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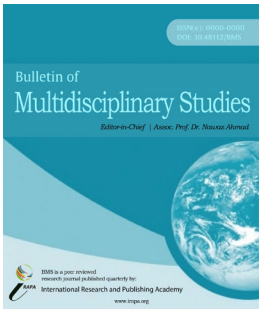

Original Article

Empirical Study of Child Birth and Mortality Status and Wealth Index in Sindh (Rural and Urban)

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ABSTRACT

This study utilised the most recent DHS data from the Pakistan Maternal Mortality Survey 2019, a program by USAID. This survey is a cross-sectional survey administered at the household level. For this study, data from the 2019 MMS (Maternal Mortality Survey) were used for this study. The distribution of child status in Sindh urban and rural areas is 6803 births in urban areas and 10091 births in rural areas since 2016. The average birth per household is 1 in urban areas and 2 in rural areas. The gender distribution in urban Sindh shows 51.9 % boys and 48.1% girls, while in rural Sindh, it is 51.7% boys and 48.3% girls. Mortality status of children indicates that since 2016, 19.3 deaths per unit in urban areas and 21.8 deaths per unit in rural areas. The death rate is higher in rural areas of Sindh as compared to urban areas. 3.2 % still birth in urban areas and 2.4% in rural areas. Survival status of children was assessed, 92.3% of children are reported alive in urban Sindh, and in rural the corresponding figure is 94.0%. Additionally, 7.7% in urban areas are reported as deceased, while 6.0% in rural areas are noted as not alive. The high percentage of children born per year indicates a high fertility rate in both regions of Sindh. An odds ratio of 1.0 (C.I, 0.98, 1.09) associated with a lower wealth index is associated with mortality. Birth status is the same in both urban and rural areas of Sindh; however, child mortality is high in rural areas compared to the urban population of Sindh. The wealth index indicates the rural population is living in lower wealth as compared to the urban population, but overall wealth of Sindh is below the middle level. Economic health indicators need to be monitored.

Keywords: *Child Birth, Economic Health, Mortality Status, Sindh Rural, Sindh Urban*

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INTRODUCTION

Infant mortality is a key national health indicator, and it is extremely susceptible to a variety of structural factors including socioeconomic development and essential living conditions. One of the most revealing aspects of under-five child mortality is the death of infants under one year old, which is regarded as a vulnerable age group. It is a reflection of a nation's progress in terms of public health, social enrichment, and demographic advancement (Chakraborty et al., 2016; Islam & Tabassum, 2021). A wealth index is a composite metric that evaluates the financial well-being of an individual or household evaluating a number of different variables, such as income, assets, and standard of life. WI reflects a population's relative wealth in a snapshot, which makes it easier to spot gaps and create focused responses (Khalid et al., 2023). This study provides a detailed report of the wealth index and child birth and mortality status of Sindh province to identify the districts that need to be improved health status and generate policy.

Research Questions

The following research questions were successfully resolved while conducting this research:

- Is there a significant difference in child mortality rates between urban and rural areas of Sindh?
- How does the wealth index influence child birth rates in urban and rural Sindh?
- What is the relationship between wealth index and child mortality status in Sindh?

LITERATURE REVIEW

The wealth index, which is calculated using a statistical technique called principal components analysis, is placed on each household on a continuous scale reflecting their relative wealth. DHS divides all families surveyed into five wealth quintiles in order to examine how wealth affects a range of population, health, and nutrition measures. The wealth index is included as a background feature in survey datasets and DHS Final Reports. Wealth indices calculated for the different regions of the world (Khan et al., 2016). Depending on the data source and the estimating technique employed, the child mortality estimates compiled by the UN exhibit significant differences across estimates for the same county and same era. Therefore, efforts should concentrate on data comparability in order to produce reliable empirical evidence on health issues using cross-county data. The best data source in this regard is the health and demographic surveys that have been carried out in more than 60 low-income nations.

The DHS surveys are comparable between nations and throughout time, using the same approach to estimate health and other socioeconomic factors. It is therefore anticipated that empirical research utilizing DHS data will produce more trustworthy outcomes (Chakraborty et al., 2016; Patel et al., 2021; Noh et al., 2019). The World Bank and World Health Organization reports from 2017 state that during the same period, Pakistan's infant mortality rates decreased from 90 to 65 per 1000 live births. Approximately 330,479 babies in Pakistan lost their lives before them turned one year old, making it one of the countries with the highest infant mortality rates (64 per 1000 live births). This rate is more than eight times higher than the 8 per 1000 live births in the WHO European Region World Health Organization, 2017 (Abbas et al., 2021). The 2019 Pakistan Maternal Mortality survey (PMMS) report is based on finding data received from Pakistan. The primary objective of the 2019 PMMS is to provide current estimates of fundamental demographic and health indicators. Specifically, the survey was designed and executed to evaluate Pakistan's current position with respect to maternal health indicators and the extent to which the nation is progressing towards the betterment of Pakistan (Noh et al., 2019).

The representative survey sample is available for the entire country; for urban and rural areas separately; for four provinces (Sindh, Khyber Pakhtunkhwa (combined with FATA), Balochistan, and Punjab (combined with Islamabad Capital Territory) (Noh et al., 2019; Abbas et al., 2021). The report shows that 3% of people live in the lowest quintile of wealth in urban areas, compared to 41% in the highest quintile. On the other hand, just 8% of people live in rural areas and 30% live in the lowest quintile of wealth. Punjab has the highest wealth quintile (26% of the population) and lowest wealth quintile (11%), among the provinces. Compared to Punjab, Sindh has a higher rate of poverty, with 33% of the population living in the lowest quintile of wealth. A significant portion of the Sindh population still lacks access to vital healthcare services. It is imperative to address disparities in order to close this gap and guarantee equitable access to healthcare. For this purpose, it is necessary to generate the report for specific Sindh district urban and rural to achieve the sustainable development goals.

Hypotheses

H_1: There is a significant difference in child mortality between urban and rural Sindh

H_2: Wealth index significantly affects child birth rates in Sindh

H_3: There is a significant relationship between wealth index and child mortality

METHODOLOGY

This study utilized the most recent DHS data from Pakistan Maternal Mortality survey 2019, program by USAID. This survey is a cross-sectional survey administered at the household level. For this study, data from Pakistan 2019 MMS (Maternal Mortality Survey) were used for this study (Jehan et al., 2009) and the DHS source is publicly available. Wealth index category was also available in data source. Wealth index households are given scores based on the number and kinds of consumer goods they own, ranging from a television to a bicycle or car, and housing characteristics such as source of drinking water, toilet facilities, and flooring materials. These scores are derived using principal component analysis. National wealth quintiles are compiled by assigning the household score to each usual household member, ranking each person in the household population by her or his score, and then dividing the distribution into five equal categories, each comprising 20% of the population (Chakraborty et al., 2016). For this study, only Sindh urban rural data was used to generate the report. This study used secondary data analysis of an openly available dataset from MACRO Demographic and Health Surveys (DHS), therefore, ethical approval from the respective institution was not required.

Statistical Analysis

The data was analysed by software R and SPSS. Descriptive analysis showed frequency and distribution of categorical data and mean and standard deviation for continuous data. Multiple response analysis was applied for the analysis of household possession. Chi-square was calculated to find the distribution of wealth index and birth distribution. Odd ratio calculated for the wealth index morality status.

RESULT & FINDINGS

The distribution of child status of Sindh urban and rural is presented in table 1. According to NHS Survey data, urban births were 6803 and 10091 births in rural areas of Sindh since 2016. This data reflects that each average birth per household is 1 in urban and 2 in rural areas. The data of Sindh urban shows gender distribution 51.9 % boys and 48.1% girls, while in rural Sindh, it is 51.7% boys and 48.3% girls. Mortality status of child show since 2016, 19.3% death in urban area while 21.8%deaths in rural area. Higher death rate identifies in rural area of Sindh as compare to urban. Where in urban result shows still birth is 3.2 % and in rural it is 2.4%. According to assessments of the children's survival, 92.3% of children in urban Sindh and 94.0% of children in rural Sindh are reported to have survived alive. Additionally, 7.7% in urban areas are reported as deceased, while 6.0% in rural areas are noted as not alive. The high percentage of per year child birth indicate a high fertility rate in both regions of Sindh.

Table 1
Distribution of Child Birth

		Urban	Rural
Any Birth Since 2016	n	6803	10091
	Median	1	2
Any Death Since 2016	Yes	1310(19.3)	2202(21.8)
	No	5493(80.7)	7889(78.2)
	Total	6803	10091
Number of Deaths	Boy	3531(51.9)	5215(51.7)
	Girl	3272(48.1)	4876(48.3)
	Total	6803	10091
Year of Birth	2016	31.0	30.7
	2017	26.5	28.2
	2018	33.7	34.0
	2019	8.8	7.1
	Total	9416	7478
Baby Born Alive	Yes	96.8	97.6
	No	3.2	2.4
Child Still Alive	Yes	92.3	94.0
	No	7.7	6.0
	Total	9114	7298

In general, Pakistani households are large, with an average household size of 6.7 persons.

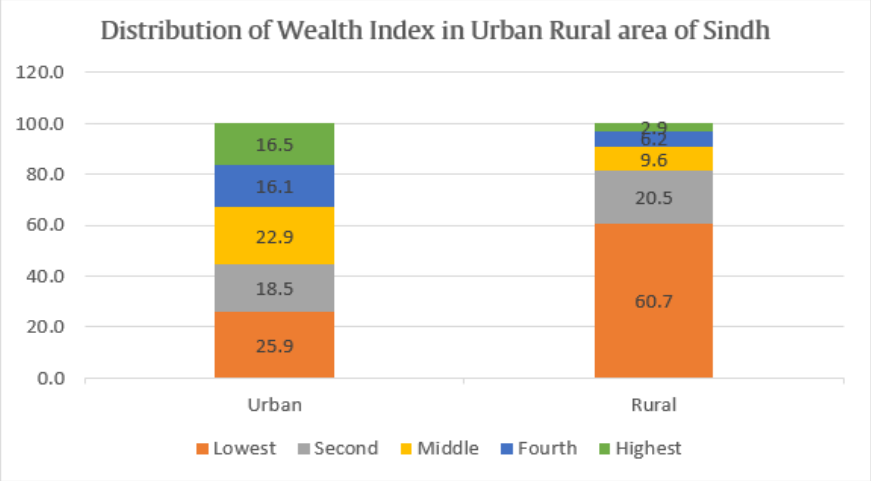

Fig. 1. Distribution of Wealth Index in Urban Rural area of Sindh

Data on wealth quintiles presented in table 2 according to residence, region, and province.

Table 2
Percentage Distribution of Household Possessions of Sindh

		Urban	Rural	p-value
Household Massecuites	Electricity	98.3%	75.6%	0.00
	Radio	2.6%	4.6%	0.00
	Television	82.5%	27.5%	0.00
	Non-mobile telephone	5.1%	1.2%	0.00
	Refrigerator	68.4%	12.5%	0.00
	Almirah/Cabinet	81.4%	22.3%	0.00
	Chair	53.2%	9.4%	0.00
	Room cooler	7.4%	1.1%	0.00
	Air-conditioner	14.3%	2.1%	0.00
	Washing machine	75.9%	14.0%	0.00
	Water pump	54.6%	11.2%	0.00
	Bed	67.9%	11.1%	0.00
	Clock	79.1%	17.9%	0.00
	Sofa	36.2%	4.5%	0.00
	Camera	5.2%	0.5%	0.00
	Sewing machine	59.7%	24.0%	0.00
	Computer	14.3%	1.8%	0.00
	Internet connection	15.5%	0.6%	0.00
	Watch	62.6%	38.1%	0.00
	Mobile telephone	97.1%	89.9%	0.00
Use of Transport	Bicycle	9.8%	7.1%	0.06
	Motorcycle or scooter	64.0%	42.7%	0.00
	Animal-drawn cart	2.6%	9.4%	0.08
	Car or Truck	8.9%	2.2%	0.00
	Tractor	0.9%	3.5%	0.00
	Boat With a Motor	0.0%	0.2%	0.067
	Rickshaw/Chengchi	3.5%	2.0%	0.00

Overall, the distribution of Wealth index is shown in figure 1, in urban areas, 16.5% of the urban population is in the highest wealth quintile and 25.9% is in the lowest quintile. Conversely, in rural areas only 2.9% of

the population is in the highest wealth quintile, while 60.7% is in the lowest quintile. Among urban Sindh, 16.1% in fourth quintile, 22.9% in middle quintile, while in rural Sindh, 20.5% in second lowest quintile, only 9.6 in middle quintile. Poverty is higher in rural areas as compared to urban, additionally, overall distribution 60% in urban also lives below the middle level of wealth index, there are still considerable challenges, indicating a complex overall economic situation in Sindh province. The survey collected data on access to distribution of household possessions of Sindh, A vast majority of the households in Sindh (98.3% in urban areas and 98.3% in rural areas) have access to electricity (Table 2). 82.5% watch television in both areas, 68.4% use the refrigerator, sofa above 30%, bad 67.9%. Overall Sindh rural and urban have the same distribution of necessities household possession.

Table 3
Mortality Distribution of Urban and Rural with Wealth Index

Wealth Index	Urban	Rural
Lowest	33.3	69.0
Second	16.7	17.7
Middle	27.8	7.1
Fourth	18.5	4.4
Highest	3.7	1.8
Total	54	113
odd ratio	1.80 (0,935 ,3.5)	1.5(0,717,3.5)

Mortality status is significantly higher in rural and urban populations with the lowest wealth index area, while the second lowest wealth index rural mortality is high as compared to urban. It is observed that the middle onwards wealth index urban population has higher mortality as compared to rural 27.8% in urban and 7.1 in rural. Odd ratios of Urban and Rural indicate 1.8 times more mortality in children in urban whereas rural is 1.5 times mortality.

Discussion

In Pakistan, questions regarding sustainability are constant. Additionally, Pakistan's districts' performance in the category of health care system, child birth, and environmental quality are not very encouraging. Pakistan is a nation under health environmental stress that is primarily affected by economic condition. The present study revealed that the birth status of urban and rural people is almost same over the years in Sindh province. The results of another study conducted in Gombat Sindh showed that children in the lower quintiles had a significantly higher risk of being stunted, wasted, and underweight compared to those in the highest quintiles. Three studies from Africa also found nearly similar results. Our study also showed that lower quartiles have significantly higher birth and mortality rate in rural areas, however in urban middle quintiles areas are affected more in urban population. Our study indicates that mortality status of urban and rural is equal in Sindh. Average deaths of under 5 years old were reported equal in urban and rural areas of Sindh.

However, in rural areas the rate is higher in the lowest quintile area than urban, where most of the deaths reported in higher quintile areas, another study showed that malnutrition was common among children under five. There was a strong correlation found between household wealth and all three types of nutritional outcomes. Interventions must focus on long-term economic empowerment of underprivileged communities as well as short-term nutrition supplements in order to successfully reduce child malnutrition in Pakistan and especially province Sindh. It is advised that more research be done to look into possible causes of child malnutrition and strategies to help children under five years old with their health status (Khan et al., 2016). Climate change is one of the factors contributing to the spread of poverty in Pakistan mainly through its impact on the agriculture sector (Anjum & Angeles, 2025). This could have adverse impacts on other components of social progress as was earlier established that social progress is correlated to wealth. Our study findings indicate the Sindh province must focus on socioeconomic indicators to face the challenges for child health.

We observed a 20% decrease in neonatal mortality in intervention compared with control clusters in our cluster-randomized study of the efficacy of an integrated community-based package consisting of preventive and home-based immediate curative care provided by public sector LHWs in a programmatic setting in rural Pakistan (Helova et al., 2017). This 20% reduction is comparable to the 15% reduction seen in

a previous trial, which did not involve giving LHWs additional training on how to administer antibiotics for suspected pneumonia or perform at-home resuscitation of neonates. A study that was published in the medical journal Lancet identified the variations in child mortality across 194 nations (Bacha & Munir, 2022).

Additionally, it mentioned that 5.9 million children worldwide passed away before turning five last year, accounting for 60% of all deaths. Despite all efforts, four million children under the age of five died; these children came from ten countries in Asia and Africa. Due to a lack of immunity and the widespread prevalence of pneumonia in the nation, this startling trend has occurred. Pakistan ranks seventh in the world for the number of children who die from measles and pneumonia before they turn five each year. With a three percent increase over the other provinces, Sindh has the highest rate in Pakistan. In a DHS survey it was observed that, the average birth of child 1 since 2016. Available literature showed the health status of only a few districts of Sindh rural; however, this study showed the combined health status of Sindh urban and rural. Therefore, we conclude that special attention is required to improve the health status of Sindh and especially under five child health status.

CONCLUSION

To conclude, the findings indicate that factors other than economic status may play a nuanced role in the convergence of the wealth index and mortality rate among the Sindh population. This calls for a holistic approach to healthcare interventions that prioritizes education, community engagement, and equitable access to healthcare. By identifying and addressing these complex determinants, we can pave the way for improved health outcomes and wellbeing in the province of Sindh.

Competing Interest

The authors had no competing interests.

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