Background and Objective: Poverty and inequality in health is pervasive in Pakistan. The provisions and conditions of health are very dismal. A significant proportion of the population (16.34%) of Pakistan is under 5 years, but Pakistan is in the bottom 5% of countries in the world in terms of spending on health and education. It is ranked the lowest in the world with sub-Saharan Africa in terms of child health equality. The objective of this study was to examine child health inequalities in Pakistan. Materials and Methods: We analyzed data from Pakistan Integrated Household Survey/ Household Integrated Economic Survey 2001–2002, collected by the Pakistan Bureau of Statistics, Government of Pakistan. Coverage of diarrhea and immunization were used as indicators of child health. Stata 11.0 was used for data analysis. Descriptive statistics including frequency distribution and proportions for categorical variables and mean for continuous variables were computed. Results: Children under 5 years of age account for about 16.34% of the total population, 11.76% (2.5 million) of whom suffered from diarrhea in 1-month. The average duration of a diarrheal episode was 7 days. About 72% of the children who had diarrhea lived in a house without pipe-borne water supply. Around 22% children who had diarrhea had no advice or treatment. More than one-third of the households had no toilet in the house, and only 29% of the households were connected with pipe-borne drinking water. About 7.73% (1.6 million) children had never been immunized. The main reason for nonimmunization was parents’ lack of knowledge and of immunization. Conclusion: Child health inequalities in Pakistan are linked with several factors such as severe poverty, illiteracy, lack of knowledge, and awareness of child healthcare, singularly inadequate provision of health services, and poor infrastructure.

Key words: Child health inequality, diarrhea, healthcare provision, immunization, Pakistan, poverty

INTRODUCTION

The wellbeing of a society is linked with good health. Alma-Ata declaration (1978) explicitly states the importance of health in public policy and health sector reforms to address systemic problems that affect the health of the society.[1] An individual’s desire for improved health may be impeded by both social and financial constraints that check their attainment of healthcare and a healthy lifestyle. However, an improvement of their socioeconomic profile as a result of the public policy, is likely to assist in the attainment of the status of improved health.[2]

A person’s health can be influenced by factors such as income, employment, access to healthcare services, education, provision of economic and social opportunities, and the conditions they live in. For instance, Pappas et al. showed that in Pakistan, urban men of low and middle economic status are more likely to smoke than men of high economic status or those in rural areas. They suggest that an individual’s health also depends on their socioeconomic conditions.[3] However, according to Lobstein et al., around 10% of school-aged children in the world are estimated to be overweight, a quarter of whom are obese.[4] The incidence of overweight in children is much higher in
rich countries than in low income countries. Moreover, children’s weight is correlated with the parents’ weight and the environment they live in.[5,6]

The poor, on the other hand, are generally the most disadvantaged in the society and they do not enjoy good health.[7] Poverty and health inequality particularly in children is pervasive in Pakistan. The determinants of poverty in Pakistan are location, large household size, high dependency ratio, illiteracy, low education, large informal sector employment, and lack of access to basic utilities.[8] According to WHO report, all the countries ranked lowest on child health equality are in sub-Saharan Africa, except for Afghanistan and Pakistan where child mortality is still relatively high.[9] The most common social determinants of health inequality and morbidity in Pakistan are location (Rural/Urban), literacy, level of education, gender, and poverty.[10]

Despite being a signatory to the Alma-Ata declaration, the first ever formal health policy in Pakistan was created in 1990. In Pakistan, the two most important socioeconomic sectors, health and education are not given the consideration due in terms of public spending. Pakistan is among the bottom 5% countries in the world in terms of spending on health and education.[11] Life expectancy (at birth) in Pakistan is about 64 and 66 years for men and women, respectively.[11] From the creation of Pakistan in 1947 until 2005, the Government of Pakistan has taken about 49 health initiatives primarily focused on disease. In 2005, for the first time, provision for safe drinking water was included in the national development agenda in Pakistan.[10] As depicted in Table 1, public spending on health in Pakistan is just above ½% of GDP. The ratio of various healthcare professionals (doctors, nurses, and dentists) for population (per 1000 people) is very low.

According to recommendations of CSDH, children need safe, healthy, supporting, nurturing, caring, and responsive living environments.[11,12] Since children’s health does not depend on their personal choice, examination of their socioeconomic background may provide a good insight into their health status and inequality. Therefore, the objective of this study was to examine child health inequalities in Pakistan and to investigate their dimensions.

**MATERIALS AND METHODS**

We analyzed Pakistan Integrated Household Survey/ Household Integrated Economic Survey (PIHS/HIES) 2001–2002 data collected by the Pakistan Bureau of Statistics (PBS), Government of Pakistan. The PIHS/HIES is a 16 comprehensive cross section of household level survey on 17 socioeconomic characteristics across the whole country. The survey was conducted using a systematic two-stage stratified random sampling methodology.[13] The PIHS/HIES data is available to the public and was acquired directly from the PBS. There is no stated restriction on the use of the data for academic purpose. The survey included 14704 households.

The analysis was based on a sample of 17,034 children under 5 years of age (from now onward referred as “children”) which corresponded to a population of 20,436,228 children. Since children have no choice in matters relating to their health, examination of their socioeconomic background may provide a good insight into the inequalities of their health status. Diarrhea and immunization coverage were used as indicators of child health in this study. Stata 11.0 (StataCorp. 2009. Stata Statistical Software: Release 11. College Station, TX: StataCorp LP) was used for data analysis; sample weights were included in all analyses. Descriptive statistics including frequency distribution and proportions for categorical variables and mean for continuous variables were computed.

**RESULTS**

The data revealed that almost 50% of the population of Pakistan was less than 20 years of age, and that children

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**Table 1: Population, education and health expenditure, and health personnel in Pakistan**

| Year | Population (million) | Population growth (%) | Literacy (%) | Expenditure on education as percentage of GDP | Health expenditure as percentage of GDP | Doctors per 1000 people | Nurses per 1000 people | Dentists per 1000 people |
|------|-----------------------|-----------------------|--------------|--------------------------------------------|----------------------------------------|-------------------------|------------------------|------------------------|
| 2001 | 140.88                | 2.15                  | 44           | 1.82                                       | 0.59                                   | 0.69                    | 0.28                   | 0.03                   |
| 2002 | 143.81                | 2.08                  | 45           | 1.79                                       | 0.59                                   | 0.71                    | 0.31                   | 0.04                   |
| 2003 | 146.75                | 2.04                  | 47           | 1.86                                       | 0.58                                   | 0.74                    | 0.32                   | 0.04                   |
| 2004 | 149.65                | 1.98                  | 50           | 2.2                                        | 0.57                                   | 0.76                    | 0.32                   | 0.04                   |
| 2005 | 152.52                | 1.92                  | 53           | 2.15                                       | 0.57                                   | 0.77                    | 0.34                   | 0.04                   |
| 2006 | 155.36                | 1.86                  | 54           | 2.24                                       | 0.51                                   | 0.79                    | 0.37                   | 0.05                   |
| 2007 | 162.91                | 4.86                  | 55           | 2.5                                        | 0.57                                   | 0.79                    | 0.36                   | 0.05                   |
| 2008 | 166.41                | 2.15                  | 56           | 2.47                                       | 0.57                                   | 0.80                    | 0.39                   | 0.05                   |
| 2009 | 169.94                | 2.12                  | 57.4         | 2.1                                        | 0.56                                   | 0.82                    | 0.41                   | 0.06                   |
| 2010 | 173.51                | 2.10                  | 57.7         | 2.05                                       | 0.54                                   | 0.84                    | 0.42                   | 0.06                   |

Source: Economic Survey of Pakistan (various issues). GDP: Gross domestic product
constituted almost 16.34% of the total population. The average household size of 7.2 lived in an average dwelling house size of 2.4 rooms (the dwelling included all rooms in the house other than the kitchen and toilet/bath). Regarding human capital, on average, there were 2.3 literate members in each household (a literate person is 10 years or older who can read, write, and do basic arithmetic). The average maximum level of education in a household was six and a 1/2 years of schooling. The average education of the head of household was 4 years of schooling and the spouses had just over 1-year of schooling. Only 21% of heads of households had education to high school (10 years) level or above, whereas, only 7% of spouses had a high school (10 years) education or above. In terms of access to basic facilities, almost 78% of households were connected to electricity, but only a quarter of the households benefited from gas. More than one-third of households had no toilets in the house, and only 29% of households were connected with pipe-borne drinking water. 

Table 2 presents the average deciles of important household characteristics. The distribution is made in comparison with average per capita monthly consumption expenditure (a proxy for income). It provides a clear though unconventional picture of the socioeconomic status of the people of Pakistan.

Table 2 indicates that household size decreases as we move up the economic ladder. Schooling levels and educational attainment were also higher among richer households. The number of people working was less in richer households that is, low income classes tended to have more working people. The penultimate column refers to access to public utilities; electricity and pipe-borne drinking water. Almost half of the richest in the population had access to either electricity or pipe borne drinking water; whereas only 16% of the poor people had access to both these utilities. The last column shows that the average duration of a diarrheal episode was higher for poor children, which was consistent with WHO.\[14\] 

Diarrhea is in fact linked with poor environment and living conditions. The data showed that nearly 11.76% children in Pakistan suffered from diarrhea in 1-month, and around three quarters of these children lived in the rural areas where basic needs and infrastructure were lacking.

The breakup of distribution of diarrhea sufferers by province [Table 3] indicates that though the proportion of children suffering from diarrhea in each province was high, it corresponded with the proportion of the province’s population to the national population. The only exception was Sindh where the rate of diarrhea was much higher than the proportion of its population. Table 4 indicates that national average duration of a diarrheal episode was 7 days; the average duration in rural areas was 1-day longer than the urban areas. Poor children tended to have an average of 7 days of diarrheal episode compared to 6 days for children who are better off.

The majority of children who suffered from diarrhea were found in small dwelling units [Table 5]. Almost 89% of these children lived in houses that were not connected to the public sewerage system [Table 6]. The situation was worst in rural areas where more than 98% children lived in houses that were not linked with the public sewerage system.

The data indicated that around 75% of the population did not have pipe-borne drinking water available in their house [Table 6]. The situation was worst in rural areas where around 80% population was without pipe-borne water compared to 45% population in urban areas. Around
72% of children who suffered from diarrhea lived in homes without pipe-borne water. In rural areas, almost 85% of these children were without pipe-borne water.

In terms of treatment for diarrhea, about 22% did not receive any advice or treatment from some expert, that is, doctor or other health professional [Table 6]. The data showed that around a quarter of the children in rural areas, and a quarter of poor children who had diarrhea did not receive the expert advice either.

On the question of immunization, 7.73% children had never been immunized; 87.5% of these children lived in the rural areas [Table 3]. Only 47% children had received all recommended vaccines. Vaccination coverage varied a lot between provinces. As shown in Table 3, around 43% children in Punjab had never been immunized. The proportion of nonimmunized children in Sindh, Khyber Pakhtunkhwa, and Balochistan was 19.27%, 17.07%, and 20.82%, respectively. A number of reasons why children were not immunized are presented in Table 7. In Pakistan, immunization of children at public health facilities is free, therefore, affordability could not have been the issue. However, the lack of availability (in terms of vaccination team visits) or distance from the vaccination facility appeared to be a strong reason for nonimmunization of children. The fear of possible side effects of the vaccination on the children or the assumption that immunization was unnecessary were other important reasons for not having children immunized.

### DISCUSSION

Pakistan has a “double burden.” First is that diseases associated with economic underdevelopment (infectious diseases and nutritional deficiencies) have not yet been controlled. The second is that the risk factors for diseases associated with economic development (chronic and cardiovascular diseases and cancer risk factors) are also significant. With systemic problems such as widespread poverty, substantial illiteracy, low levels of education, huge unemployment, lack of access to basic utilities and healthcare in Pakistan, it would be unjust to hold individuals responsible for the inequalities in health.

The extent of children's exposure to unhygienic and unhealthy conditions is further worsened by the fact that around 34% public schools in Pakistan do not have drinking water, 36% have no toilets, and 59% are without electricity. These unhygienic living conditions no doubt contribute to the poor health of children in Pakistan.
According to WHO, children in Pakistan, except those in urban households of high economic status, suffer from under-nutrition and disease. In general, people especially women living in rural areas and belonging to low economic class suffer badly from under-nutrition. This is evident from Table 2, which indicates that per capita adult equivalent calories consumed seemed to have a direct relationship with per capita consumption (according to planning commission of Pakistan, adult calorie requirement in Pakistan is 2350 for both male and female). However, it should be noted that the consumption of less than what is required is not indicative of poverty, but rather an indication of under-nutrition which would improve with an increase in consumption expenditure. According to Khan, almost half of the annual child deaths in Pakistan are due to malnutrition.

The reasons for the fewer number of working people in richer households could be several. An obvious one is that the poor have large households. Also in wealthier households, more time is dedicated to education and training, thus delaying the time of entry into the labor market. The number of people in richer households who work is, therefore, low. This is evident from columns on the number of literate people in the household and maximum level of education of the household members [Table 2].

According to WHO, diarrhea is the second biggest cause of child mortality in the world, and is responsible for 1.5 million child deaths worldwide every year. Pappas et al. found that prevalence of diarrhea, nutritional deficiency, and anemia in children in Pakistan is 11.6%, 14.3%, and 66.4%, respectively. The association of diarrhea with small sized dwellings and connection to the sewerage system found in present study are consistent with Shrestha et al. The high prevalence of diarrhea in Sindh could be the result of poverty, which is higher than in all other provinces. Another reason could be the very different geographic and geological conditions of Sindh from other provinces. Sindh is mostly hot with a large dry barren desert terrain. The extreme environmental factors coupled with overall poor healthcare infrastructure may add to higher incidence of diarrhea in Sindh. Nontreatment of 22% of diarrhea cases, in Table 6, is consistent with the report by CSDH which indicates that only 27.6% children get medical treatment for diarrhea. There could be many reasons for this rather grim situation. It could be that medical attention or treatment is not affordable, or that the health facilities are not easily accessible because of the long distance from their homes (particularly in rural areas). Parents' lack of knowledge and awareness could also be reasons for not seeking any advice or treatment. This is evident from Tables 1, 2, and 7 which present a bleak picture of education and health infrastructure, and the level of education in Pakistan.

However, the high percentage of nonimmunized children is a serious threat to public health in general and to children’s health in particular. This can also be a serious challenge to the health system in terms of resource allocation and health treatment later in life. According to Ahmed, the highest coverage of immunization was in Punjab (53%) and the lowest in Balochistan (35%). Immunization coverage in Khyber Pakhtunkhwa and Sindh was 47% and 37%, respectively. According to present study, the situation concerning immunization was worst in Balochistan. Since Balochistan has around 5% to the total child population, a high concentration of nonimmunized children (20.82%) in this province indicates that though child immunization programs are not very efficient in Pakistan, they seem to be most inefficient in Balochistan. The biggest reason for nonimmunization was that parents had no knowledge of immunization. This is an alarming sign, which indicates that people are not aware of the importance of immunization, which raises the question of the effectiveness of health promotion and vaccination campaigns in Pakistan. The lack of availability and the inaccessibility of the vaccination facility (distance from home) also appeared to be another strong reason for nonimmunization of children.

### Table 7: Reasons why parents never got children immunized by region and poverty level

| Description                      | Region (percentage of total) | Poverty status (percentage of total) |
|----------------------------------|-----------------------------|-------------------------------------|
|                                  | Pakistan | Urban | Rural | Nonpoor | Poor |
| Cannot afford                    | 1.51         | 1.25   | 1.58   | 0.71     | 2.42  |
| No vaccination team visited      | 22.42        | 14.02  | 24.55  | 21.33    | 23.66 |
| Facility too far away            | 11.65        | 4.05   | 13.58  | 12.56    | 10.62 |
| No knowledge about immunization  | 27.46        | 13.08  | 31.1   | 26.42    | 28.63 |
| Fear that child will get sick    | 11.46        | 19.94  | 9.31   | 12.32    | 10.48 |
| For no reason                    | 9.01         | 17.13  | 6.95   | 8.29     | 9.81  |
| Immunization is unnecessary      | 7.24         | 14.02  | 5.52   | 7.23     | 7.26  |
| Other reasons                    | 9.26         | 16.51  | 7.42   | 11.14    | 7.12  |

Source: PIHS/HIES 2001-2002. PIHS/HIES: Pakistan Integrated Household Survey/Household Integrated Economic Survey
The findings of this study are generally consistent with Jamison et al., who state that in low income countries such as Pakistan, children suffer from infectious diseases and nutritional deficiencies, and later on adults may suffer the consequences of having had those diseases. Though people's actions and choices may affect their health, the responsibility of the health of the society rests on the state. The objective of reducing health inequalities through healthcare provision and promotion should be integrated into the overall public policy to improve the socioeconomic profile of the deprived classes of the society. Large scale child health inequalities in Pakistan are associated with socioeconomic conditions of people and the low priority given by the state to the health sector. In order to address inequalities in child health, Pakistan will need improvement not only in healthcare but also in socioeconomic situation. Healthcare and health promotion should be on the national agenda with improvement of other socioeconomic indicators such as economic growth, employment, education, infrastructure development etc. The role of government here for raising the level of awareness of the people, allocation of resources, and legislating if necessary is critical. Community partnership and ownership of healthcare and promotion could be effective in improving health provision and reducing inequalities in Pakistan. Individuals, businesses, and local communities should be mobilized to help raise awareness of the benefits of good health and address health issues in their various organizations and areas under their control.

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There are no conflicts of interest.

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