

**Review Article**

Inequality Analysis of Main Health Indicators Among Children Under 5 years / Iraq 2016

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Abstract: The major challenges facing the health system in Iraq is critical damage over the past two decades, with significant damage to infrastructure and conditions that have forced a large number of the trained and experienced health staff leaving the country. Iraq today faces economic and human development challenges including poverty, malnutrition and insecurity. Such conditions result in fewer resources for social sectors, including health. The study aimed to assess the inequality level in children under 5 years across 6 indicators with 4 dimensions overtime in Iraq and was compared with other benchmark countries. A descriptive study was conducted based on data obtained from the two Demographic and Health Survey (DHS) (2006 and 2011) through the WHO health equity assessment toolkit (HEAT). Six Child health indicators such as (DTP3 immunization coverage among one-year-olds, children with diarrhea receiving ORS, children aged < 5 years with pneumonia symptoms taken to a health facility, underweight prevalence in children aged < 5 years, wasting prevalence in children aged < 5 years and early initiation of breastfeeding (in the two or three years preceding the survey)). Inequality were assess based on four inequality dimensions (education, place of residence, sex and subnational). Ratio and difference were used to compare inequality on residence and sex. Moreover, inequality regarding education level were determined with slop index. Theil index was also used to assess subnational regions inequality. For all dimensions used in this study, children in the richest urban households were are more receive immunization than children from the poorest households in all region. Female children were more received the service than male children. Inequality in DTP3 immunization coverage among one year's old from rural area was high. However, early initiation of breastfeeding in the 2 or 3 preceding survey inequality was high among urban children than rural. Inequality among children those parents attained secondary education was lower than those from parents attained primary and no education. All the dimensions used to assess inequality were shown better access for all indicators. When we comparison Iraq with other countries such as Pakistan, Jordan, based on education status, Iraq was showed medium inequality coverage in wasting prevalence among children <5, however highest inequality in early initiation of breast feeding coverage than Jordan.

Keywords: Inequality, Indicator, Breastfeeding, Children, Iraq, Subnational, Immunization

1. Introduction

In the last 35 years, sanctions have severely crippled Iraqi's infrastructure, including health facilities. Iraq is a country facing a huge burden of both communicable and non-communicable diseases such as diarrheal diseases and respiratory tract infections especially among children. Child malnutrition is also common in Iraq with the incidence rate of low birth weight exceeding 10 percent [1].

To meet Millennium Development Goals (MDGs) 4 and 5 by 2015 (reduction of child mortality by two-thirds and maternal mortality by three-quarters between 1990 and 2015), unprecedented progress has been made toward the accomplishment of MDG goals through recent developments at national as well as regional levels [2]. A National Health Strategic Plan for 2013-2017 is currently being implemented to establish develop a health information system and shift toward the concept of family medicine in providing health

services to the community [2]. Iraq has a wealth of human resources for health care and a network of medical, nursing, and paramedical colleges distributed throughout all governorates of the country. In addition, private health sector are playing a small but an increasingly important role in delivering personal health care [3]. Iraq's population almost tripled between 1970 (10 million) and 2015 (more than 36 million) and the United Nations Population Division estimates that by 2030, it will have quadrupled to almost 50 million. 68.3 percent living in urban areas and 31.7 percent in rural areas. The population growth rate reached 3.4 percent, and the total fertility rate was 5.2 percent, categorizing Iraq as a society of adolescent age. Children and adolescents constituted approximately 50 percent of the general population. The average life expectancy was 72 years, 69.7 years for males and 74.3 years for females [4]. For several decades, the economy of Iraq has suffered many political, social, and economic stressors. The resulting decline in production capacity and infrastructure is evident in the decrease in per capita GDP from US \$2,741.5 (in 1983) to US \$455.5 (in 2000). Although it increased to approximately US \$3,500 in 2011, about 20 percent of Iraqi people still live below the poverty line [5]. In addition, the rate of child vaccination in infants younger than 12 months was 78 percent, while 40 percent of pregnant women did not receive tetanus vaccines in time [3]. Only 20 percent of children younger than 6 months were exclusively breast fed, a level considerably lower than recommended. It is worth mentioning that adequate feeding was more common among women who were uneducated and below the poverty line [6]. Prior to 1990, Iraq was ranked among the group of middle-income countries. Malnutrition was virtually unheard of, as almost all households had affordable access to a balanced diet. However, according to the Multiple Indicators Cluster Survey 2011, the national rates of malnutrition in Iraq were estimated to be 7.4 percent for wasting, 22.6 percent for stunting, and 8.5 percent for being underweight [7]. The major challenges facing the health system in Iraq is critical damage over the past two decades, with significant damage to infrastructure and conditions that have forced a large number of the trained and experienced health staff leaving the country. Iraq today faces economic and human development challenges including poverty, malnutrition and insecurity. Such conditions result in fewer resources for social sectors, including health. The aims of this study to assess the inequality level in children under 5 years across 6 indicators with 4 dimensions overtime in Iraq and was compared with other benchmark countries such as (Pakistan and Jordan).

2. Materials and Methods

A descriptive study was based on data obtained from the WHO health equity assessment toolkit (HEAT) [The Health Equity Assessment Tool (HEAT) is used for assessing the potential for health interventions to reduce health inequalities. The tool consists of a set of 10 questions that enable the assessment of policies, programs and service interventions for

their current and future impact on health inequalities⁽⁸⁾]. Source of data was Multiple Indicator Cluster Survey for two years (2006 and 2011), Six Child health indicators such as (DTP3 immunization coverage among one-year-olds, Children with diarrhea receiving ORS, Children aged < 5 years with pneumonia symptoms taken to a health facility, Underweight prevalence in children aged<5 years, Wasting prevalence in children aged<5 years, Early initiation of breastfeeding (in the two or three years preceding the survey). Inequality were assessed based on four inequality dimensions like (education, place of residence, sex and subnational region).

Data analysis: - The simple measure was appropriate to make pairwise comparisons of two subgroups, difference and ratio are the most straight forward ways to estimate place of residence and sex. However the complex measure was used when there are more than two subgroups; inequality regarding education level were determined with slop index. Their index was also used to assess subnational regions inequality. A software application was used on desktop or laptop computers and mobile devices (Minimum screen size of 7.9 inches recommended). Whereas used the explore inequality to determine the latest situation of inequality and the change in inequalities overtime then use the compare inequality to compare the situation in one country with the other countries [8].

3. Results

Six indicators such as DTP3 immunization, Receiving ORS, pneumonia, underweight, Wasting, Initiation of breastfeeding was selected and compared with inequality 5 dimensions (economic status, education, sex, residence and subnational region. Coverage of DTP3 immunization among one year old, in rural area was 50% (2006) and 57% (2011) while in urban area was 68 (2006) and 76 (2011). The differences between urban and rural was decreased in 2006 than in 2011. The percentage of cases was 58% for female and 63% for male in 2006 also in 2011 69% for female and 71% for male. The ratio was decreased in female than male [table 1]. In 2006, the children receiving oral rehydration salts was 32% in rural area more than 30% in urban area, then 31% for female and 30% for male. The differences was increased between 2006 and 2011. As well the percentage of children with pneumonia was decreased in 2011 than 2006 according to place of residence and sex. But the differences between rural and urban area was decreased in 2006 than in 2011. And the ratio male /female was decreased in 2011 [table 1]. Regarding the underweight children, the differences between the urban/rural areas was decreased slightly in 2011 and the ratio male/ female was 0.1. So in children wasting under 5 years, the differences was decreased in 2011 than in 2006. For percentage of female was increased 6.3% and 6.5% for male in 2011. The percentage of children with early initiation of breastfeeding was 36% (2006) and 45% (2011) according to rural area and in urban area was 27% (2006) and 42% (2011). The differences was decreased in 2006 than 2011 [table 1].

Table 1. Six indicators of inequality on children health by residence and sex subgroups in Iraq, MICS 2006 and 2011.

Indicators	year	Residence			Sex		
		rural	urban	Difference	Female	Male	Ratio
DTP3 immunization coverage among one year's old (%)	2006	50	68	18	58.4	62.8	0.9
	2011	57.1	76.4	19.4	69.3	70.9	1.0
Diarrhea children aged <5 years with diarrhea receiving oral rehydration salts (%)	2006	32.0	29.8	-2.2	31.4	30.1	1.0
	2011	19.2	29.7	5.6	22.7	22.8	1.0
Children aged < 5 years with pneumonia symptoms taken to health facility (%)	2006	78.9	83.3	4.4	83.0	80.3	1.0
	2011	70.5	76.5	6.0	71.8	76.5	0.9
Underweight in children under <5 years (%)	2006	7.4	6.9	0.5	6.6	7.6	1.2
	2011	7.2	6.7	0.4	6.4	7.4	1.1
Wasting prevalence in children aged <5 years (%)	2006	6.2	5.5	0.7	5.4	6.1	1.1
	2011	6.2	6.5	0.3	6.3	6.5	1.0
Early initiation of breastfeeding in the 2 or 3 preceding survey (%)	2006	35.9	27.3	-8.6	NA	NA	NA
	2011	45.4	41.5	-3.9	NA	NA	NA

Source / World Health Organization (2016). Health Equity Assessment Toolkit (HEAT). WHO website: [http://www.who.int/gho/health_equity/assessment_toolkit/en/\[8\]](http://www.who.int/gho/health_equity/assessment_toolkit/en/[8]).

Concerning to education level, it was increased across 3 education subgroups (no education, primary, secondary) for the survey period (2006, 2011), People with secondary education (82.0%) had better access to DTP3 immunization coverage in 2011, followed by (25.8%) of children with diarrhea, (6.8%) of children with underweight, (7.1%) of children with wasting and (40.7%) of children with early initiation of breastfeeding coverage [Table 2]. Therefore the slop index of inequality measures was lower in 2011 than in 2006 [Table 2].

Table 2. Six indicators of inequality on children health according to education subgroups in Iraq, MICS 2006 and 2011.

Indicators	year	Education			Slop index of inequality
		No education	Primary	Secondary	
DTP3 immunization coverage among one year's old (%)	2006	45.5	58.4	74.5	38.3
	2011	55.9	67.3	82.0	34.5
Children aged <5 years with diarrhea receiving oral rehydration salts (%)	2006	28.9	33.0	27.5	-2.3
	2011	20.0	22.2	25.8	7.7
Children aged < 5 years with pneumonia symptoms taken to health facility	2006	74.4	83.0	83.7	10.3
	2011	72.3	73.3	77.9	8.0
Underweight in children under <5 years (%)	2006	9.3	6.8	5.9	4.2
	2011	8.1	6.6	6.8	1.3
Wasting prevalence in children aged <5 years (%)	2006	6.4	5.9	5.0	1.9
	2011	6.3	6.0	7.1	-1.4
Early initiation of breastfeeding in the 2 or 3 preceding survey (%)	2006	34.5	30.5	28.3	-7.7
	2011	48.0	42.4	40.7	-8.3

Source / World Health Organization (2016). Health Equity Assessment Toolkit (HEAT). WHO website: [http://www.who.int/gho/health_equity/assessment_toolkit/en/\[8\]](http://www.who.int/gho/health_equity/assessment_toolkit/en/[8]).

Regarding the subnational region, the children had much lower access to DTP3 immunization coverage in 2011 than in 2006, the Theil index measures was (1.2%), followed by (15.4%) of children with diarrhea, (0.1%) of children with pneumonia and (0.9%) of children with initiation of breastfeeding [table 3].

Table 3. Six indicators of inequality on children health according to Theil index measures in Iraq, MICS 2006 and 2011.

Indicators	year	Subnational region
		Theil index
DTP3 immunization coverage among one year's old (%)	2006	17.2
	2011	1.2
Diarrhea children aged <5 years with diarrhea receiving oral rehydration salts (%)	2006	41.8
	2011	15.4
Children aged < 5 years with pneumonia symptoms taken to health facility	2006	5.7
	2011	0.1
Underweight in children under <5 years	2006	49.8
	2011	16.0
Wasting prevalence in children aged <5 years (%)	2006	78.2
	2011	13.2
Early initiation of breastfeeding in the 2 or 3 preceding survey (%)	2006	167.7
	2011	0.9

Source/World Health Organization (2016). Health Equity Assessment Toolkit (HEAT). WHO website: [http://www.who.int/gho/health_equity/assessment_toolkit/en/\[8\]](http://www.who.int/gho/health_equity/assessment_toolkit/en/[8]).

4. Discussion

This research aims to assess the inequality level across 6 indicators with 5 dimensions overtime and also to compare with benchmark countries.

The percentage of one-year-olds who have received three doses of the combined diphtheria, tetanus toxoid and pertussis (DTP3) vaccine in a given year [6]. It was observed in the indicator DTP 3 immunization among children under one years, the difference between the urban and rural area was lower in 2006 than in 2011, compare with other country like Jordan had good national average but low inequality against immunization. Regarding the ratio male/female was 1.0 due to larger decrease female to DTP3 immunization coverage than male and compared with Pakistan had lower national average and inequality to DTP3 immunization. People with secondary education had better access to immunization as compared with Jordan had higher national average but no inequality to immunization. While in dimension (subnational region) the Iraqi people had much lower access to immunization in 2011 than in 2006. Compare with Pakistan had lower national average but higher inequality [8]. The decline in immunization coverage in Iraq is part of a broader war-induced deterioration in the country's health care capacity. My findings confirms anecdotal reports documenting that since 2003 pervasive violence and disruption have restricted access to health care facilities and, at the same time, reduced the quality of services provided in such facilities.

From 2000 to 2015, the total annual number of deaths from diarrhea among children under 5 decreased by more than 50 per cent – from over 1.2 million to half a million [9]. In the Indicator children aged <5 years with diarrhea receiving ORS, have been observed the differences between urban and rural area was lower in 2011 than in 2006, Compare with Pakistan had higher average and higher inequality. Then the slope index of inequality in 2006 was lower than in 2011 its means that the people with secondary education had much better access to receiving ORS. Compare with Pakistan had higher national average and inequality and the People with subnational region had much lower access to receiving ORS in 2011 than in 2006. Compare with Jordan had lower national average and inequality [8]. This may be due to limited resources and competing health priorities; poor management of health systems.

Percentage of children aged 0–59 months with pneumonia symptoms in the two weeks prior to the survey who were taken to an appropriate health provider [10]. Likewise in the Indicator children < 5 years with pneumonia symptoms taken to a health facility it appears that the difference between urban and rural area during the 2006, 2011 year, the Iraqi people had lower national average with higher inequality compare with other country like Pakistan had higher national average & inequality. Then the People with subnational region had much lower access to health facility in children under 5 years with pneumonia in 2011 than in 2006. Compare with Pakistan had higher national average and inequality but in Jordan had

medium national average and lower inequality [8]. This differences due to the ongoing insecurity and lack of health awareness, services during the war.

Child malnutrition – as measured by poor child growth – is an important indicator for monitoring population nutritional status and health [11]. In the Indicator underweight in children under <5 years, it Shows that the difference between the urban and rural area was lower in 2011 than in 2006 Compare with other country such as Jordan had poor national average and inequality while in Pakistan had good national average and inequality. As well the ratio between male/female was 1.2 due to larger decrease female with underweight. Compare with Jordan had poor national average and inequality while in Pakistan had good national average and inequality. Then the people with secondary education had much better access to underweight in children under 5 years and Compare with Jordan had poor national average and inequality. While in subnational region the people had lower national average of underweight children and medium inequality as comprise with Jordan had lower national average and inequality [8]. Iraqis are suffering from a growing lack of food, shelter, water and sanitation, health care, education, and employment due to unstable security.

Wasting prevalence is the proportion of children under five whose weight for height is more than two standard deviations below the median for the international reference population ages 0-59 [12]. Concerning the Indicator wasting prevalence in children aged <5 years (%), it show that the differences between urban and rural area was lower in 2011 and the Iraq had medium national average but bad inequality as compare with Pakistan had higher national average and inequality but in Jordan had poor national average and inequality while in the sex ratio the Iraq had medium national average and inequality as compare with Pakistan had higher national average and inequality than in Jordan had lower national average and inequality. Iraqi people had medium national average of wasting prevalence of children but lower inequality according to education compare with Pakistan had higher national average and inequality than in Jordan had lower national average and inequality [8]. In active conflict zones, service delivery problems caused by damaged infrastructure are compounded by interruptions in the supply of medicines and by fuel shortages which have contributed to the disruption of electricity and water supplies to hospitals, health centers and vaccine stores. Staff shortages are also adding to the difficulties in providing adequate health care. In the last Indicator early initiation of breastfeeding in the 2 or 3 preceding survey (%) it show that the people had higher national average and lower inequality of education compare with Jordan had poor national average and inequality than in Pakistan had poor national average but higher inequality. The people living in the rural area had lower access to initiation of breast feeding in 2006 than in 2011 as comprise with Pakistan had lower national average but higher inequality than in Jordan had lower national average and inequality [8]. Insecurity and political instability have also discouraged

private investments, and the violence-induced outmigration of doctors has led to the closure of a few private hospitals operating due to persistent and growing insecurity, the expansion of health care infrastructure will remain an arduous undertaking in the coming years.

5. Conclusions

For all dimensions used in this study, children in the richest urban households were more receive immunization than children from the poorest households in all region. Female children were more received the service than male children. Inequality in DTP3 immunization coverage among one year's old from rural area was high. However, early initiation of breastfeeding in the 2 or 3 preceding survey inequality was high among urban children than rural. Inequality among children those parents attained secondary education was lower than those from parents attained primary and no education. All the dimensions used to assess inequality were shown better access for all indicators. When we comparison Iraq with other countries such as Pakistan, Jordan, based on education status, Iraq was showed medium inequality coverage in wasting prevalence among children <5, however highest inequality in early initiation of breast feeding coverage than Jordan.

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