medical Services (Visit during Last Two Weeks)	–	–	0.138	0.345
Natural Log of per Capita Consumption Expenditure	6.702	0.513	6.656	0.513
Child is Male=1; Female=0	0.521	0.500	0.505	0.500
Child's Age in Months	3.000	1.661	30.700	14.687
Birth Order 1	0.223	0.417	0.182	0.386
Birth Order 2	0.193	0.395	0.163	0.370
Birth Order 3	0.159	0.366	0.135	0.342
Birth Order 4	0.132	0.339	0.114	0.318
Birth Order 5	0.249	0.433	0.355	0.479
Mother's Age at Time of Birth in Years	26.354	5.544	26.763	6.505
Total Number of Children Born	3.537	2.482	4.466	2.730
Infant is Exclusively Breastfed: Yes=1	0.189	0.392	–	–
Child was Ever Breastfed: Yes=1	–	–	0.126	0.332
Child had Immunisation: Yes=1	0.600	0.491	0.739	0.439
Mother's Education: Primary and Higher=1	0.291	0.454	0.238	0.428
Father's Education: Primary and Higher=1	0.434	0.497	0.429	0.495
Mother's Working Status: Yes=1	0.140	0.347	0.194	0.395
Father's Occupation: White Collar=1	0.132	0.339	0.126	0.332
Family Size	9.679	4.934	9.687	4.647
House Type: *Pakka*=1	0.396	0.490	0.362	0.481
Dwelling has Electricity: Yes=1	0.811	0.392	0.783	0.412
Person per Room	4.168	2.459	4.316	2.371
Dwelling has Telephone: Yes=1	0.143	0.351	0.112	0.315
Dwelling has Piped Water Inside: Yes=1	0.192	0.394	0.232	0.422
Dwelling has Toilet with Flush: Yes=1	0.517	0.501	0.450	0.498
Dwelling is Connected with Underground Drain: Yes=1	0.223	0.417	0.170	0.376
Distance to Nearest Health Facility-km	5.323	4.510	6.016	5.332
Place of Residence: Urban=1, Rural=0	0.398	0.490	0.320	0.467
Province Dummies: Punjab=Reference				
Balochistan=1	0.102	0.303	0.117	0.322
Sindh=1	0.177	0.383	0.231	0.421
NWFP=1	0.140	0.347	0.145	0.352

Source: PSES 2000-01.

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