



Child Mortality Rate in Ethiopia

A Sathiya Susuman

Dept. of Statistics, University of the Western Cape, Cape Town, South Africa

(Received 19 Sep 2011; accepted 10 Jan 2012)

Abstract

Ethiopia's childhood mortality has continued to decline although at a swift pace. The drop in urban childhood mortality decline, duration of breastfeeding is the principle reason for the overall decline in mortality trends in Ethiopia. Data from the Ethiopian Demographic and Health Surveys 2000 and 2005 were used. Indirect estimation of Brass and Trussell's methods were adopted. Selected demographic and socio-economic variables were included in the analysis with statistically significant effects. Findings clearly show neonatal and post neonatal mortality decline gradually. Even though, Ethiopia's childhood mortality rates are still high. The result shows less than 2 years birth interval have higher infant mortality rates than higher birth interval (113 deaths per 1000). The proper spacing of births allows more time for childcare to make more maternal resources available for the care of the child and mother. Therefore, further research is urgent for regional level and national level investigation.

Keywords: Childhood mortality, Neonatal, Post neonatal, Demography, Ethiopia

Introduction

Ethiopia is one of the poorest and second most populous countries in sub Saharan Africa. As one of the least developed countries Ethiopia is faced with many social and economical problems. As Zewudu and Sibanda (2003) illustrate that the high fertility of the population is attributed to low levels of contraception, cultural values favoring large family size, low socio-economic development and high infant and child mortality (1). In view of this most Ethiopians are suffering from the lack of basic needs of life such as food, clothing, housing, and health care, education, safe and healthy environment as consequences of the uncontrolled and rapid increase of population growth.

But the official source indicates that child mortality declined 35 percent in Ethiopia between 2000 and 2005; infant mortality declined 21 percent and under-five mortality decline 26 percent during the same period. Nevertheless, mortality rates are still high. The data on infant and child mortality rates reflect the country's level of so-

cio-economic development and quality of life and are used for monitoring and evaluating population and health programs and policies. In addition, the crude death rates have substantially declined over the past fifty years (2). Another report indicates that the infant mortality rate declined from 199 in 1950 to 90 and 77 in 2005, (3).

Although the precise size of the decline varies across data sources, the reduction of infants and child mortality has been substantial over the past years. This paper, the main focus is not the absolute crude death rate, but rather the forces changing the crude death rate over a period of time. Infant and under-five mortality in Ethiopia has continued to decline over the past 25 years with a more pronounced reduction in the last decade (3). Yet, overall infant and under five mortality rates remain very high: between 1995 and 2000 (4). The data show that almost one of every ten newborns (97 per 1000) did not survive to celebrate their first birthday and one of

***Corresponding Author:** Tel: +27 21 959 3898, E-mail address: sappunni@uwc.ac.za

every six children (166 per 1000) died before their fifth birthday (4). Given the slow pace of improvement in infant and child mortality to reach the child survival Millennium Development Goal target by 2015, Ethiopia should have reduced under-five mortality at the rate of 5.2 per 1000 live births each year since the beginning of the 1990 (5). As shown, between 1990 and 2000, the rate of decrease of under-five mortality has only been less than 2 per 1000 live births per year. Ethiopia should, therefore, reduce child mortality by 7.4 per 1000 live births per year between 2003 and 2015 in order to achieve the MDG goal in question (6,7).

This task would be very challenging given past trends as well as major unmet needs for child survival in Ethiopia. Therefore, in-depth understanding of the levels, trends, differentials and determinants of childhood mortality is crucial in any attempt to attain the goal of reducing infant and child mortality level through proper and sustainable types of intervention. This article, researcher have updated several factors and mainly focusing on declining mortality issues an approximate calculation from EDHS 2000 and 2005 for Ethiopia and described the relationship between child mortality and socio-economic and demographic characteristics in Ethiopia. The research topic is an exciting subject. Is it child mortality really decline in Ethiopia? Using a Brass (1968) and Trussell (1975) models are replicated methodology to derive a single consistent time series of calculations for infant, child and under-five mortality from the compiled data (8, 9).

The main aim is to analyze the declining childhood mortality in Ethiopia. Further, it is very important to generate discussion on declining childhood mortality and to promote awareness of the issues associated with birth interval and duration of breastfeeding. This can be examined in different ways, child and mother's demographic and socio-economic characteristics. Now the issue is how childhood mortality declined in Ethiopia? At what level? Is it true or not? For the experimental determinations an

analysis is confined to two methods such as Brass and Trussell models of childhood mortality. Specifically this study was to investigate prevalence, duration of breastfeeding status and child mortality in Ethiopia.

In view of the objectives of the study as well as observations made while reviewing the relevant literature the following hypothesis have been formulated;

- i) *Those women who give births interval more than 3 years have less childhood mortality and those women gave birth interval less than 3 years have more childhood mortality.*
- ii) *Those women who give breastfeeding long period (>12 months) less childhood mortality and those women who give breastfeeding less period have more childhood mortality.*
- iii) *Those women who give child birth order more than 5 and above have more childhood mortality and those women who give birth order less than two have less childhood mortality.*

Materials and Methods

The data sources for this study are the 2000 and 2005 Central Statistical Authority (CSA), Ethiopian Demographic and Health Survey (EDHS, 2005) (10). The EDHS is the second comprehensive survey conducted in Ethiopia as part of the worldwide Demographic and Health Surveys (DHS) project. The EDHS covered 9 regions and 2 administrative council areas and was conducted between April and August 2005. There is significant decline in childhood mortality at different stages of childhood and for the purpose of analysis deaths are classified as per the DHS into five groups:

Neonatal mortality (NNM): the probability of dying during the first month of life

Post neonatal mortality (PNNM): the probability of dying between the first and twelfth month

Infant mortality (${}_1q_0$): the probability of dying during the first year of life

Child mortality (${}_4q_1$): the probability of dying between the first and fifth birthday

Under-five mortality (${}_5q_0$): the probability of dying between birth and the fifth birthday

All the rates are expressed per 1000 live births except child mortality, which is expressed per 1000 children surviving to 12 months of age.

Several estimates are used to assess the association between childhood mortality and selected socio-economic and demographic variables. But here, dependent variable is childhood mortality and the main independent variables are the selected socio-economic and demographic variables. In order to account for regional differences, we created categorical variables that distinguished each region in Ethiopia. The study briefly describes about childhood mortality levels and the most important independent variables. Based on the *bivariate* analysis, the models were fitted using the Brass and Trussell version north models of the childhood mortality estimation. Sure, this model could determine exactly childhood mortality decline rate. Let us see from Brass indirect estimation procedure.

Brass Method of Estimation

A technique used to estimate infant and child mortality rate. It estimates mortality with an assumption that the risk of child death is a function of the age of the child only and does not depend on other factors such as mother's age or child's birth order (11). However, the mortality estimates obtained by the use of above method on live births to the women aged 15-19 are generally disaggregated. It is partly because the above mentioned assumption that it may not be in accordance with the reality and further the number of children born and dead to the women in this age group is usually small. In order to apply the procedure software package, MORTPAK was used and estimates were computed applying South Asian pattern of model life table. The estimating equations are as follows:

Average parity per women: $P_i = \text{CEB}_i / W_i$

Proportion of children dead: $D_i = (\text{CEB}_i - \text{CS}_i) / \text{CEB}_i$

Probability of dying: $Q_i = K_i * D_i$

Mean age at child bearing: $M = 2.25 * (P_3/P_2) + 23.95$

Where, $I = 1$ for 15-19, $2 = 20-24$, $3 = 25-29$, age grouprespectively

CEB_i = Number of children ever born by women in the age group 'i'

W_i = Total number of women in the age group i , irrespective of their marital status

D_i = Proportion of children dead

K_i = Multiplier

$K_i = a_i + b_i * (P_1/P_2) + c_i * (P_3/P_2)$

The coefficient a_i , b_i and c_i are provided in United Nations Manual and vary between the four different families of model life table developed by Coale and Demeny system (12). This article provides details on selected factors with infant and child mortality in Ethiopia. The key resolution is to estimate and interpret (net) effects on declining trend in infant and child mortality controlled for various socioeconomic and demographic factors of mothers, characteristics of children and health-care pattern of mothers. Understanding the relationships between these factors, infant and child mortality can provide valuable information for social scientists, policymakers, and health professionals who are concerned with improving the survival of young children in Ethiopia. Apart from that Trussell's indirect estimation could confirm decline childhood mortality with selected demographic key issues.

Trussell Method of Estimation

It has been observed that the accuracy of the estimates depend on rate of childhood mortality decline, onset of childbearing and the age of children. The error is more when childbearing starts early and the age of children is higher. Further, it is observed that the decline in mortality affects the estimate more than the decline in fertility. In addition to this assumption, the qual-

ity of data also affects the estimates of infant and child mortality. In fact, the estimates based on the data from 15-19 age groups (q_1) seem to be unreliable. Generally, q_2 , q_3 and q_5 are taken as reliable estimates of mortality and q_1 is extrapolated from these values. The indirect estimation of childhood mortality from data on children ever born and child surviving Coale - Demeny Model Trussell equation is given below. *Mean age of childbearing*: Mean age of mother at childbearing in the population. This variable is only used when data are tabulated by age of mother. If data are tabulated by duration of marriage, this value will not be used. An approximate estimate of M (mortality) can be calculated from children ever born data through FERTCB or from the age schedule of fertility through FERTPF.

Children ever born: This is the average number of children ever born to a woman. If "Tabulations" is coded as "age of mother", the data are given by age groups (15-20, 20-25... 45-50); if "Tabulations" is coded as "duration of marriage", the data are given by duration of marriage (0-5 years, 5-10 years... 30-35 years).

Children surviving: The average number of children surviving per woman, either by her age group, or by duration of her marriage.

Results

It is sound recognized that childhood mortality is quite high due to poverty and other social factors or to poor medical care (1). At the same time demographic factors of both the mother and child influence on childhood mortality. In developing countries, low birth weight is due to mother's poor health and nutrition. Inadequate weight gain during pregnancy is particularly important since it accounts for a large proportion of fetal growth retardation. Birth spacing is generally believed to be associated with childhood mortality (13). The proper spacing of births allows more time for childcare to make more maternal resources available for the care of the child and also allows a healthier mother. But Ethiopia scenario is entirely

different for instance; access to health services is limited. In general, the reality is the health problems of mothers and children are related to fertility and childbirth. The maternal mortality rate of 673 per 100,000 live births and infant mortality rate of 77 per 1,000 live births are among the highest in the world (3). There is an increasing trend in the incidence of adolescent pregnancy, contributing to more than 30 percent of the death toll arising from unsafe abortion (14-16). About 90 percent of women gave delivery at home (EDHS, 2005), only 28 percent of women receive antenatal care and skilled personnel attend only 7 percent of births. Postnatal care is extremely low in Ethiopia (17, 18). The low status of women in Ethiopia underpins and often directly undermines each of the negative reproductive health outcomes. Most of Ethiopian women, especially rural women, lack the reproductive and social self-determination needed to exercise their reproductive rights, a condition that, in turn, perpetuates their low reproductive health and social status. Therefore, childhood mortality decline is suspicious. As per the study findings show that overall Ethiopia childhood mortality rate is declined tremendously. Declined rates are given below (Table 1).

An average childhood mortality rates from EDHS 2000 and 2005 has been declined progressively such as neonatal mortality (+17.1), post neonatal mortality (+15), infant mortality (+33), child mortality (+29) and under-five mortality (+56). Whereas, children born to mothers who were not in union have 32 percent higher mortality risk than those children born to mothers who were in union. The study reveals that childhood mortality is higher for non-working mothers (EDHS, 2005). In Ethiopia, childhood mortality is often thought to be higher in rural areas than urban areas because of differences in standards of living, health conditions and availability of or access to public health facilities and services.

Is it really childhood mortality decline in Ethiopia?

We have reflected different issues in connection with childhood mortality, now the time to confirm whether childhood mortality is coming down or not? It is seldom possible to establish mortality levels with confidence for a period of more than fifteen years before a survey. Even within the recent 15 year period considered here, apparent trends in mortality rates should be interpreted with caution for several reasons. First, there may be differences in the completeness of death reporting related to the length of time before the survey. Second, the accuracy of reporting of age at death and of date of birth may lapse with time. Third, sampling variability of mortality rates tends to be high, especially for groups with relatively few births. Fourth, mortality rates are shortened because women currently age 50 or above bearing children during earlier periods were not included in the survey (19, 20). This truncation affects mortality trends, in particular. For example, for the period 10-14 years before the survey, the rates do not include any births for women age 40-49 since these women were over age 50 at the time of the survey and were not eligible to be interviewed. Since these excluded births to older women were likely to be at a somewhat greater risk of dying than births to younger women, the mortality rates for the period may be slightly underestimated. Estimates for more recent periods are less affected by truncation bias since fewer older women are excluded. The extent of this bias depends on the proportion of births omitted. Selection bias for infant and child mortality statistics as far back as fifteen years before the survey should be negligible.

Brass and Trussell's method

In this connection under reporting of births and deaths as well as misplacement of dates of birth and death are common in developing countries like Ethiopia where the great majority of the population particularly women, are illiterate and births as well as deaths are not registered. The decline in child mortality was more rapid than in infant mortality, but still it continues to be

higher rate in Ethiopia. Since estimation of infant and childhood mortality using direct methods is already accessible in the CSA (2006) report. But here, an attempt is made to estimate of childhood mortality in Ethiopia, using indirect techniques for the purpose of judgment and clearness. In order to estimate this mortality technique the Trussell variant of the Brass Indirect Technique (21, 22) was employed. The Trussell and Brass indirect estimation is the standard pattern of mortality estimations and this measures is considered to be more suitable for a community or society that breastfeeds the children for more than a year.

The Brass model is clearly noticed that women aged 20-34 (q_2 , q_3 and q_4) have been proven to be more accurate women age group 20-24 child mortality 64 per 1000 and 25-29 reduced child mortality 54 per 1000 than the estimates of younger and older women (4) Child mortality was declining 0.031 points last five years in the age group of 20-24 women. In case of mortality decline, it is argued that the estimate of infant and child mortality may not pertain to the survey year but to sometime before the survey date. The methods are given to estimate the reference period for estimated infant and child mortality. In addition to that infant (1q0), child (4q1) and under five (5q0) mortality rates are calculated by taking an average values of the three rates implied by $q(2)$, $q(3)$ and $q(5)$ the results are presented in Table 2. The childhood mortality was gradually coming down it was obviously noticeable.

Trussell's model shows childhood and under-five mortality rates for five-year period before the survey. The most recent estimates EDHS 2005 show that overall childhood mortality has been declined vastly. The decline rate for under-five mortality is coming down from 0-14 years preceding the survey. Particularly 5 to 9 years about 70 under-five mortality has declined. A recent news article quoting a United Nations official gave the following assessment: "*Ethiopia, the second populous nation in Africa, has managed to reduce under-five mortality rates by*

40 per cent during the last 15 years". The report also gave a concordant mortality trend carefully put together by section rates from a variety of sources to give a complete picture of childhood mortality trends since the 1960s (7). Even though, infant mortality rate also decline in the same period of survey around 50. Because the Ethiopian government is undertaking a number of interventions aimed at reducing childhood diseases and mortality. Government has established the health sector development program and health policy with emphasis on disease prevention and control was formulated (23).

But still neonatal and post neonatal mortality rates have not that much decline. This is due to the fact that the antenatal care (28 percent) for pregnant women was quite low in Ethiopia and post natal care (less than 10 percent) was extremely poor (3). Majority of the deliveries conducted at home (about 90 percent) with untrained birth assistance. Among health interventions, mother's tetanus immunization during pregnancy is strongly associated with neonatal mortality (24-26). Based on the Trussell model the results reveal an overall decline in infant, child and under-five mortalities between reference period 1989 and 2003.

Childhood mortality therefore contributes to a better understanding of a country's changing socioeconomic situation and quality of life. Central Statistical Agency, EDHS findings on childhood mortality highlight the need for strategies that aim to change high (risk fertility behavior) and the need for a new policies and programs that will improve maternal and child health care. A major decline appears to have occurred in child mortality, with somewhat smaller declines in infant mortality. There is no doubt in Ethiopia childhood mortality rates is declined which is true. Thus, we could definitely conclude with help of Brass and Trussell's indirect methods.

In addition, survivors and childhood mortality variance by selected demographic factors in Ethiopia, 2005 presented in Table 3. The study found that age at birth of women less than 20

years, neonatal and infant mortality rates are quite high 59 and 105 respectively. Infant mortality rate 68 per 1000 live births this is due to the mortality rates for the 10 years preceding the survey. However, the risk to children born by women over the age of forty express sharply increased (90 per 1000) infant mortality rates. Children from multiple births (twins, triplets, etc) experience much higher mortality than single births. It is a biological factor that plays a major role in the survival of infants.

However, estimation of relative effects on childhood mortality results presented in Table 4. An analysis of 2005 shows a slight decline in the childhood mortality levels in the country. This decline may be attributed to better quality of the EDHS 2005 data as compared to 2000 EDHS. The study hypothesis clearly accepted birth interval 2-3 years is 2.7 times less childhood mortality than those women who have birth interval less than 2 years which is statistically highly significant (Table 4). Another important determinant is duration of breastfeeding whose women gave less than six months duration of breastfeed 5.3 times higher risk than no breastfeeding. Those women gave multiplicity of birth which is 2.3 times higher childhood mortality than single birth women. Therefore, preceding birth interval, duration of breastfeeding and multiplicity of birth became an important childhood mortality factors than other variables, the study hypothesis is accepted. In general developing countries like Ethiopia childhood mortality is often thought to be higher in rural areas than urban areas because of differences in standards of living, health conditions and availability of or access to public health facilities and services. The study reveals that children of mothers residing in rural settings have higher risk of dying during infancy and childhood periods as compared to those residing in urban areas. With respect to wealth and mortality, children born to mothers in the middle wealth index are at higher risk of dying than children born to mothers in the lowest and highest wealth index during infancy, childhood periods (7).

Table 1: An average childhood mortality rates from Ethiopia DHS 2005 and 2000

Years ceding survey	pre- the	NNM	Decline Rate	PNN M	Decline Rate	(1q0)	Decline Rate	(4q1)	Decline Rate	(5q0)	Decline Rate
0-4		39	+ 9.7	38	+ 10.3	77	+ 20	50	+ 26.7	123	+ 43.2
5-9		42	+ 26.3	42	+ 19.5	83	+ 46.8	63	+ 30.7	141	+ 70.4
10-14		46	+ 17.4	49	+ 20.7	95	+ 38	77	+ 19.3	165	+ 51.5
All		41	+ 17.1	40	+ 14.8	80	+ 32.9	56	+ 28.5	132	+ 55.8

Source: DHS, 2005 and Decline rate is last five years DHS 2000

Table 2: Brass and Trussell's indirect estimation of childhood mortality in Ethiopia, DHS-2005

Age of Woman	CEB	CS	Brass Model	Trussell Model	Child mortality	Probability of dying between ages 1 and 5	Life Expectancy at birth	Total Births
15 - 20	0.82	0.73	0.11	3.92	0.040	0.018	67.3	663
20 - 25	1.95	1.75	0.103	8.17	0.068	0.04	59.8	720
25 - 30	3.48	3.02	0.132	0.12	0.084	0.058	55.1	2396
30 - 35	4.96	4.44	0.105	0.11	0.068	0.041	59.3	2807
35 - 40	6.27	5.58	0.11	0.12	0.067	0.041	59.5	1500
40 - 45	6.98	5.62	0.195	0.21	0.104	0.076	50.8	1255
45 - 50	7.34	5.77	0.214	0.23	0.103	0.074	51.1	520

Source: Calculations based on EDHS data. 2005

Table 3: Survivors and childhood mortality variances by demographic factors in Ethiopia, 2005

Characteris- tics	Total No. of Births	Survivors age < month	Survivors at age one year	NNM	PNNM	(1q0)	(4q0)	(5q0)
All	9861	9412	7267	35	35	68	26	120
Size of Child								
Small	3058	2920	2290	40	41	79	24	123
Average	4022	3857	3004	28	27	54	28	112
Large	2723	2591	1942	34	35	68	24	98
Preceding Birth interval						***	***	
< 2 years	1728	1618	1314	59	58	113	48	131
2-3 years	2885	2784	2209	26	33	58	20	126
3-4 Years	1740	1672	1241	22	26	47	27	125
4+ Years	1585	1537	1124	17	17	33	12	99
Sex of child				*		***		
Male	5027	4770	3638	42	40	79	25	111
Female	4834	4642	3629	28	15	56	28	108
Duration of Breast Feeding				***		***	***	***
Never	352	173	140	506	127	568	64	147
< 6 Months	1578	1340	215	84	153	214	84	152
6-12 Months	2178	2178	1214	0	38	38	52	135
> year	5569	5569	5569	0	0	0	15	128
Birth Order				**		**	*	***
1	1917	1795	1377	52	39	88	25	100
2-3	3073	2959	2285	28	31	58	20	110
4-6	3096	2955	2289	33	31	63	27	98
7+	1775	1703	1316	30	42	71	37	116
Age at Birth				*		***		***
< 20 years	1383	1292	1034	59	49	105	18	133

Table 3: Continued...

20-29 years	5203	4987	3851	32	31	61	28	122
30-39 years	2755	2641	2026	26	33	58	26	129
40-49 years	520	492	356	44	49	90	37	125
Multiplicity of Birth						***		***
Single	9683	9256	7160	33	33	65	26	97
Multiple	178	156	107	124	109	219	56	125

*** = $P < 0.001$, ** = $P < 0.01$, * = $P < 0.05$, (***, **, * indicate level of significance at specified level).

Table 4: Estimation of relative effects on childhood mortality in Ethiopia 2005

Selected Variables	B	Exp (B)	95.0% CI for Exp (B)	
			Lower	Upper
Size of Child				
Small [@]				
Average	0.126	1.13	0.790	1.630
Large	0.179	1.19	0.846	1.690
Preceding Birth Interval				
Less than 2 years [@]				
2-3 years	0.989	2.69***	1.634	4.427
3-4 Years	0.376	1.45	0.883	2.401
4+ Years	0.168	1.18	0.685	2.044
Duration of Breast Feeding				
Never [@]				
Less than 6 Months	1.663	5.27***	3.957	7.037
Sex of Child				
Male [@]				
Female	0.140	1.15	0.868	1.522
Multiplicity of Birth				
Single [@]				
Multiple	0.847	2.33***	1.418	3.836
Age at Birth				
Less than 20 [@]				
20-29	0.510	1.67	0.970	2.860
30-39	0.009	1.01	0.694	1.467
40-49	0.014	1.01	0.598	1.719
Birth Order				
2 [@]				
3-4	-0.037	0.96	0.632	1.469
5+	0.158	1.17	0.747	1.837
Wealth Index				
Poorest [@]				
Poorer	-0.549	0.579	0.363	0.923
Middle	-0.699	0.497	0.304	0.814
Richer	-0.132	0.877	0.549	1.400
Richest	0.076	1.079	0.665	1.753

*** = $P < 0.001$, ** = $P < 0.01$, * = $P < 0.05$, (***, **, * indicate level of significance at specified level[@] Reference category)

Conclusion

An examination of indirect estimation models effects of demographic and socioeconomic factors on infant and child mortality leads to general observations. This study also shows that the most important related factors influencing childhood mortality in Ethiopia are demographic in nature. The demographic factors identified in this study include birth order, maternal age at birth, multiplicity of birth, duration of breast feeding, birth interval, which are similar to those documented in many settings throughout Africa and other developing countries. The effects of most socioeconomic characteristics are smallest during the neonatal period and largest during childhood. There are some exceptions like religion and access to a flush or pit toilets have stronger effects on neonatal mortality than on post neonatal or child mortality (17). This observation is that effects of socioeconomic characteristics tend to be stronger in nation with high levels of mortality. Other study mentioned that *“emerging evidence of fertility levels below two children per woman in an African city (Addis Ababa, capital of Ethiopia). Postponement of marriage and increased incidence of non-marriage, as well as a decline in marital fertility recorded across all birth orders and all age group, are the routes by which the observed transition to below-replacement fertility has been achieved”* (27). Such a level of fertility is remarkably low for an urban area in a developing country such as Ethiopia which still has moderately high mortality, a low standard of living, and no history of an effective national family planning program.

However, the prevailing circumstances in Addis Ababa and more broadly in Ethiopia are hardly comparable with those in developed countries. In the past 10 years there has been a gradual progressive in the prospect of reproductive change in Africa. Consequently, the question is now not so much whether Tropical Africa remains a spectator of childhood mortality transi-

tion, but whether and how soon overall childhood mortality in the country will decline to level attained in other parts of the world. In connection with all the selected variables have strong and statistically significant effects of declining mortality. There is no hesitation the estimation of childhood mortality such as direct and indirect measure was useful to identify the declining trend. We discussed Brass and Trussell's indirect estimation of declining mortality for the clarity and concrete evidences. If any developing countries we are come across to achieve for the MDG 4 *“reduce child mortality”* absolutely we must reduce entire childhood mortality rates. Despite progress, deaths of childhood mortality remain unacceptably high in Ethiopia. Still demographic key indicators are not balancing. Therefore, the concerned officials remain work against to childhood mortality specifically neonatal, post neonatal and under-five mortality. Increase health facilities, promote rural maternal health care and special fund allocation is needed to reduce childhood mortality. New health policy for childhood mortality should be implement which is immense worth in this juncture. Therefore, further research is very urgent for regional level as well as national level investigation.

Ethical Considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

Acknowledgments

I wish to thank Prof. Charles Teller, Population Reference Bureau and Washington DC for his critical reading of this manuscript and valuable

advice. The authors declare that there is no conflict of interests.

References

1. Zewudu Wubalem, Sibanda A (2003). The proximate determinants of the decline to below replacement fertility in Addis Ababa; *Studies in Family Planning*, 34 (1): 1-7.
2. United Nations (2006). *World Population Prospects: The 2006 Revision*. New York, NY: United Nations Population Division.
3. Ethiopia Demographic and Health Survey (2006). Central Statistical Agency, Addis Ababa, Ethiopia, RC Macro, Calverton, Maryland, USA.
4. Ministry of Health (2004). National Strategy for Child Survival in Ethiopia unpublished memo.
5. Millennium Development Goals Report (2004). Challenges and Prospects for Ethiopia. Ministry of Finance and Economic Development (MOFED) of the Federal Democratic Republic of Ethiopia and the United Nations Country Team, Addis Ababa.
6. United Nations (1983). Indirect techniques for Demographic Estimation. United Nations, New York.
7. World Bank (2007b). *Urban Labor Markets in Ethiopia: Challenges and Prospects* Poverty Reduction and Economic Management Unit, Africa Region, Report No. 38665-ET, Washington DC: World Bank, (2).
8. Brass W (1968) *Methods of Analysis and Estimation*. In Brass, et al. (eds). *The Demography of Tropical Africa*, Princeton, Princeton University Press.
9. Trussel, J (1975). A re-estimation of the multiplying Brass technique for determining childhood survivorship rates, *Population Studies* 29, No. 1, p 97-107.
10. Ethiopia Demographic and Health Survey (2001). Central Statistical Agency, Addis Ababa, Ethiopia, RC Macro, Calverton, Maryland, USA, 2000.
11. Caldwell, John C (1994). How is Greater Maternal Education Translated into Lower Child Mortality? *Health Transition Review*, 4: 224-29.
12. Coal AJ, Demeny P (1983). "Regional Model Life Tables and Stable Populations", Second Edition. New York: Academic Press.
13. Assefa Hailemariam, Mekonnen T (1997). Determinants of infant and early childhood mortality in a small urban community of Ethiopia: a hazard model analysis. *Ethiopian Medical Journal*, 11(3), 189-200.
14. Cleland, JG, Ginneken, JKV (1988). Maternal education and child survival in developing countries: the search for pathways of influence. *Social Science and Medicine* 27 (12), 1357-1368.
15. Central Statistical Authority (1995). *The 1995 Fertility Survey of Urban Addis Ababa*, Central Statistical Authority and Addis Ababa
16. Eberstein IW, Parker JR (1984). Racial differences in infant mortality by cause of death: the impact of birth weight and maternal age. *Journal of Demography*, 21(3): 309-321.
17. Mekonnen Heins, Valente (2000). Infant and child mortality in urban Ethiopia In-Depth Analysis from the 1994 Population and Housing Census of Ethiopia. Addis Ababa and Roma.
18. Gribble, JN (1993). Birth Intervals, Gestational Age, and Low birth Weight: Are the Relationships Confounded? *Population Studies*, 47(1): 133-146.
19. Kennedy Kathy J (1990). Breast-feeding and return to fertility: clinical evidence from Pakistan, Philippines and Thailand, *Asia-Pacific Population Journal* 5(1):45-56.
20. Hobcraft, JN, Mc Donald JW, Rutstein SO. (1984). Socio-economic Factors in Infant and Child Mortality: A Cross Sectional Comparison. *Population Studies*, 38 (2): 193-223.
21. Rutstein SO (2000). Factors Associated with Trends in Infant and Child Mortality in Developing Countries during the 1990s.

- Bulletin of World Health Organization*, 78 (10): 1256-1270.
22. United Nations (1985). *Socio-economic differentials in child mortality in developing Countries*, New York: United Nations.
23. USAID (2007). Trends in Demographic and Health survey in Ethiopia.
24. Pandey A, Choe MK, Luther N (1998). Infant and Child Mortality in India, National Family Health Survey Subject Reports No 11.
25. Rajan S Irudaya, Mohanchadran P (1998). Infant and Child Mortality Estimates- Part-I, *Economic and Political Weekly*, Vol. XXXIII No 19: pp1120-1140.
26. Bicego George, Hill K, Mahy M (1994). Trends, Age Patterns and Determinants of Early Childhood Mortality in Kenya. *Marco International Inc., Maryland*. Available from: www.google.com
27. Kinfu Yohannes (2000). Below-replacement fertility in tropical Africa? Some evidence from Addis Ababa. *Journal of Population Research*, 17 (1): P 63-70.