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Socioeconomic Inequalities in Infant Mortality in Egypt: Analyzing Trends between 1995 and 2014

Mesbah Sharaf
University of Alberta

Ahmed Rashad
Philipps University Marburg

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Mesbah Sharaf [1] & Ahmed Shoukry Rashad[2] [3]

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Abstract

This paper examines the trends in the socio-economic inequalities of infant mortality rates in Egypt during the period 1995-2014, using repeated cross sectional data from the National Demographic and Health Survey. A multivariate logistic regression model, concentration curves, and concentration indices are used to examine the demographic and socio-economic correlates of infant mortality, and how the degree of socio-economic disparities in child mortality rates has evolved over time. We find a significant drop in infant mortality rates from 63 deaths per 1000 live births in 1995 to 22 deaths per 1000 live births in 2014. Results show an inverse association between infant mortality rates and living standard measures, with the poor bearing the largest burden of early child mortality. Though the estimated concentration indices show a decline in the degree of socio-economic inequality in child mortality rates over time, infant mortality rate among the poor remains twice the rate of the richest wealth quintile. Nonetheless, this decline in the degree of socio-economic inequality in child mortality rates was not supported by the results of the multivariate logistic regression model. Results of the logistic model show higher odds of infant mortality among rural households, children who are twins, households with risky birth intervals. No statistically significant association was found between infant mortality and access to safe water, gender, and mothers' education. Infant mortality was negatively associated with household wealth, receiving a regular health care during pregnancy by mothers, having more than two under-five children. By identifying the correlates of child mortality, the findings of this paper inform intervention measures that aim at reducing child mortality rates and socio-economic inequalities in Egypt.

JEL Classification: I14, I15

Keywords: Infant Mortality; Inequality; Trend Analysis; Millennium Development Goals; Egypt.

[1]Department of Economics, Faculty of Arts, University of Alberta, Edmonton, Canada (sharaf@ualberta.ca)

[2]Philipps University Marburg, Germany (ahmed.rashad@wiwi.uni.marburg.de)

[3]Frankfurt School of Finance and Management

1 Introduction

According to the World Health Organization (WHO), 6.3 million children, under the age of five, died in 2013 worldwide (WHO, 2014). More than half of these early child deaths are avoidable, since medical interventions are available and widely known. As part of the global effort to curb early child mortality, the United Nations included the reduction in early child deaths by two third, between 1990 and 2015, as one of the Millennium Development Goals (MDGs) (United Nations, 2014). Egypt along with many other developing countries has adopted these goals to be achieved by 2015. It has been documented that Egypt has made significant progress toward achieving the MDGs for health. Lozano et al. (2011) tracked the progress toward the MDGs for health worldwide, and considered Egypt as a top performing country. The under five-mortality rate dropped from 85 deaths per 1000 live births in 1990 to 33 deaths by the year 2008. The progress has even continued after the dramatic political change that took place between 2011 and 2014, and the under five-mortality rate dropped to 27 per 1000 live births (Ministry of Health and Population et al., 2015).

The progress toward MDGs may mask socio-economic disparities underneath, as the MDGs for health call for improvement in national averages, which may be attained either by improvement in the health of the poor, or the better off. Consequently, the improvement in national averages may result from improvement in the health of the better off, while the poor is lagging behind. For instance, Subramanyam et al. (2010) pointed out that despite the stark economic growth and reduction in the overall prevalence of child malnutrition in India, social inequalities in child health either widen or stayed the same between the years 1992 and 2005. This raises the question as to what extent the poor in Egypt have benefited from the reduction in child mortality. Consequently, the objective of this paper is to examine the pattern of child mortality rates in Egypt, and as to whether the progress that took place in reducing mortality rates has been uniform by socio-economic status. To the best of our knowledge, no study has evaluated the trends in socio-economic inequalities in early child mortality in the Egyptian context.

The paper is organized as follows: Section 2 presents a brief review of the related empirical literature. Section 3 provides a description of the data, and Section 4 presents the empirical methodology. Section 5 discusses the results, and

section 5 concludes the paper.

2 Literature Review

A growing literature has emerged to study the trends of child mortality, and its determinants, in a wide range of countries (see for instance: Dallolio et al., 2012; Feng, et al., 2012; Amouzou et al., 2012; Nattey et al., 2013; Nguyen et al., 2013). For example, Nguyen et al. (2013) estimated the change in child mortality rates in two of India's largest and poorest states over the period 1990-2007. They found that although there was a decline in child mortality rates at the national level, there were considerable disparities across socio-economic groups, ethnicities, districts, and wealth. In a cross sectional study, Nattey et al. (2013) investigated the relationship between household socio-economic status and under-5 mortality, and examined the risk factors associated with under-five mortality in Tanzania. The prevalence of under-five mortality was found to be 26.9 per 1,000 in the year 2005. They found evidence that household socio-economic inequality, and maternal education were significantly associated with under-five mortality. The poorest were 2.4 times more likely to die compared to the least poor, indicating considerable health inequality. Least poor households had a 52% reduced mortality risk, and also children with mothers who had attained secondary education had a 70% reduced risk of dying compared to mothers with no education.

Using micro-data on 1.7 million births from 59 developing countries, Baird et al. (2011) found a robust negative association between per capita GDP and infant mortality. They found that on average, a 1% decrease in per capita GDP results in an increase in infant mortality of between 0.24 and 0.40 per 1,000 born children. They also found that female-infant mortality is more sensitive than male-infant mortality to negative economic shocks.

Gamper-Rabindran et al. (2010) examined the effect of piped water on infant mortality rate in Brazil, using a quantile regression with panel data. They found that the provision of piped water reduces infant mortality by significantly more at the higher conditional quantiles of the infant mortality rate distribution than at the lower conditional quantiles (except for cases of extreme underdevelopment). These results imply that targeting piped water intervention toward areas in the upper quantiles of the conditional infant mortality rate distribution, when accompanied

by other basic public health inputs, can achieve significantly greater reductions in infant mortality.

Several developing countries have achieved great progress in reducing the under-five-child mortality rates. Using data from Niger, Amouzou et al. (2012) reported a significant decline in child mortality rates from 226 deaths per 1000 live births in 1998, to 128 deaths in 2009, with an annual rate of decline of 5.1%. They then examined using the Lives Saved Tool, the factors that contributed to this reduction, and found that about 59,000 lives were saved in children younger than 5 years in 2009. This was attributed to three effective strategies (increase in access to child health services; use of mass campaigns; and programming for nutrition), operating together, that caused the greatest part of the reduction in child mortality.

Though extant literature is mostly dominated by studies covering low and middle income countries, several studies have investigated the problem of child mortality in developed countries. For example, Dallolio et al. (2012) assessed the association between infant mortality and four key socio-economic determinants in 20 Italian regions. Infant mortality was positively correlated with income inequality, total unemployment rate, negatively associated with household income, and female educational attainment.

While a substantial number of studies have examined the determinants of child mortality in a wide range of countries, and during different periods of time, there is limited evidence at the population level in Egypt. Since countries are likely to be heterogeneous with respect to their socio-economic conditions, and level of development, it is to be expected that the factors associated with child mortality could be country-specific and may differ from one country to another. Identifying the factors associated with child mortality at the country level will help guide effective intervention measures in Egypt.

3 Data

This paper uses repeated cross sectional data from several rounds of the Egyptian Demographic and Health Survey (EDHS) over the period 1995-2014. EDHS, is a cross-sectional survey for a nationally representative sample of the Egyptian households. The survey contains information on children's and women's health using a rich set of socio-demographic characteristics, maternity care, reproductive

behaviour, and housing characteristics. The U.S. Agency for International Development funded the DHS surveys which have been conducted in over 90 countries.

3.1 Outcome Variable: Infant Mortality

Infant mortality estimates are calculated using data of the variables in the fertility history section of the mothers' questionnaire. The fertility history section contains data about the number of children residing with the mother, and the number of Childs who died. It also has data on the birth history, gender, month and year of conception, survivorship status, and current age, or age at death, of each of the respondent's live births. This data is utilized to directly evaluate the infant mortality rates. The incidence of infant mortality was represented by a dichotomous variable, taking the value of one if a household has experienced a mortality of a child less than 1 year, and equals zero otherwise.

3.2 Explanatory Variables

To examine the correlates of infant mortality, we use a standard set of socio-economic and demographic covariates that have been widely used in the literature. Child's size at birth is represented by 5 categories: very large (reference category), larger than average, average, smaller than average, and very small. A child's sex is represented by 2 categories: male (reference category), and female. Regional fixed effects are captured in two categories: urban (reference category), and rural. Household's economic status, captured by the wealth index, is represented by 5 categories: poorest (reference category), poorer, middle, richer, and richest. Access to safe water was represented by a dichotomous variable, with no access to safe water is used as the reference category. The effect of a regular health care during pregnancy was represented by two categories, with not receiving regular health care as the reference category.

As for the mother's characteristics, mother's education level is represented by 4 categories: no education (reference category), primary education, secondary education, and post-secondary. Working status of the mother is represented by a dummy variable, with 2 categories: unemployed (reference category), and employed. The effect of birth interval is represented by 2 categories: non-risky birth interval (reference category), and risky birth interval.

4 Methodology

To get a descriptive indication of how the socio-economic inequalities in child mortality rates have evolved over time, we examine the Concentration Curve (CC) and the Concentration Index (CI) at different points of time. The CC and CI are two conventional measures of socio-economic disparities in health (Wagstaff, 2000; Van Doorslaer, 2006; O' Donnell et al., 2008). The CC ranks households by their position in the income distribution and plots the cumulative percentage of deaths against cumulative percentage of households ranked in ascending order based on economic status. The CC lies above (below) the line of equality when child deaths are concentrated among households from lower (higher) socio-economic status. The farther the CC is above (below) the equality line, the more concentrated the child deaths among poor (rich) households (O' Donnell et al.,2008).

On the other hand, the concentration index (CI) ranges between -1 and +1. The sign of the CI reflects the direction of the relation between the health variable of interest and household's position in the living standard distribution. A CI with negative sign indicates that child mortality is concentrated among the poor, while a positive CI indicates that it is the better off who have a higher incidence of child mortality.

The magnitude of the CI, in absolute value, indicates the strength of the relation between the health variable of interest and economic status. Thus, the higher the value of the CI, the higher is the degree of concentration among the poor or the better off depending on the sign. Analogous to the Gini coefficient, a CI with zero value indicates perfect equality. The CI is computed as in Equation 1.

$$C = \frac{2}{\mu} Cov(H, W) \tag{1}$$

In which H is an indicator of the health variable and μ is its mean, while W is a measure of living standard, and cov is the covariance between H and W. The wealth index is used as a living standard measure. The EDHS team has developed the wealth index using a statistical method known as principal components analysis. The value of the wealth index depends on household's possession of chosen assets such as cars, floor type, access to water and sanitation, and materials used for

housing construction. This index was used to stratify the interviewed households into five wealth quintiles.

The CI is computed for the survey years 1995, 2000, 2005, 2008 and 2014. By comparing the values of the concentration indexes over time, we could determine whether the degree of socio-economic disparities in child mortality has declined over time. This is like a movie approach, where child health disparities are measured in each frame and the frames are rolled after each other (O' Donnell et al., 2008).

After measuring the disparities in child mortality rates using the concentration indexes over 1995-2014, we next examine the socio-economic disparities of child mortality within a multivariate framework. Multiple logistic regression analysis is used to examine the odds of infant mortality associated with demographic and socio-economic characteristics as in Equation (2).

$$M_{ijt} = \alpha + \beta X_{ijt} + \gamma H_{ijt} + \varepsilon_{ijt} \tag{2}$$

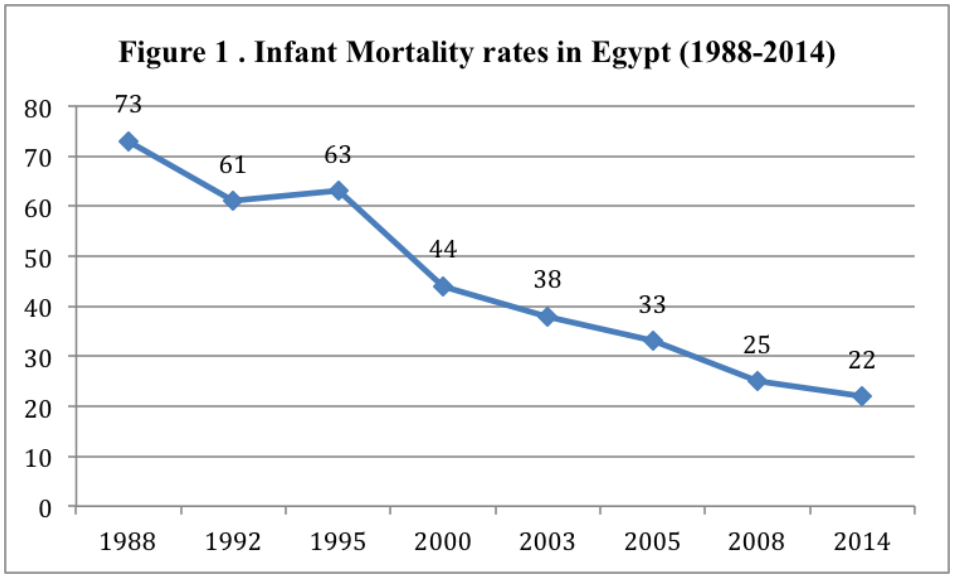
Where M_{ijt} an indicator variable that takes the value of 1 if child i in household j at year t died in the first year of life, and 0 otherwise; X_{ijt} is a vector of child characteristics such as child age, sex, birth order of the child. H_{ijt} is a vector of parental and household-level factors; ε_{ijt} is the error term. To examine whether the degree of the socio-economic inequalities in infant mortality has declined over time, we interacted the households' wealth index, mothers' education level, and region of residence with the year dummies.

The multivariate regression analysis and the descriptive statistics are population weighted using the EDHS survey weights to have population estimates and adjust for unequal probabilities of selection.

5 Results

Figure 1 displays the evolution of infant mortality rates over the period 1988 to 2014. Infant mortality rates show a declining trend, with a significant drop from 73 deaths per 1000 live births in 1988 to 22 deaths per 1000 live births in 2014.

Table 1 shows the infant mortality rates at different wealth quintiles. Infants



Source: Authors' compilations based on data from EDHS.

born to poor households have a greater risk of mortality than infants born to rich households. There is a consistent inverse association between infant mortality rates and living standard measure across different rounds of the survey. The last column of Table 1 gives the CI for each round of the EDHS, where all have negative values. This suggests that the poor are bearing the largest burden of early child mortality.

Table 1: Infant mortality rates by socio-economic status in Egypt (1995-2014)

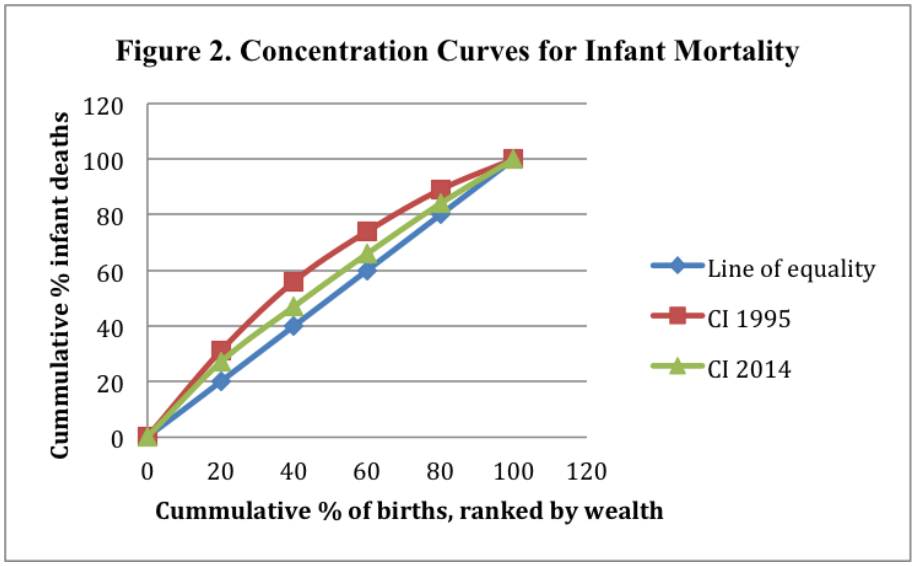
Year	Q1	Q2	Q3	Q4	Q5	CI
1995	110	89	65	51	32	-0.2347
2000	76	64	54	44	30	-0.1763
2005	59	43	39	33	23	-0.1741
2008	42	31	26	25	17	-0.1654
2014	36	28	25	22	18	-0.134

Authors' compilations based on data from EDHS.

Comparing the estimated CI over time suggests that the degree of socio-economic disparities in child mortality rates has significantly declined, as CI is much smaller in 2014 than the values in 1995. Even among the poorest two quintiles, infant mortality rates have dropped substantially between 1990 and 2014. Despite this progress, it is important to stress that infant mortality rate among the poor remains twice the rate of the richest quintile.

Figure 2 plots the CC for infant mortality at two points of time, 1995 and 2014, which allows a visual assessment of socio-economic inequalities across time.

It is evident that the CC is above the line of equality at the two points of time, which indicates persistence in the concentration of child deaths among the poor. However, the figure shows a decrease in the degree of disparity "inequality" in the incidence of infant mortality between the rich and the poor households over time. In particular, the CC for the year 2014 is closer to the line of equality than that for the year 1995. This indicates that socio-economic disparities in child mortality have narrowed over time.



Authors' compilations based on data from EDHS

Insert Table 2 here

Table 2 reports the result of the multiple logistic regression model, including the 95% confidence interval (CI) for the determinants of infant mortality. Results show no statistically significant difference, by sex, in the odds of infant mortality. For the year fixed effects, the odds of infant mortality decreased over time. In particular, the odds of infant mortality are lower in the year 2008 (OR=0.529; 95% CI=0.309 - 0.905), and 2014 (OR=0.436; 95% CI=0.256 - 0.742) when compared with the year 1992. Being a twin and having a risky birth interval increased the odds of infant mortality. In particular, the odds of infant mortality is higher among infants who are twins (OR=7.570; 95% CI=6.195 - 9.250) when compared to infants who are not twins. Infants with risky birth interval have higher odds of mortality (OR=3.307; 95% CI=2.868 - 3.813) when compared with infants with non-risky birth interval. Receiving a regular health care during pregnancy by mothers has a protective role against infant mortality. Infants whose mothers received regu-

lar health care during pregnancy have lower odds of mortality (OR=0.815; 95% CI=0.688 - 0.966) when compared to infants whose mother did not receive a regular health care during pregnancy. Though mothers' education was in general not significantly associated with infant mortality, mothers with post-secondary education have lower odds of infant mortality (OR=0.443; 95% CI=0.172 - 1.143) which was weakly significant at 10%, when compared to mothers with less than primary education. Household economic status, as measured by the wealth index, has a statistically significant negative association with infant mortality. Lower odds of infant mortality is among households from the middle wealth group (OR=0.585; 95% CI=0.448 - 0.765), richer wealth group (OR=0.490; 95% CI=0.340 - 0.705), and richest wealth group (OR=0.373; 95% CI=0.237 - 0.588) when compared to the poorest households. Rural households have higher odds of infant mortality (OR=1.239; 95% CI=0.964 - 1.594) compared to urban households. No statistically significant association was found between access to safe water and infant mortality. Having more than two under-five children was negatively associated with infant mortality (OR=0.370; 95% CI=0.305 - 0.448) when compared with households with less than two under-5 Childs.

The trend in the socio-economic disparities in infant mortality has been assessed by the interaction terms between households' wealth index, mothers' education level, and region of residence with the survey year dummies. Results show that none of the interaction terms for the households' wealth index and mothers' education level is statistically significant. The regional disparity between rural and urban areas in infant mortality rates has declined in 2008 compared to 1995, as the odd ratio was statistically significant at 5% significance level (OR=0.559; 95% CI=0.359 - 0.868). Though the interaction term for 2014 was less than one indicating a decline in the regional difference in infant mortality rates, the odd ratio was not statistically significant. These results indicate that the degree of inequalities in infant mortality rates by the socio-economic has not decreased over time.

6 Discussion and Policy Implications

This paper investigated the socio-economic inequalities in infant mortality rates in Egypt during the period 1995-2014. A multivariate logistic regression model

and a concentration index were both used to examine how the trends of socio-economic disparities in infant mortality rates have evolved over time. We found that childhood mortality has fallen remarkably in Egypt from 63 deaths per 1000 live births in 1995 to 22 deaths per 1000 live in 2014. In addition, the results of the multiple logistic regression showed that the socio-economic, and geographical inequalities in infant mortality have not declined over this period.

While it is difficult to attribute the improvement in child mortality outcomes to a specific intervention measure, several policy measures that have been implemented could be directly associated with Egypt's success in bringing down infant mortality rates. For example, the Expanded Program on Immunization (EPI) whose aim was to protect children from preventable childhood diseases (Measles, Diphtheria, Pertussis, Tetanus, Tuberculosis, Poliomyelitis, Hepatitis B, Rubella and Mumps) has increased the percentage of fully immunized children from 67% in 1992 to 91% in 2014 (Egypt DHS). Another program that was implemented is the Healthy Mother, Healthy Child (1993-2009) project, with the objective of reducing the risk associated with child birth in Upper Egypt, the most deprived region in the country, by increasing access to quality health care before and during delivery. In 1990, Egypt adopted the National Acute Respiratory Infection program that aimed to cut infant deaths caused by acute respiratory infection. In addition, there have been investments and interventions outside the health sector that are commonly associated with better health outcomes such as higher rates of women education, and increasing access to clean water and improved sanitation facilities. For instance, access to improved sanitation facilities has increased from 72% in 1990 to 95% in 2011 (Ministry of Health and Population et al., 2014).

Egypt has experienced high rates of economic growth in the mid 1990s and during the first decade of the new millennium. Between 1995 and 2014, GDP per capita has increased from $963 to $3,198. This improvement in economic conditions could improve child health by increasing household capacity to purchase food and medicine necessary for child growth and development (Rashad & Sharaf, 2015c).

The econometric analysis showed that trends in socio-economic and regional inequalities in infant mortality rates have not narrowed over time. Despite the significant decline in infant mortality rates among all socio-economic groups and regions, the decline was higher among the better off households and urban regions

than among the poor households and rural regions. One potential explanation for the gap in child health is the unequal distribution of the benefits from economic growth among different socio-economic, where the better off households are the main beneficiaries. According to a governmental report, income inequalities between regions (urban vs. rural) have not change in the last 20 years (Ministry of Health and Population et al., 2014). The high prevalence of poverty, in addition to the lack of adequate health care facilities in rural areas could explain the persistent geographical inequality in infant mortality rate between urban and rural regions in Egypt. Maternal health care during pregnancy and delivery has been remarkably low among the poor and rural households. A possible justification for the lower access to health care among the poor is the unequal distribution of health workforce and the domination of private maternal care that requires user fees and could derive poor and near poor households into financial catastrophe (Rashad & Sharaf, 2015b, 2015a). In addition, there is an empirical evidence of a pro-rich distribution of public healthcare subsidies in Egypt (Rashad & Sharaf, 2015d).

Moreover, the political turmoil in 2011, along with its associated and subsequent deteriorating economic conditions, seems to have interrupted the progress that took place in 2008, in narrowing the gap in infant deaths between the rural and urban areas.

The findings of the current study are in line with several previous studies which covered other developing and middle income countries. For example, Nguyen et al. (2013) found that although there was a decline in child mortality rates at the national level in India, there were considerable inequalities across socio-economic groups, ethnicities, districts, and wealth. In another study, Nattey et al. (2013) found evidence that household socio-economic inequality and maternal education in Tanzania were significantly associated with under-five mortality. The poorest were 2.4 times more likely to die compared to the least poor, indicating considerable health inequality. Least poor households had a 52% reduced mortality risk, and also children with mothers who had attained secondary education had a 70% reduced risk of dying compared to mothers with no education. Dallolio et al. (2012) found that infant mortality in Italy was positively correlated with income inequality, total unemployment rate, negatively associated with household income, and female educational attainment. In the current study, we find no significant association between infant mortality and access to safe water. This is in contrast to

the findings of several previous studies including Gamper-Rabindran et al. (2010) who found that the provision of piped water reduced infant mortality in Brazil.

Promoting maternal education, reducing fertility rates, provision of nutrition programs, and improving access to clean water, child healthy, and safe sanitation were found to be effective measures to reduce child mortality rates (Feng et al. 2012). Using data from China, Feng et al. (2012) examined the effect of social, economic and political determinants, as well as health programs and interventions on the reduction of under-five mortality rate. They found empirical evidence that the main factors behind the success of china in reducing child mortality rate were sustained economic growth, social development, and investments in health systems and expanded health intervention coverage. In another study, Amouzou et al. (2012) found that universal access and provision of free health care for pregnant women, and children, and decentralized nutrition programs have contributed significantly to the reduction of child mortality in Niger.

7 Conclusion

Saving young children's lives is among the MDGs, which was developed by the United Nations. Goal number 4 in the MDGs calls for reducing child mortality by two third between 1990 and 2015. Egypt has achieved a significant progress in fulfilling this goal. However, despite the stark reduction in early child mortality rates in Egypt over the period 1995-2014, the current study yields that this progress was not uniform across different socio-economic and regional groups. Concerted effort and directed-intervention measures are still needed to reduce the degree of socio-economic and regional inequalities in child health, including infant mortality, in Egypt.

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Table 2. Multiple Logistics Regression Analyses of the Socio-Economic Correlates of Infant Mortality

VARIABLES	Odds ratio
Child Sex	
Female	0.990
	(0.870 - 1.127)
Year Fixed Effect	
2008	0.529**
	(0.309 - 0.905)
2014	0.436***
	(0.256 - 0.742)
Wealth Index	
Poorer	0.888
	(0.709 - 1.111)
Middle	0.585***
	(0.448 - 0.765)
Richer	0.490***
	(0.340 - 0.705)
Richest	0.373***
	(0.237 - 0.588)
Interaction term wealth index by Year Dummies	
Poorest× year 1995	1
	(1 - 1)
Poorest× year 2008	1
	(1 - 1)
Poorest× year 2014	1
	(1 - 1)
Poorer× year 1995	1
	(1 - 1)
Poorer× year 2008	1.010
	(0.641 - 1.592)
Poorer× year 2014	0.843
	(0.548 - 1.298)
Middle× year 1995	1
	(1 - 1)
Middle× year 2008	0.923
	(0.541 - 1.575)
Middle× year 2014	1.196
	(0.755 - 1.894)
Richer× year 1995	1
	(1 - 1)
Richer× year 2008	0.862
	(0.453 - 1.643)
Richer× year 2014	0.960
	(0.525 - 1.756)
Richest× year 1995	1
	(1 - 1)

Richest× year 2008	0.681
	(0.293 - 1.580)
Richest× year 2014	1.550
	(0.745 - 3.228)
Rural vs Urban	
Rural	1.239*
	(0.964 - 1.594)
Mother's education	
Primary	1.022
	(0.814 - 1.282)
Secondary	1.095
	(0.829 - 1.445)
Higher	0.443*
	(0.172 - 1.143)
Received Regular care during pregnancy	
Yes	0.815**
	(0.688 - 0.966)
Whether there are more than two under-fives in the household (1-0)	
Yes	0.370***
	(0.305 - 0.448)
Risky birth interval	
Yes	3.307***
	(2.868 - 3.813)
Interaction term mother's education by Year Dummies	
No education× year 1995	1
	(1 - 1)
No education× year 2008	1
	(1 - 1)
No education× year 2014	1
	(1 - 1)
Primary education× year 1995	1
	(1 - 1)
Primary education× year 2008	1.244
	(0.719 - 2.152)
Primary education× year 2014	1.149
	(0.686 - 1.927)
Secondary education× year 1995	1
	(1 - 1)
Secondary education× year 2008	1.373
	(0.866 - 2.179)
Secondary education× year 2014	0.899
	(0.579 - 1.398)
Higher education× year 1995	1
	(1 - 1)
Higher education× year 2008	2.275
	(0.668 - 7.747)
Higher education× year 2014	1.587
	(0.537 - 4.692)

Interaction term region (rural) by Year Dummies	
Urban× year 1995	1
	(1 - 1)
Urban× year 2008	1
	(1 - 1)
Urban× year 2014	1
	(1 - 1)
Rural× year 1995	1
	(1 - 1)
Rural× year 2008	0.559***
	(0.359 - 0.868)
Rural× year 2014	0.832
	(0.520 - 1.333)
Access to safe water	
Yes	1.001
	(0.772 - 1.297)
Mother is malnourished	
Yes	0.893
	(0.493 - 1.619)
Size of child at birth	
Very large	1
	(1 - 1)
Larger than average	0.663
	(0.266 - 1.654)
Average	0.454*
	(0.189 - 1.091)
Smaller than average	0.790
	(0.326 - 1.916)
very small	1.439
	(0.585 - 3.541)
Mother is working	
Yes	0.922
	(0.755 - 1.126)
Child is twin	
Yes	7.570***
	(6.195 - 9.250)
Constant	0.116***
	(0.0444 - 0.305)
Observations	28,935

Note: The provided coefficients are the adjusted odds ratios. Robust 95% confidence intervals are in parentheses. *** P <0 .01; ** P < 0.05, * p<0.1. All estimations are weighted using the DHS sampling weights.

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