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## **Determinants of Child Health in Pakistan: A Regional Analysis**

### **ABSTRACT**

*This paper investigates state of child health under five years of age and its causes in different regions of Pakistan separately. For that purpose, cumulative regression analysis is used by employing health data of PDHS 2012-13. In this study socio-economic, demographic, environmental, health awareness and nutritional factors are taken as the determinants of child health, and state of health is represented by degree of stunting among children. Results reveal that socio-economic determinants are the most important factors in determination of child health and there are large scale variations in status of child health across the different regions of Pakistan.*

**Keywords:** child health, socio-economic, regional analysis.

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## **Introduction**

Among all the things which are available to mankind, good health is perhaps the most important one. Health is the very first requirement for joyful and fruitful life. Its extreme importance is expressed by a proverb as such "*Health is not everything in life, but without health, life is nothing*". From economic perspective it is an integral component of human welfare and fundamental requirement for economic development and growth. The issue of child health is important not only because of its humanitarian orientation but also because of economic implications. If a person has an unhealthy childhood, then it is very likely that same individual will remain health vulnerable for rest of the life and society will not receive full benefits of its productive potentials. Until the second half of the 20<sup>th</sup> century good health was considered to be blessing of nature and poor health a misfortune of a person. With the advancement of medical science, it is realized that the role of preventive and curative measures is highly significant in maintenance of good health. These measures are far more important for the child health in particular. Newborns and infants are highly vulnerable, their resistance and immunity are very limited and they need care and attention around the clock. Any negligence in terms of nutrition, environment and medical care results in ailments. And repetitions of them have extreme health consequences. In Pakistan the state of child health is far from satisfactory, our country has third highest rate of infant mortality and second highest rate of stillbirths in the world<sup>2</sup>. In addition to that health conditions under five years of age is also highly alarming, according to PDHS 2012-13 child ailments due to diarrhea, respiratory infection and fever are fairly common and growth of forty-five percent of children is a stunted growth. The stunted child proportion of forty-five percent is an aggregate representing overall health conditions. Distribution of this ratio raises serious concerns, in some regions of the country proportion of unhealthy children must be far greater than that.

Researchers try to explore possible causes behind poor child health. These causes are in general classified as socio-economic, environmental, demographic and health awareness factors. According to their findings poverty, high rate of population growth and lack of education; especially female education are the main culprits behind this scenario. The situation is further aggravated because of poor management of medical facilities and infrastructure which are already insufficient in comparison of national requirements. A brief review of literature of child health with respect of our country is mentioned as under.

## **Review of Literature**

Mahmood and Kiani (1994) investigate causes of child mortality in Pakistan, it is the very first empirical study on child health. Authors study is based on "Pakistan- Social and Demographic Survey 1990-91. List of independent variables cover parental education, health profiles of mother and child, pre-

birth and post-birth immunization, living standard of household and regional affiliation in form of rural urban residence and province. The results reveal that child survival among elderly mothers is highest in both rural and urban areas, as far as mother's education is concerned more educated mothers play significant role in care of child in urban areas but in rural areas their education is not of any significance. Poor education of father effects negatively in rural dwellings but in urban families it does not. Child feed of mother's milk and immunization reduce chances of mortality regardless of regional affiliations.

Mehmood (2001) took up the issue of child health and try to figure out causes of stunted growth of children up to five years of age, Pakistan Demographic and Heath Survey (1990- 91) is the data source of investigation. Author use anthropometric index of height for age as representative of youngster's health. Findings of this study are that illiteracy, poverty and low standard of living, unhygienic environment, short birth intervals and five or more siblings have poor effects on child growth. On the other hand, mature aged mothers take a good care of their young and pre and post-natal care is also important for child health.

Arif (2004) follows theoretical model of Behrman and Deolalikar (1988) and covers a number of determinants; poverty, child and parental characteristics, living environment at household level and community environment. The data source of this study is Pakistan Social Economic Survey (2000-01). For detailed analysis children are divided into three age groups covering birth time to five years; in addition to that child's demand for medical services is also estimated in this research. It is found that infants under six months of age are highly vulnerable to multiple biological and parental characteristics in comparison of their elderly counterparts and at advanced age; house hold and community level influences become more significant components of health. Large family leads to illness and different levels of income has no effect to event of illness. Immunization causes obstruction in growth and children belong to Sindh province are in poor health in comparison of other provinces. Finally, immunization, cemented construction of house and large distance from medical center reduce the demand for medical services.

Shehzad (2006) analyze child health in Pakistan with help of the same data employed by Mehmood and Kiani (1996). Author's methodology is based on the "Health Production Model of Grossman". Two models of child health have been developed. First model is meant to study permanent health of the child; second model consist of two simultaneous equations of transitory and permanent health. Estimations indicate that children grown up in urban areas are healthier in comparison of their rural counterparts and at provincial level Balochistan is lagging behind in comparison of other regions of the country. Male children are more vulnerable as far as temporary health

status is concerned. Education of mother has a strong positive influence in both transitory and permanent health of child. Housing facilities, better standard of living and per capita house hold income was also positively contributing in welfare of child. Just a few variables of model were found to be insignificant under special circumstances.

Arif and Naheed (2012) evaluate causes behind diarrhea morbidity on regional basis. Pakistan Social and Living Standard Measurement Survey 2004-05 is the data source of study. Initial classification is rural and urban and then rural Pakistan is divided in nine agro-climatic regions. Urban areas are identified as major urban centers and other urban centers. Results of logistic regression show that some determinants namely gender, number of children, maternal education and safe drinking water have the same expected effects to diarrhea morbidity regardless of the region. However other variables like housing, sanitation and ownership of land have different outcomes with respect to different regions.

Bhutta et al., (2013) make a detailed enquiry on the subject of maternal newborn and child health. The analysis build upon statistics collected from all social, household living standard and health surveys conducted during the last three decades and performance of public sector health delivery system for the same time period. Conclusion of analysis is that poverty, illiteracy, high rate of population growth and inefficient management of public health delivery system are responsible of high rate of stillbirths, maternal and child mortality in Pakistan.

In studies conducted in Pakistan, researchers try to figure out socio-economic and environmental factors that influence child health either positively or negatively. All of these investigations carried out at aggregate national level accept Arif and Naheed (2012). The aggregate approach is helpful to develop some generalizations for the national population but regional and local severity of issue get obscured. We do not get the insight about area specific components of the problem. The interesting reality about Pakistan is that it has a variety of landscapes, climatic zones and cultures. Each region has its own socio-economic development levels which are subject to its natural resources and cultural environment. There are wide spread economic disparities across the regions and health condition of children varies according to economic wellbeing and socio-culture environment. Therefore, main objectives of the study are

- To identify different factors, causes and influences responsible for deterioration of child health in different areas of our country and
- To highlight differences in state of child health across different regions of Pakistan.

## Framework of Analysis

### 1. Theoretical Framework:

Mosely and Chen (1984) develop an analytical framework to evaluate child survival for less developed countries. According to their study health of a child depends on socio-economic determinants and they operate through a set of multiple factors. These factors can be classified as maternal and environmental factors, nutritional deficiency, injuries and personal illness control. In the current study same conceptual frame work is employed with few modifications.

### 2. Area Specification:

Area specification of Pakistan has been a very delicate part of this study because there exist a number of possible ways to identify different regions of our country such as conventional administrative division, geographical zones, cultural regions, rural urban and many other possible identification units. The choice of regional classification is subject to availability of health data as well. Considering nature and availability of data and objectives of the study; rural urban parts of four provinces are defined as stratum that makes eight regions in total.

### 3. Variable Construct:

Child as per definition of this study “an individual under five years of age of either sex”. In terms of economics, health is an intangible variable and influenced by a variety of reasons consisting of both intangible and tangible factors, in addition to that a child is highly vulnerable and exposed to a number of additional health hazards especially during first two years of its life in comparison of an adult. The rationale of selecting health proxy and its influencing components are discussed as under.

#### Dependent Variable (Health Status of Child)

World Health Organization United Nations has defined four anthropometric standards of child health. And one of them “Child Stunting” is employed in this study as an independent variable. Incidence of stunting is a result of long term nutrition deficiency and recurrence of infectious diseases. This anthropometry standard is proxy of child health in this study as it covers all kinds of health abuses over period of time. To have better understanding of the issue, measure of stunting is further classified in two categories “Stunted” and “Severely Stunted” which is three standard deviations less than standard growth.

#### Independent Variables:

In this study, following the methodology of Mosely and Chen. Determinants of child health are classified in five categories, namely; socio-economic, environmental, demographic and health awareness determinants. Multiple

proxies are identified for these determinants. The set of independent variables with respect to their categories is given as under in Table-1.

**Table-1**

Socio-economic Factors	1- Mother's Education 2- Father's Education 3- Standard of Living Index
Demographic Factors	1- Mother's Age 2- Birth Interval 3- Sex of Child 4- Number of Siblings
Environmental Factors	1- Source of Drinking Water 2- Sanitation Facility 3- Housing Material
Health Awareness	1- Place of Delivery 2- Delivery Attendant 3- BCG Vaccination
Nutritional Factors	1- Birth Size 2- Bottle Feeding with Nipple 3- Incidence of Diarrhea

**4. Data:**

Most appropriate data source for the purpose of this study is Pakistan Demographic and Health Survey 2012-13; the survey is conducted periodically nationwide at one particular time interval and it contains detailed information regarding demography, individual health, socio-economic status and environmental conditions of household. However, unfortunately missing key component of child's age (exact date of birth) from the survey has restricted our sample size. Area wise sample is mentioned in Table-2 as under.

**Table-2**

<b>Region</b>	<b>Sample Size</b>
Punjab Urban	389
Punjab Rural	648
Sindh Urban	344
Sindh Rural	384
KPK Urban	211
KPK Rural	378
Balochistan Urban	174
Balochistan Rural	188
Total	2716

### 5. Model:

Considering the qualitative nature and three levels of dependent variable (stunting); cumulative logit model is used for analysis and results are presented in odd ratios. In addition to that predicted probability analysis at different ages (in months) also used for each region, this analysis will provide us information regarding probability of normal, stunted and severely stunted growth in each month up to 59 months of child's life.

## Findings and Analysis

We begin our analysis with probability projections of child growth with respect to every region. After that we will make a comparative analysis across the regions. Where we will try to figure out causes behind similarities or differences in child health responses with respect each determinant.

**1. Projected Probability Analysis:** The analysis for each defined region is made with the help of a total of eight multiple bar diagrams, starting from Punjab Urban to Baluchistan Rural and accordingly labelled as Diagram 1 to Diagram 8 respectively. In these diagrams each bar is representing probability of normal, stunted and severely stunted growth in every month of life, starting from zero to sixty months.

It is evident from the diagrams that regions which are relatively prosper and have a better physical and social infrastructure have healthier children. In Urban Punjab for instance, at the age of five years a child has more than eighty percent probability for normal growth. While in poor and underdeveloped regions prospects of healthy growth are very miserable. Worst health prospects for children are found in Baluchistan Rural, Baluchistan Urban and then in Sindh Rural. In these areas, probability of stunted growth dramatically increases after first year and children are not able to catch up the normal growth rate even at the end of fifth year of their life. At this age, probability of stunted growth is at alarming ninety, eighty and sixty percent, respectively.

According to these projections, Urban Punjab is the healthiest part of the country, where nine out of ten children are healthy at the time of birth and nearly eighty percent of children are having normal growth at the age of five years. Children of other regions are not that fortunate, where normal/healthy birth rate is seventy percent or less and the worst is Sindh Rural, where normal size births are less than sixty percent. Small birth size is an indicator of insufficient pre-natal care including deficiency of right and sufficient food intake.

These figures show that in almost all regions during first twelve months of life, children maintain a reasonable growth rate. But during year one to year three, probability of stunting increases in every part of the country. It is because during early period of life, physically and biologically children are highly vulnerable to different infections and surrounding environment. And along with that probably, inappropriate food and nutrition intake aggravate

health issues. However, in initial first-year, mother's milk is the main source of food and provides the required nutrition for healthy growth and protection from infections. But after that their growth rate retard due to the reasons mentioned above. In fourth year of life children get stronger and generally catch up their normal growth with the support of sufficient and healthy nutrition and medical care. But this trend is weaker or absent in case of poor parts of our country; once a child unfortunately gets to the path of stunted growth then it is difficult to return to normality.

Figure-1

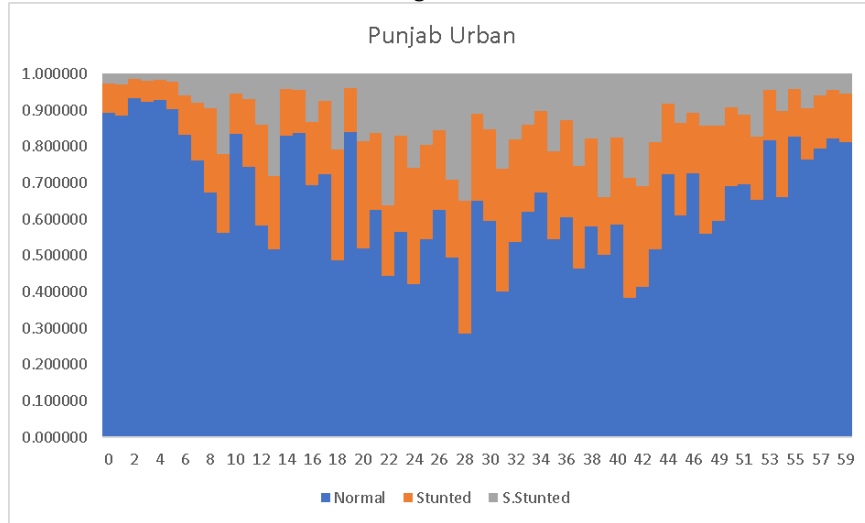


Figure-2

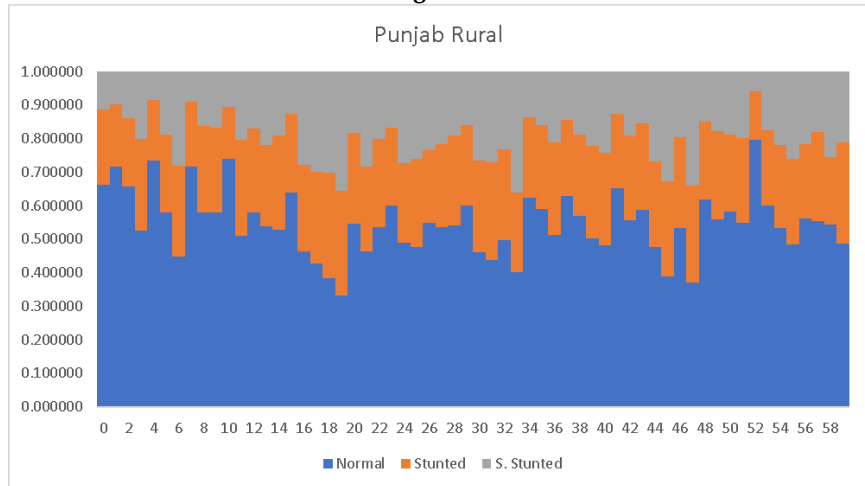




Figure-3

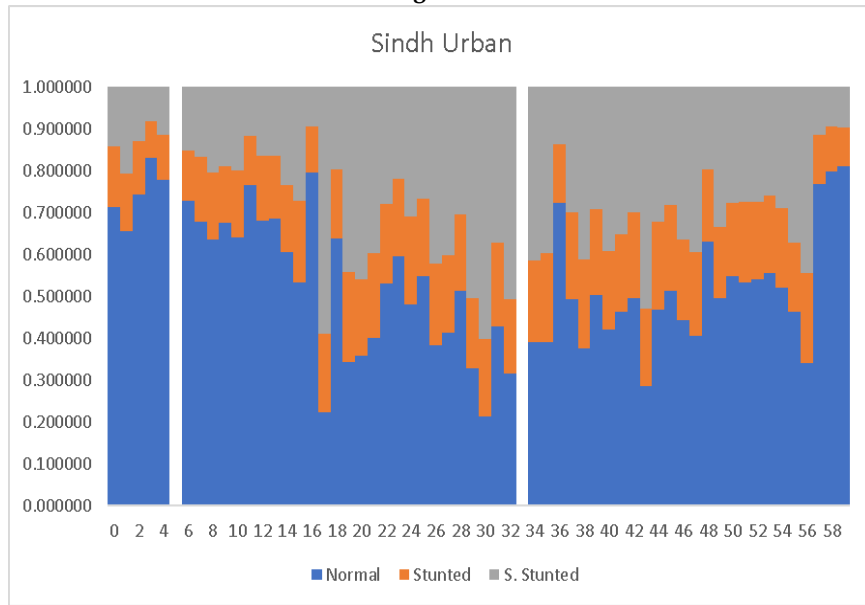


Figure-4

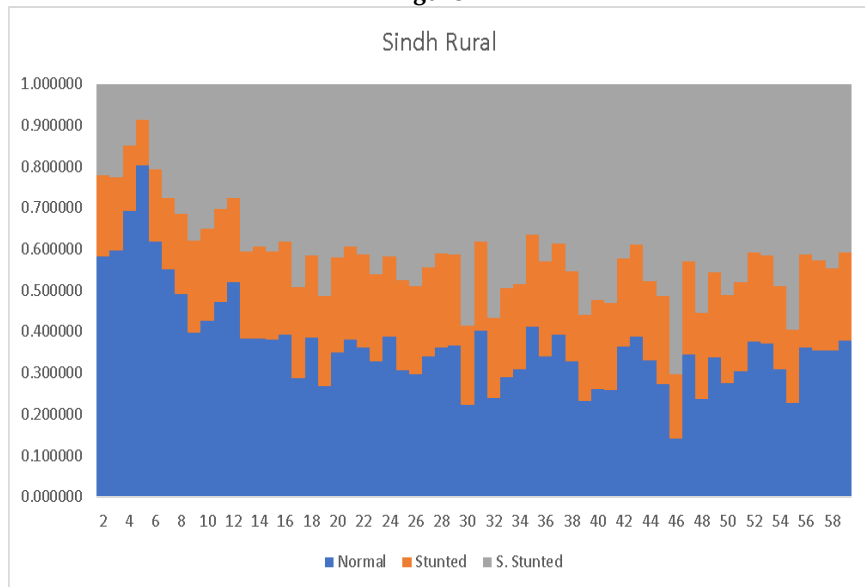


Figure-5

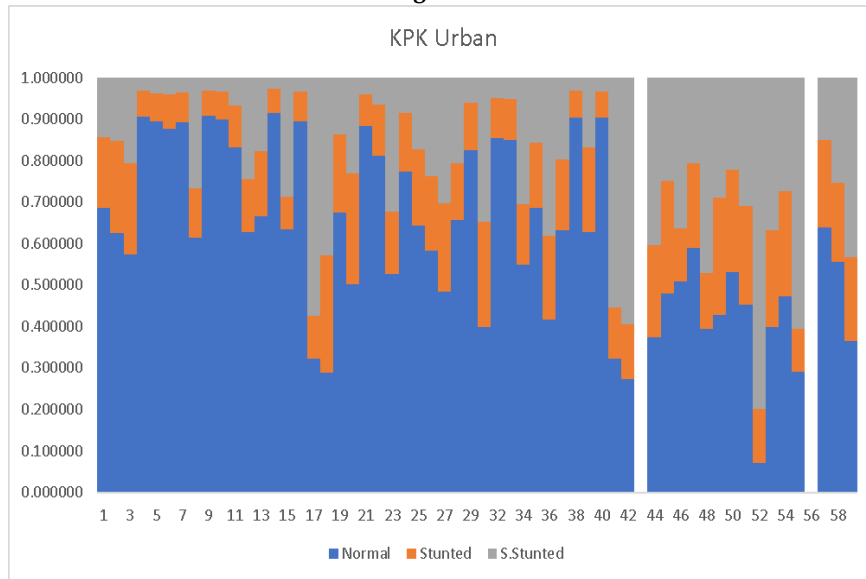
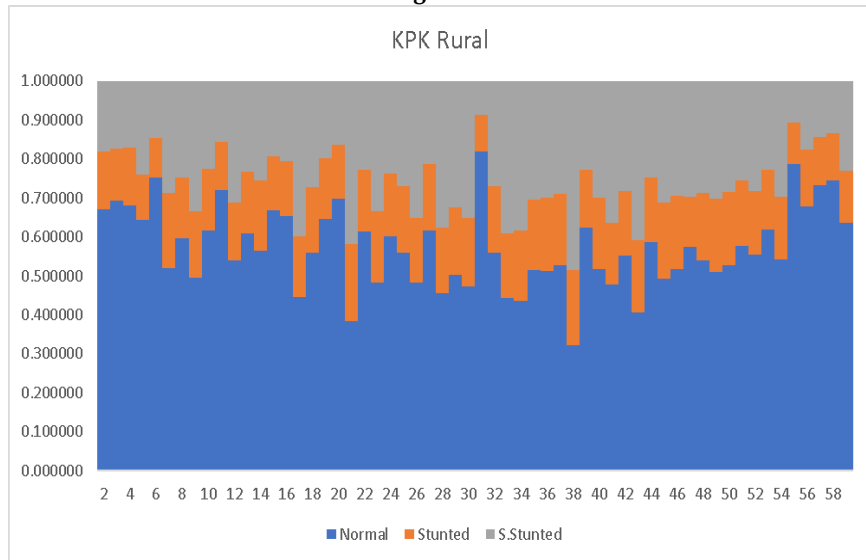
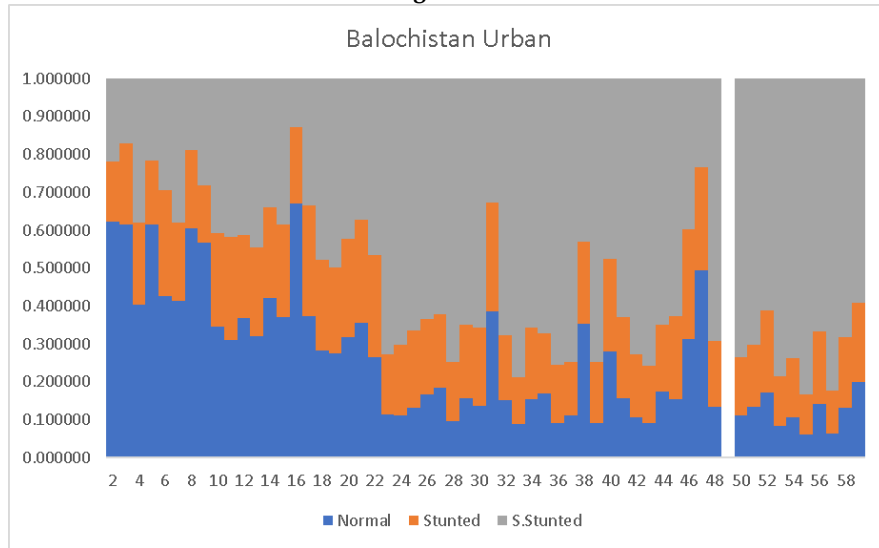


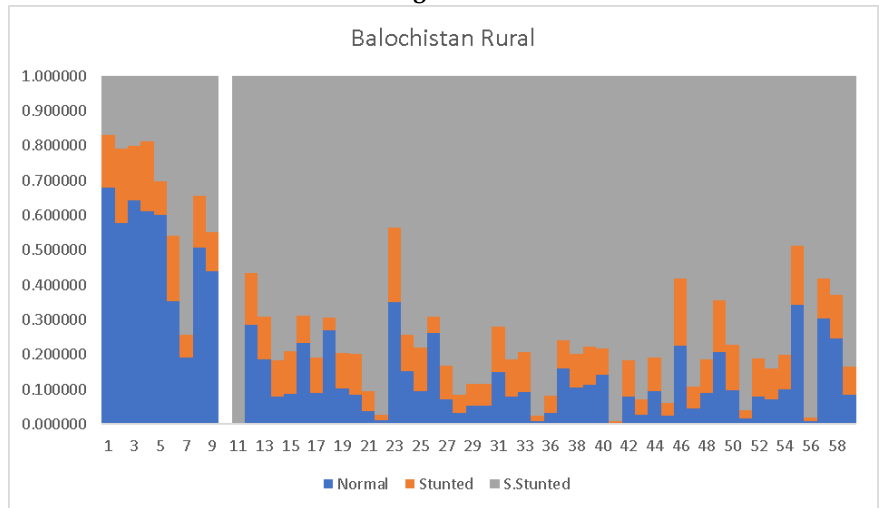
Figure-6



**Figure-7**



**Figure-8**



**1. Comparative Analysis:** In this section we will try to figure out causes behind a variety of responses in child health with respect to the same set of proximate determinants in the context of every region. For this section regions of Punjab Urban, Punjab Rural, Sindh Urban, Sindh Rural, KPK Urban, KPK Rural, Baluchistan Urban and Baluchistan Rural are also identified as Region 1, 2, 3, 4, 5, 6, 7 and 8. And we may use these identifications as per convenience.

**2. Age of Child:** Health of child with respect to age is revealing an inverse U-shaped trend; during the first half of five-year period incidence of stunting increases but it declines in later months. This trend is almost common in every region of the country, with the exception of KPK urban. Biological reason for such trend is that child is very vulnerable to different kind of infection and diseases in earlier period of life and that is around two years. After that vitality of child increases and then it naturally finds its way toward healthy growth. For KPK urban, statistics suggest that growth is not following any kind of trend with respect to age of child and health is independent from age factor. Which is possible when a very good care of child is taken not only since its day of birth but during gestation period as well.

**3. Education of Parents:** We have discovered mixed trends as far as role of parental education is concerned. Positive effects of mother's education are observed in regions 1, 2, 5 and 7. In case of father's education the same effects are found only in regions 6 and 8. As per PDHS (2012-13) in our country, it is not only that large proportion of population is uneducated but the percentage of population having at least ten years of education is also quite low. It is twenty-seven percent and nineteen percent for male and female respectively. This kind of educational composition and level may be a reason for such results. However; in Punjab province educational conditions are far better than any province, and we have found that in this part of the country a child has a better probability of healthy growth when its mother is educated. On the contrary education of father is helpful for the health only in rural parts of KPK and Baluchistan. All these observations reveal few interesting realities; in urban parts of our country education of mother is more significant and in rural areas education of father in comparison of their respective counterparts. Secondly, by and large education of mother is more beneficial for the health of child than the father.

**4. Standard of Living:** As a whole Pakistan belongs to group of low-income countries, where per capita income as per Pakistan Economic Survey 2017-18 is little more than 1600 US dollars. Estimated odd ratios reveal that an improvement in standard of living improves health of the children in all regions except urban areas of Punjab and Sindh. In Punjab Urban, odd ratios are clearly showing that health of a child deteriorated with an increase in income. In Urban Sindh, although the effects are not so vivid but still there is a little tilt toward health deterioration. According to PDHS (2012-13) these two areas are the wealthiest parts of our country. In this particular scenario we simply cannot expect any kind of deficiency in medical care or nutrition among the children. Therefore; it seems that a very high standard of living or income becomes counterproductive as far as health of a child is concerned. The possible causes

of child stunting could be imbalanced and extra rich diet, unawareness of child care requirements, working mothers or else.

**5. Source of Drinking Water:** In our analysis different water sources are compared with hand-pump. In general regression results reveal that there is a positive contribution of piped and tube-well water sources. A clear positive effect of piped water with respect to child health is found in rural areas of Punjab and KPK, and in KPK urban this water source is also little helpful in reducing child stunting. However; in Sindh rural it is found that this source of water is increasing probability of child stunting. In the same region we have also observed that tube-well is a better source of drinking water as it reduces chances of stunted growth. Which indicates that water management authorities are not properly following safety standards of water handling in this particular area. Tube-well water usage is also helpful in reducing child stunting in rural Punjab and KPK. All in all, we can conclude that tube-well is the best source of drinking water in Pakistan with the exception of coastal areas where underground water is brackish.

**6. Sanitation:** In order to compare different toilet facilities, reference is households without toilet facility and they have to go outside for disposal of excrement. This scenario is common in rural area but almost non-existing in urban areas. It is only Baluchistan urban where a small proportion of population do not have a toilet facility within their houses. Therefore, results are not applicable to other three urban regions. In rural Sindh and Baluchistan, toilet facility of flush is of no benefit but it is yielding positive health effect in KPK rural and Baluchistan urban. Use of pit showing negative effects in all regions except for rural Sindh where the result is neutral. Therefore; in general, we can form an opinion that flush facility is a safest toilet facility. However; for rural Punjab an interesting finding is that doing toilet outside is safest! Remaining facilities are contributing negatively towards health of child. The only possible reason of such finding is that in this region people are not hygiene conscious and do not properly clean their toilets.

**7. Housing:** Among two housing categories, houses made of unbaked bricks; we have mixed results with respect to health of child. In the regions 3, 5 and 6 chances of stunting decreases in comparison of reference category. And it is consistent with respect to theory and general perception. In Baluchistan rural this residential status does not make any difference toward the health. However, in the region 2, 4 and 7 probabilities of stunting increases, which is a surprise. Now, the ground reality is that the people who live in huts or the houses made of non-standard materials (wood, bamboo, stone, etc.) belongs to the poorest segment of the society and the population lives in houses made of mud is also very poor. But there is a difference, a

portion of population living in huts are habitual beggars and occasionally they meet their food and nutritious requirements from charities. This could be one possible reason that the children belong to these particular areas are in a better health. Now, about the children living in houses made of backed bricks or standard construction material. In most of the regions their probability of stunting is much lower in comparison of reference category, which fairly logical. However; in rural Punjab this facility is not doing any positive contribution. And surprisingly, in rural Sindh and Baluchistan urban odds of stunting increases for these children. The reason/s of this observation is/are not understood as yet.

**8. Age of Mother at the Time of Birth:** As discussed earlier that good health of mother during gestation period is very critical for the health of new-born. Now in case of teenage pregnancies, mothers need extra rich nutrition in comparison of elderly mothers as they need it for their own physical growth as well. On the other hand; in case of elderly mothers, a natural biological deterioration process kicks in since the age of late thirties. And chances of healthy births started to decrease. The odd ratios obtained for age factor partially agrees with the realities discussed above. Within an age group of fifteen to nineteen years old mothers, negative health effects for children are observed in the regions of Punjab rural, Sindh urban and Baluchistan urban. And for rest of Pakistan, it is not showing any kind of influence. It means that in other parts of the country mothers are in very good or in poor health in both age groups and that is why odd ratios are not been able to scan any difference. Negative effects of older age, thirty to forty-nine years are observed only in Punjab Urban. However, KPK urban chance of stunting decreases when an off spring has an older mother. And for all other areas, older age does not make any kind of difference in child stunting.

**9. Birth Interval:** In general, intervals in births do not appear to be an important factor as far as health parameter of child stunting is concerned. And most interestingly, an interval of less than eighteen months is found to be least significance among three groups of the interval. In the regions 1, 4 and 5 odd ratios are showing that child stunting is totally independent of any kind of birth interval, whether small or large. Smallest interval has a negative growth effect only Baluchistan urban. Larger birth gaps of eighteen to thirty-five months and more than four years are showing mild negative effects in some regions.

**10. Gender of Child:** In our country, especially in rural and tribal societies male birth is more welcomed and celebrated in comparison of a female. Therefore; a common perception is that a male child is given more attention and care accordingly. But instead of this reality odd ratios reveal that in rural areas of Punjab and Sindh and in KPK urban, male child is more vulnerable

in comparison of a female and it has a far greater chances of a stunted growth. In addition to that there is no other region in Pakistan where it is observed that a baby girl has a higher probability of stunting in this comparison. Now there is no biological explanation of such an observation. And possible causes of this trend can be traced in social norms and practices, which requires additional investigation.

**11. Number of Siblings:** In case of number of siblings, a common perception is that in poor families, health of children deteriorates with an increasing number of children. But at the same time socialization of children is highly conducive for their psychological development and physical growth, which is more likely to occur in presence of a number of siblings. In this investigation there are mixed findings. In urban Punjab and KPK and in rural Sindh and Baluchistan, a greater number of siblings is associated with a better health of the child. And in the regions of Punjab rural and Baluchistan urban it is associated with greater chance of stunting. In the regions of Sindh urban it is not demonstrating any kind of outcome toward the health. Under the circumstances, with the existing available information about socio-economic status and cultural norms of these regions, regrettably we cannot identify any plausible explanation of such pattern.

**12. Size at the Time of Birth:** Small birth size that represents poor health during gestation period matters a lot in years to come. Odd ratios are disclosing this biological reality. Apart from urban Punjab and Sindh and Baluchistan Rural, chances of stunting increase in all other areas of Pakistan. In Baluchistan rural proportion of stunted growth is highest and it could be a reason that odd ratio unable to capture negative effect of underweight birth. While urban areas of Punjab and Sindh belongs to a relatively wealthier part of country and improved health facilities are also in access that is why it seems that due to these means a child is provided required care and soon recovers from the problems associated with small birth size. Positive effects of oversized births are observed in Sindh urban and to some extent in rural parts of Sindh only.

**13. Bottle Feeding with Nipple:** As per our sample, majority of children are not fed by bottle with the exception of Punjab urban. And advantage of this practice is observed in urban Punjab, KPK rural and Baluchistan rural only. And negative effects are not found in any part of country. In rural areas of KPK and Baluchistan proportion of children who are fed milk by bottle feeding is very small. Now with the information available, we can suggest that it is the administration and optimum mix of bottle milk with other nutrition which makes it beneficial in certain parts of Pakistan.

**14. Incidence of Diarrhea Fifteen Days Prior to Survey:** Fortunately, as per odd ratios this infection does not seem to be very harmful. Its negative effects on child growth are observed only in Sindh rural and KPK urban. It seems that appropriate medical care is not taken and/or required food supplements are not applied or at least not properly, during and after the ailment in these areas.

**15. Place of Delivery:** As per our sample, highest number of births take place at home, after that, private clinics and hospitals are the next and lowest number of births are observed at public sector hospitals/facilities. Apparently, it seems that people if they can afford prefer private sector facilities for birth over public sector. Furthermore; data also reveals that in relatively poor regions maximum number of births take place at home. Now as far as odd ratios are concerned ignoring Baluchistan for a while, they do not show any kind of health advantage or disadvantage when child is delivered at home or at public sector facilities. In case of child delivery at private sector hospitals/clinics, an advantage in child health is seen in regions of rural Punjab and Sindh. There are two possible reasons of these observations; in private sector hygiene conditions are better than any other facility and secondly a relatively higher income group of people go there who can also afford additional medical care and accessories which is not in excess of lower income groups. Now turning to Baluchistan, in urban areas chances of stunting decrease when delivery takes place in any health facility, either public or private. However; in rural areas of the province probability of stunting increases if child is not delivered at home.

**16. Medically Trained Delivery Attendant:** In general, it seems that training of the attendant does not make much of a difference. As per odd ratios positive outcome in child growth is found in Baluchistan rural and to some extent in Punjab urban. And slightly negative effects are observed in Baluchistan urban when delivery attendant is medically trained. Therefore; with that much of information we can infer that skill levels of delivery attendants are more or less same whether she is medically trained or not.

**17. BCG Vaccination:** Overall outcome of BCG vaccination is found to be positive. In urban areas of Punjab and KPK, odd ratios are clearly indicating that a child has far better chances of healthy growth if it is vaccinated. In Sindh rural it is also showing positive trends. Negative effects of the vaccination are not observed in any part of Pakistan.

**Limitation:** Small sample size of KPK Urban and Baluchistan (both urban & rural) caused problems of degree of freedom and statistical anomalies in some results, therefore contribution of some factors cannot be evaluated from these regions.



Table -3

<b>Stunting</b>	<b>Punjab Urban</b>	<b>Punjab Rural</b>	<b>Sindh Urban</b>	<b>Sindh Rural</b>	<b>KPK Urban</b>	<b>KPK Rural</b>	<b>Baluchistan Urban</b>	<b>Baluchistan Rural</b>
	1.2821 (2.35)**	1.063412 (2.42)***	1.131567 (2.76)***	1.086407 (2.82)***	1.031551 (0.48)	1.073677 (2.05)**	1.096714 (1.88)*	1.216312 (3.39)***
<b>Child Age</b>	.9947 (-1.34)	.9991358 (-2.15)***	.9981402 (-.74)***	.9989633 (-2.22)***	1.000307 (0.32)	0.9988422 (-2.12)**	.9991355 (-1.04)	.9972745 (-2.92)***
<b>Age Square</b>								
<b>Maternal Education</b>								
<b>Primary or above</b>	.603 (-1.31)	.9343938 (-0.28)	1.025875 (0.06)	.8414962 (-0.41)	.2725372 (-2.65)***	.9621503 (-0.11)	.4352551 (-1.43)	3.207548 (0.74)
<b>Father's Education</b>								
<b>Primary or above</b>	1.243534 (0.42)	.8726 (-0.56)	1.232285 (0.53)	.741583 (-1.02)	1.026129 (0.04)	.6342391 (-1.44)	.7107895 (-0.59)	.3116844 (-1.73)*
<b>Household Possession Index</b>								
<b>Middle</b>	5.146908 (1.98)**	.5448027 (-2.22)**	1.369919 (0.60)	1.056963 (0.18)	.3351916 (-1.57)	1.349036 (0.86)	.7356126 (-0.34)	.916737 (-0.11)
<b>Higher</b>	4.355262 (1.73)*	.3913104 (-2.76)***	1.413216 (0.528)	.4121814 (-1.92)*	.1705555 (-2.33)**	.5123858 (-1.50)	.4820793 (-0.86)	.1449411 (-1.70)*
<b>Source of Drinking Water</b>								
<b>Piped into residence</b>	1.361649 (0.48)	.5067711 (-1.96)**	.4345112 (-.98)**	1.681871 (0.94)	.4405957 (-0.78)	.5565039 (-1.27)	1.864262 (0.39)	44.92455 (2.62)***
<b>Tubewell/borehole</b>	1.401312 (0.50)	.7832709 (-0.81)	.6992569 (-0.61)	.5088462 (-0.93)	1.309053 (0.24)	.3225162 (-2.55)**	1.889627 (0.37)	1.01e+40
<b>Surface/Other</b>	.9685966 (-0.04)	1.420569 (0.79)	.8633771 (-0.26)	.9930134 (-0.01)	1.140907 (0.12)	.6767852 (-1.00)	1.000028 (0.00)***	4.431705 (1.68)*
<b>Toilet Facility</b>								
<b>Flush</b>	.0508246 (-2.92)***	.5067711 (-1.96)**	.5752496 (-0.51)	1.154095 (0.40)	1.89e-10v (-9.13)***	1.453154 (0.95)	.1446825 (-1.79)*	1.044601 (0.02)
<b>Pit</b>		.7832709 (-0.81)	.7161675 (-0.29)	.8506405 (-0.39)	4.65e-11 (-9.67)***	2.99502 (1.63)	.118425 (-1.89)*	.6188895 (-0.72)

<b>Stunting</b>	<b>Punjab Urban</b>	<b>Punjab Rural</b>	<b>Sindh Urban</b>	<b>Sindh Rural</b>	<b>KPK Urban</b>	<b>KPK Rural</b>	<b>Baluchistan Urban</b>	<b>Baluchistan Rural</b>	
		1.420569 (0.79)	1.02e+07 (9.99)***	.536292 (-0.79)	1.61e+43	1735091 (-1.97)**	.0443178 (-1.75) <sup>†</sup>	8.16e+37	
<b>Housing Construction Material</b>									
Unbaked bricks		9.58e-09 (-13.28)***	1.509758 (1.00)	.4694876 (-0.67)	1.991756 (2.05)**	.1527 (-1.52)	.6302073 (-1.00)	5.927199 (1.88) <sup>†</sup>	.9774142 (-0.03)
	Baked bricks, cement	.4246703 (-1.06)	1.075392 (0.19)	.389917 (-1.10)	1.574887 (1.15)	.5609 (-0.79)	1.01177 (0.03)	4.985479 (1.92) <sup>†</sup>	.1694561 (-1.56)
<b>Maternal Age at Time of birth</b>									
<b>15-19 Years</b>		1.495177 (0.51)	6.334391 (0.2.87)***	2.9548 (1.06)	.823927 (-0.30)	.6555738 (-0.50)	1.611889 (0.73)	4.18e+35	1.295855 (0.15)
	<b>30-49 Years</b>	1.567657 (1.07)	1.157684 (0.49)	.7745729 (0.432)	.9487625 (-0.14)	.3379018 (-1.80)	1.037656 (0.11)	.7811846 (-0.39)	.542209 (-0.62)
<b>Preceding birth Interval (Months)</b>									
Less than 18 months		1.288869 (0.67)	1.2687 (0.62)	1.515142 (0.68)	.7058328 (-0.77)	.7454809 (-0.33)	1.738578 (0.92)	2.916206 (1.27)	1.175071 (0.14)
	18-35 months	1.40866 (1.01)	1.3381 (0.85)	1.598976 (0.99)	1.079993 (0.20)	.5319468 (-0.88)	1.542406 (1.06)	1.155415 (0.23)	.3119104 (-1.28)
More than 48 months	.9138994 (-0.21)	.8279 (-0.43)	2.190795 (1.45)	.7985704 (-0.44)	.595692 (-0.77)	1.807653 (1.32)	1.781711 (0.77)	.3757598 (-0.95)	
<b>Sex of Child</b>									
Male	1.467988 (1.76)	1.7344 (2.42)**	1.198565 (0.62)	1.436722 (1.41)	2.687059 (2.15)**	.8933905 (-0.38)	.9101773 (-0.20)	1.672643 (0.76)	
<b>No. of Siblings</b>									
1-2		.0566439 (-4.08)***	2.613017 (1.45)	1.123052 (0.07)	.6242707 (-0.66)	.1587412 (-1.91) <sup>†</sup>	.3486936 (-0.74)	5.39e+08 (11.47)***	3.10e-08 (-10.59)***
	3-4	.0419157 (-4.43)***	2.648681 (1.49)	1.339522 (0.17)	.5925694 (-0.73)	.1484441 (-1.84) <sup>†</sup>	.5029482 (-0.48)	3.87e+08 (11.17)***	2.59e-08 (-11.67)***

<b>Stunting</b>	<b>Punjab Urban</b>	<b>Punjab Rural</b>	<b>Sindh Urban</b>	<b>Sindh Rural</b>	<b>KPK Urban</b>	<b>KPK Rural</b>	<b>Baluchistan Urban</b>	<b>Baluchistan Rural</b>
	.1099557 (-3.33)***	2.142324 (1.17)	1.362768 (0.18)	.5312512 (-0.77)	.085745 (-2.12)**	.3034492 (-0.81)	4.77e+08 (10.61)***	4.23e-08 (-9.21)***
More than 4								
<b>Size at Birth</b>	<b>Punjab Urban</b>	<b>Punjab Rural</b>	<b>Sindh Urban</b>	<b>Sindh Rural</b>	<b>KPK Urban</b>	<b>KPK Rural</b>	<b>Baluchistan Urban</b>	<b>Baluchistan Rural</b>
	1.049983 (0.11)	3.068077 (4.17)***	1.288192 (0.57)	1.611943 (1.21)	3.839897 (1.98)**	1.749974 (1.30)	2.971803 (1.68)	1.171006 (0.22)
very small	.6578555 (-0.66)	1.042089 (0.10)	.3610955 (-1.53)	.4885194 (-1.13)	.6005519 (-0.48)	1.381135 (0.49)	1.118304 (0.13)	2.37e+39
very large								
<b>Bottle Feeding With Nipple</b>								
Yes	.5832923 (-1.63)	1.672865 (1.88)*	1.100014 (0.26)	.8374037 (-0.57)	.9688603 (-0.06)	.4889755 (-1.39)	1.455544 (0.80)	.2479365 (-1.26)
<b>Had Diarrhea 15 Days Before Survey</b>								
Yes	1.180375 (0.44)	1.9192 (2.04)**	.7731841 (-0.64)	1.511334 (1.33)	2.383031 (1.65)*	.7600508 (-0.77)	1.104367 (0.17)	1.038618 (0.05)
<b>Place of Delivery</b>								
Government hospital	1.225659 (0.35)	1.49596 (0.61)	1.679259 (0.44)	.9139385 (0.15)	1.500863 (0.47)	.6641821 (-0.67)	.2280065 (-1.26)	1.07e+07 (4.83)***
Private hospital/ clinic	.6531301 (-0.67)	.4959847 (-1.18)	.7724343 (-0.23)	.6169269 (-0.78)	1.690644 (0.63)	.7418736 (-0.63)	.1185088 (-1.61)	7840624 (5.09)***
Medically trained (Yes)	.4998557 (-1.17)	1.196355 (0.32)	.5870519 (-0.46)	1.427736 (0.64)	1.191895 (0.19)	.8846047 (-0.31)	4.326276 (1.24)	9.42e-08 (-6.18)***
BCG Vaccinated (Yes)	.0925935 (-2.85)***	.7921003 (-0.75)	.9156026 (-0.17)	.7502553 (-0.98)	.2415905 (-1.81)	.7544436 (-0.78)	1.230153 (0.29)	1.589132 (0.61)

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

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