Fertility Trends in Urban and Rural Zambia: Evidence from DHS Data 1992-2014.

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Abstract

Introduction: Zambia, like much of sub-Saharan Africa is one of the last countries in the developing world to initiate fertility decline (Shapiro et al 2011). Scholars have for some time claimed that fertility transition in sub-Saharan Africa has been characterised by stalling in a number of countries (Bongaarts 2005, 2008; Westoff and Cross 2005; Shapiro and Gebreselassie 2010). Among the key transition variables in fertility decline are education and contraception use for women. However, quite little has been documented to examine the role of contraception in fertility transition of urban and rural Zambia.

Methods: The study examined the factors associated with trends in Urban and Rural fertility in Zambia. This study used secondary data from the 1992, 1996, 2001 and 2007, and 2013-14 DHS. Nationally Representative samples of (7060 women in 1992, 8,021 women in 1996, 7,658 in 2001 and 7,146 in 2007, and 16,411 in 2013-14). The samples covered all women aged 15-49 years. Trend analysis of proportions of children ever born and contraception use was performed using Stata software. Bivariate and binary analysis using logistic regression model were also performed on the data.

Results

The study results show that overall fertility declined from 6.5 births per woman in the 1992 ZDHS to 5.3 births per woman in the 2013-14 ZDHS—a drop of just over one birth per woman in the nearly two decades. However, this decline is more pronounced in urban Zambia. Fertility in rural Zambia has been resilient even though contraception use has significantly increased over the years.

Conclusion:

Unless concrete reproductive health interventions are undertaken seriously Zambia's fertility levels especially in rural areas are likely to remain relatively high for some in the future. The increase is contraception use in rural areas has had less effect on declining fertility. There is therefore need to consider strengthening education and awareness campaigns on the importance of contraception use among women in rural Zambia.

1. *Key Words: Fertility Trends; DHS Data; Urban-Rural; Zambia*

2. Introduction

Fertility has been declining for some years now world over buts has remained highest in sub-Saharan African countries than in any other parts of the world. This is mainly due to strong kinship networks and high economic and social values of children in most African cultures (Romaniuk, 1980). At the macro level, high fertility leads to high population growth which leads to a more serious issue of poverty. Poorer families, especially women and marginalised groups, who bear the burden of large number of children with fewer resources per child, further adding to the spiral of poverty and deterioration in the status of women. Sub Saharan Africa has been characterised by high population growth rate resulting from high levels of fertility for over five decades now. Although new evidence suggests that fertility levels have begun to decline in the region. The pace and intensity of such change among the countries in the region, has by no means been uniform (Palamuleni, 2010).

Fertility is the most important component of population dynamics and plays a major role in changing the size and structure of the population of a country. Uncontrolled fertility can have adversely influence the socio-economic, demographic and environmental development of a country. At the individual level, high fertility can undermine the economic potential of woman and is also associated with high maternal mortality risks. Studies have revealed that different fertility regulation mechanisms such as use of modern contraceptives, termination of pregnancies and delayed marriages that contribute to fertility reduction have made an impact in urban areas but are not available in rural areas to play similar roles in most sub-Saharan African countries. It is for this reason that urban and rural fertility trends in Zambia need to be carefully examined to identify the trends determinants of the differentials.

The 2010 census of population and housing indicate that on average Zambia's fertility reduced from 7.2 in 1980 to 5.9 in 2010. This is barely a reduction of one child in the period of three decades.

Since 1992, the government of Zambia, through The National Health Policies and Strategies has invested a lot of resources and made tremendous efforts in the provision of family planning programmes. The government's policy is to reduce the high level of fertility, particularly adolescent fertility, and to improve sexual and reproductive health, including family planning, so as to encourage small family size (MOFNP, 2007). Fertility helps to determine the size, structure, and composition of the population in any country (CSO 2009).

Unless concrete reproductive health interventions are undertaken seriously Zambia's fertility levels especially in rural areas are likely to remain relatively high for some in the future. Zambia's national population policy on fertility is to slow population growth by providing family planning services, allowing couples and individuals to plan their families.

Zambia's family planning programs have recently undergone a fundamental shift from being focused on women only to focusing on men individually, or on both partners.
However, contraceptive use among married women has remained low in most rural parts of the country. Men's role in reproductive decision-making remains an important and neglected part of understanding fertility control both in high-income and low-income countries. Family planning (FP) services have been promoted as critical in giving couples the freedom to space and plan the number of children they wish, but also contributing to the health and overall quality of life of the population (UNFPA, 2012).

Therefore, the Government has a responsibility to facilitate people's ability to make informed choices and to create an enabling environment in which they can effectively manage their lives, (CSO, 2009). Male involvement in family planning remains limited despite the 1994 International Conference on Population and Development in Cairo,

which emphasized the need for men's involvement in sexual and reproductive health issues (World Health Organization; 2002).

3. Study Objective

The aim of the study is to examine the fertility trends in urban and rural Zambia with evidence from DHS data 1992 – 2014.

4. Methods and Materials

This study uses the Zambia Demographic and Health Survey (DHS) data, collected in 1992, 1996, 2001/2002, 2007, and 2013/2014. The DHS surveys included nationally representative samples of (7060 women in 1992, 8,021 women in 1996, 7,658 in 2001 and 7,146 in 2007, and 16,411 in 2013-14). The samples covered all women aged 15-49 years

The DHS studies used a multistage sampling design that first selected a random sample of enumeration areas and then selected a random sample of households systematically from a household listing of all households in the enumeration area. All eligible women in the sampled households were approached and asked to participate in the interview. Information on women's birth history was capture with the view of measuring life time and current fertility. Women were also asked questions about fertility preferences and family planning.

The analysis focuses on urban-rural trend analysis of total fertility rates (TFR) and contraception prevalence rates (CPR), children ever born, fertility preferences and desire for children from 1992 to 2014. Trend analysis of total fertility rates and proportions of children ever born were performed on weighted datasets. Bivariate analyses and Multivariate analysis using logistic regression model were also performed to assess the influence of contraception use on fertility in urban and rural Zambia.

All analyses were adjusted for the multi-stage sampling design and were weighted. All analyses were performed using Stata version 13.0.

5. Results

Table 1 describes the basic socio-demographic characteristics of women in the Zambia DHS samples captured in 1992, 1996, 2001/2, and 2007 and 2013/14. The study sample includes all women interviewed in the survey. Less than half of the women surveyed in all the five DHSs were younger than 24, and about one-third were between the ages of 25 and 34.

The majority of women in samples finished primary school but did not continue with secondary school. Over half of women the last four DHS samples lived in urban areas.

About three-quarters of the women in the DHS samples were Protestant, and most of the remainder was Catholic. At least 6 in 10 women of the study samples reported that they were currently married at the time of the survey. Less than 20 percent of women had at least one child.

Table 1: Socio-demographic characteristics of women in DHS Samples, Zambia 1992-2014

	Study Samples				
Background characteristic	1992 (n=7,060)	1996 (n=8,021)	2001/2 (n= 7,658)	2007 (n=7,146)	2013/14 (n=16,411)
Age					
15-24	48.5	47.8	45.4	41.2	40.4
25-34	29.7	29.5	30.9	33.9	32.2
35-39	9.3	9.5	10.1	10.5	12.2
40-44	7.2	7.1	7.7	7.9	8.9
45-49	5.4	6.2	6.0	6.6	6.2
Residence					
Urban	51.5	44.9	38.9	42.1	46.2
Rural	48.5	55.1	61.1	57.9	53.8
Education					
No education	16.5	13.3	12.0	10.4	8.4
Primary	60.0	58.9	58.9	54.4	46.8
Secondary	22.0	25.0	26.3	29.9	39.7
Higher	1.8	2.8	2.8	5.2	5.1
Religion					
Catholic	27.9	24.1	23.4	20.4	18.2
Protestant	69.1	74.6	75.1	77.8	80.4
Muslim	0.4	0.3	0.3	0.5	0.6
Other	2.6	1.0	1.1	0.3	0.8
Marital status					
Never married	25.4	25.3	24.6	25.9	27.9
Currently married	63.1	61.1	61.7	61.6	60.1
Formerly married	11.5	13.5	13.7	12.4	12.1
Number of children					
None	29.6	28.9	28.8	25.9	25.1
1	17.4	17.4	16.9	15.4	15.4
2	12.2	13.7	14.4	14.7	14.0
3	10.0	10.9	12	12.6	12.3
4+	30.7	28.9	29.8	31.3	33.3
Total	100	100	100	100	100

The government of Zambia's population policy is to reduce the high level of fertility, particularly adolescent fertility, and to improve sexual and reproductive health, including family planning, so as to encourage small family size (MOFNP, 2007). Fertility helps to determine the size, structure, and composition of the population in any country. Results in table 2 shows fertility trends in Zambia, overall fertility has decreased from 6.5 births per woman in 1992 to 5.3 births per woman in 2013-14, a more than one-child decline in about two decades. Fertility reduction is more pronounced in urban areas than in rural areas of the country. While fertility has reduced by two children in urban areas it has only reduced by 0.5 children in rural areas in the same period.

Table 2: Trends in Total Fertility Rate by year, Zambia 1992-2014

Year	Total Fertility Rate		
	Urban	Rural	Total
1992	5.8	7.1	6.5
1996	5.1	6.9	6.1
2001	4.3	6.9	5.9
2007	4.3	7.5	6.2
2014	3.7	6.6	5.3

The level of fertility is inversely related to women's educational attainment. Table 2 shows total fertility rate classified by education attainment in the five DHSs conducted in Zambia. Fertility decreases rapidly from 7.2 births among women with no education to 3.0 births among women with more than secondary education in the 2013-14 survey.

Table 3: Trends in Total Fertility Rate by Education level and year, Zambia 1992-2014

Year	Total Fertility Rate			
	No education	Primary	Secondary	Higher
1992	7.1	6.8	5.4	4.0
1996	6.8	6.7	5.1	3.9
2001	7.4	6.5	4.9	3.1
2007	8.2	7.1	4.2	2.4
2014	7.2	6.3	3.8	3.0

Between 1992 and 2013–14, the total fertility rate (TFR) in Zambia fell more than one child per woman (from 6.5 to 5.3) and the contraceptive prevalence rate (CPR) more than doubled. However, the aggregate picture masks important underlying disparities between rural and

urban areas. Urban areas enjoyed substantial decreases in TFR (from 5.8 to 3.7) and increases in CPR (any method: 14.4 percent to 36.6 percent). Even though contraceptive use has increased significantly in rural areas (Any method: 8.5 percent to 33.5 percent) the reduction is TFR has been slow.

Table 4: Total Fertility Rate and Contraceptive Prevalence Rate by Residence and year, Zambia 1992-2014

Year	Urban		Rural	
	TFR	CPR	TFR	CPR
1992	5.8	14.4	7.1	8.5
1996	5.1	23.7	6.9	15.5
2001	4.3	30.1	6.9	20.8
2007	4.3	30.8	7.5	29.2
2014	3.7	36.6	6.6	33.5

Table 5 shows the trend in children even born to all women by residence in Zambia from 1992 to 2014. Parity data show how average family size varies across the DHS years in Zambia. Women living in rural areas are more likely to have a higher family size compared to their counter parts in urban areas. The proportion of women who have never given birth has been consistently higher in urban areas than in rural areas for example in 2013-14 survey it is 12 percentage point higher in urban than in rural areas.

Table 5: Percent of women by number of children ever born by residence and year, Zambia 1992-2014

Year/Urban	Children Ever Born				
	0	1 − 3	4 − 6	7 - 9	10+
1992	30.9	36.1	19.0	10.5	3.5
1996	30.3	30.9	18.9	8.7	3.1
2001	28.6	40.9	20.1	8.1	2.3
2007	32.5	40.3	18.6	7.2	1.5
2014	30.2	43.7	20.2	5.1	0.8
Year/Rural					
	0	1 − 3	4 − 6	7 - 9	10+
1992	22.6	36.9	20.4	13.8	6.2
1996	22.4	37.4	22.6	12.6	5.0
2001	21.5	38.2	22.9	12.9	4.5
2007	18.1	36.5	28.4	13.7	3.3
2014	18.8	34.9	27.1	15.6	3.6

Marriage exposes women to a high frequency of sexual intercourse, and thus the beginning of exposure to the risk of pregnancy, marriage is an important social and demographic indicator and, in most societies, represents the point in a person's life when childbearing first becomes acceptable. Duration of exposure to the risk of pregnancy depends primarily on the age at which women first marry. Women, who marry early, on average, are more likely to have their first child at a young age, give birth to more children overall, contribute to higher fertility rates, and experience possible maternal health implications.

Table 6 shows the rural-urban trends of median age at first marriage for women. Age at first marriage is defined as the age at which the respondent begins living with her or his first spouse/partner. Marriage occurs relatively early in rural than in urban Zambia. In 2013-14 women in rural areas were likely to marry two years earlier than their urban counterparts.

Table 6: Median age at first marriage by residence and year, Zambia 1996-2014

Year	Median age at first marriage		
	Urban	Rural	Total
1992	18.0	17.4	17.7
1996	18.7	17.5	18.0
2001	18.7	17.7	18.1
2007	19.6	17.8	18.4
2014	19.9	18.0	18.7

The onset of childbearing at an early age has a major effect on the health of both mother and child. It also lengthens the reproductive period, thereby increasing the level of fertility. Table 7 shows the rural-urban trends for median age at first birth. The median age at first birth in urban areas has increased by one year while for rural areas it has remained the same from 1992 to 2014.

Table 7: Median age at first birth by residence and year, Zambia, 1992-2014

Year	Median age at first birth (20-49)		
	Urban	Rural	Total
1992	18.8	18.6	18.6
1996	19.1	18.5	18.7
2001	19.2	18.6	18.8
2007	19.9	18.7	19.0
2014	19.8	18.7	19.1

Information about the desire for more children is important for understanding future reproductive behaviour. The provision of adequate and accessible family planning services is dependent on the availability of such information. In the ZDHS, currently married women (whether pregnant or not) were asked about their intentions to have another child and, if they had such intentions, how soon they wanted the child. Table 8 shows that in all the Zambia DHSs women in rural areas were more likely to decide to have another child soon than their rural counterparts.

Table 8: Percent distribution of currently married women by desire for children by residence and year, Zambia 1992-2014

Year	Urban			Rural		
	Have another soon	Undecided	Want no more	Have another soon	Undecided	Want no more
1992	65.6	4.2	25.2	70.1	4.1	20.5
1996	58.0	2.7	33.2	70.2	2.5	22.0
2001	54.3	1.5	40.3	63.7	3.3	29.7
2007	48.0	8.2	40.0	60.0	5.7	31.5
2014	56.0	4.7	35.8	57.1	4.8	34.8

All the five DHSs in Zambia collected information from women age 15-49 about the total number of children they would like to have in their lifetime if they could choose the exact number to have at the time they had no children. Even though this question is based on a hypothetical situation, it provides two measures. Firstly, for women who have not yet started a family, the data provides an idea of future fertility. Secondly, for older and high-parity women, the excess of past fertility over ideal family size provides a measure of unwanted fertility. Results in table 8 indicate that in 2013-14 DHS less than a quarter of women in

urban areas and about one-third in rural areas indicated that they would want to have more than six children.

Table 9: Percent distribution of women's fertility preference according to ideal number of children by residence and year, Zambia 1992-2014

Year/Urban	Ideal number of children						
	0	1	2	3	4	5	6+
1992	0.3	0.7	6.0	6.9	26.7	17.2	37.5
1996	0.4	1.4	11.2	11.3	30.4	15.6	25.8
2001	0.5	1.6	16.3	17.5	32.1	12.2	17.0
2007	1.2	1.6	16.2	20.2	31.5	12.0	14.4
2014	0.8	0.9	11.3	18.2	36.2	13.3	17.3
Year/Rural							
	0	1	2	3	4	5	6+
1992	0.0	0.5	2.7	3.8	13.7	16.9	54.9
1996	0.1	0.4	3.5	4.9	16.8	18.3	49.7
2001	0.1	0.9	6.0	8.2	21.8	20.1	34.8
2007	0.7	0.8	5.4	8.0	22.6	19.3	34.4
2014	0.9	0.9	6.1	8.9	23.8	18.3	36.2

Logistic regression

Total fertility rates

Trend analysis of odds ratios from logistic regression of residence associated with fertility levels are presented in Table 10. The findings show that in all the DHS years, women living urban in rural areas were more likely to have children than women living in urban areas. The results indicate that the gap in the odds ratios is increasing over the years (from 1.23 in 1992 to 1.71 in 2014). By 2014 fertility in rural areas was almost twice (1.78) more than that of urban areas.

Table 10: Binary logistic regression odds ratios and confidence intervals for analysis of total fertility rates by residence, Zambia 1992 - 2014

	Study Samples									
Background characteristic	1992 (n=7,060)		1996 (n=8,021)		2001/2 (n= 7,658)		2007 (n=7,146)		2013/14 (n=16,411)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Residence										
Rural	1.23	1.13- 1.36	1.08	0.98 - 1.24	1.59	1.44 - 1.73	1.70	1.62 - 1.83	1.71	1.62 - 1.84
Urban (r)										

All analyses are weighted and control for survey design.

Contraception Use

Trend analysis of odds ratios from logistic regression of residence associated with contraceptive use are presented in Table 11. The findings show that in all the DHS years, women living in urban areas were more likely to use any method of contraception than women living in rural areas. For example in 1992 women in urban areas were almost twice (1.78) more likely to use any method of contraceptive than women in rural areas. However, the gap in the odds ratios is reducing over the years (from 1.78 in 1992 to 1.13 in 2014).

Table 11: Binary logistic regression odds ratios and confidence intervals for analysis of any method of contraceptive use and residence, Zambia 1992 - 2014

Background characteristic	Study Samples									
	1992 (n=7,060)		1996 (n=8,021)		2001/2 (n= 7,658)		2007 (n=7,146)		2013/14 (n=16,411)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Residence										
Urban	1.78	1.53 - 2.06	1.68	1.50 - 1.88	1.63	1.44 - 1.84	1.14	1.03 - 1.27	1.13	1.06 - 1.20
Rural (r)										

All analyses are weighted and control for survey design.

6. Discussion

This paper set out to examine fertility trends and implications in urban and rural Zambia. The paper has highlighted a number of factors that explain fertility differentials and implications for interventions. The findings have consistently showed that fertility has been declining in Zambia although the pace of decline has differed by residence. Age at marriage, education level of women and residence generally affect the level of fertility at micro level (van de Walle and Foster, 1990). The difference in fertility by urban-rural residence is widening in Zambia over the past twenty years. In 1992 TFR in urban areas was 5.8 children compared to 7.1 children in rural areas, a difference of 1.3 children. By 2014 the difference in the number of children between urban and rural areas increased to of 2.9 children.

The number of children ever born to all women of reproductive age is another measure of fertility. The study findings are consistent with other studies conducted in sub-Saharan Africa, indicating that women living in rural areas are more likely to have seven or more children ever born. Further the proportion of women who have never given birth has been consistently higher in urban areas than in rural areas for example in 2013-14 survey, the difference is 12 percentage point higher in urban than in rural areas.

Education is one of the most important determinants of a woman's fertility behaviour. Higher female education is universally associated with lower and delayed fertility (Brown, 2004). According to Becker (1992) women's education raises their labour participation which in turn raises their earnings, "and hence greater investment in market-oriented skills" which increases women's time value. Women living in urban areas are more likely to be educated than their counterparts living in rural areas. There are significant differences in fertility between women with different levels of education. The largest difference is between women with no education and those with higher education. It is likely that women with higher education spend more time in school and thus delay marriage and childbearing. Women with higher education are also more likely to use effective contraceptive methods to space or limit their births.

Generally, analysis of fertility preferences by type of residence shows that women living in rural areas are more likely to prefer having another child than women living in urban areas. It also argued that contraceptive use plays an important role in fertility regulation. Contraceptive use is recommended for women who want to limit their births, space their birth or to avoid bearing children. Study finding have revealed that women living in urban areas are more likely to use contraceptives that those living in rural areas.

A woman's age at first marriage and the age at which she has her first child determine the length of her reproduction period. Therefore an early age at first birth or marriage entails a longer period of reproduction which can leading to high levels of fertility. The findings indicate that women in rural areas are more likely to experience a longer child bearing period because of lower median ages at first marriage and first birth.

7. Conclusion

Fertility levels in Zambia have been predominantly higher in rural areas than in urban for the past two decades. High fertility levels translate to a high growth rate and to large populations putting a strain on the environment; causing underdevelopment and can lead to high poverty levels. High fertility levels are also associated with high maternal and child mortality.

Unless concrete family planning and reproductive health interventions are undertaken seriously Zambia's fertility levels especially in rural areas are likely to remain relatively high

for some time in the future. The increase is contraception use in rural areas has had less effect on declining fertility. There is therefore need to consider strengthening education and awareness campaigns on the importance of contraception use and small family size among women in rural Zambia.

Authors Contribution

MP: Conceptualised the study, manipulated the data and wrote the first draft of the paper in close collaboration with **ML**.

ML: Contributed to writing of the first draft and contributed greatly to the process of editing and developing the discussion of findings and conclusion.

MP: Contributed to the write up of the first draft and summarisation of the results into tables.

CB: Performed the data analysis in Stata and produced tables in Ms-Excel and also contributed in the proof reading of the final document. All authors contributed to the revision of the final text and approved the final manuscript.

Competing Interests:

The authors declares that they have no competing interests

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References

Becker, G.S. (1992) Fertility and the Economy, Journal of Population Economics, 5(3):185-201

Bongaarts, J. (2005) The Causes of Stalling Fertility Transition, Population Council working papers No. 204, Policy Research Division

Bryant, J (2007) Theories of Fertility Decline and the Evidence from Development Indicators, Population and Development Review, 33: 101-127

Caldwell, J.C and Caldwell, P. (1987) The Cultural Context of High Fertility in sub-Saharan Africa: Population and Development Review, 16 (3), 409-437

Caldwell, J.C (1982) Theory of Fertility Decline: Academic Press, London in Africa

Caldwell, J.C (1992) Fertility Decline in Africa: A New Type of Transition? Population and Development Review, 18 (2), 211-242

Coleman, D. (2007) The road to low Fertility: Ageing Horizons, 7 December 2007. Pp 7-15

Central Statistical Office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], and ICF International. 2014. *Zambia Demographic and Health Survey 2013-14*. Rockville, Maryland, USA: Central Statistical Office, Ministry of Health, and ICF International.

Central Statistical Office (CSO) [Zambia], Central Board of Health [Zambia], and ORC Marco. Zambia Demographic and Health Survey, 1996. Calverton, Maryland, USA: CSO, CBH, and ORC Macro; 1998.

Central Statistical Office (CSO) [Zambia] 2010 census of population and housing. Lusaka, Zambia; 2013.

Cleland, J and Wilson C. (1987) Demand Theories of the Fertility Transition: An iconoclastic view, Population Studies, 41(1), 5-30

Ministry of Finance and National Planning (MoFNP) [Zambia]. 2007. National Population Policy. Lusaka, Zambia: Ministry of Finance and National Planning.

Ministry of Finance and National Planning (MoFNP) [Zambia]. 2014. Revised Sixth National Development Plan 2013-2016. Lusaka, Zambia: Ministry of Finance.

Ministry of Health (MOH) [Zambia], Central Statistical Office [Zambia], and ORC Macro. Zambia HIV/AIDS Service Provision Assessment Survey 2005. Calverton, Maryland, USA: Ministry of Health; 2006.

Palamulemi, M. (2010) Fertility decline in Malawi: An Analysis of the proximate determinants. Journal of Social Development in Africa, vol 25, No1.

Pollak, R.A. and Watkins S.C (1993) Cultural and Economic Approaches to Fertility: Proper Marriage or Mesalliance? Population and Development Review 19(3): 467-496.

Tadesse F. (1998). Socioeconomic determinants of Fertility in Ethiopia, ESSP II.

Romaniuk A. 2010. Fertility in the Age of Demographic Maturity: An Essay. Canadian Studies in Population, Special Issue, December 2010:283-295.Westoff, Charles F. and Anne R. Cross. 2005. "The Stall in the Fertility Transition in Kenya." Paper presented at the IUSSP International Population Conference, Tours, France, July 2005.

Shapiro, David and Tesfayi Gebreselassie. 2010. "Falling and Stalling Fertility in Sub-Saharan Africa." Revised version of paper presented at the International Union for the Scientific Study of Population International Seminar on Human Fertility in Africa: Trends in the Last Decade and Prospects for Change, Cape Coast, Ghana, September 16-18, 2008.

UNFPA (2012) State of World Population 2012, Family Planning, Human Rights and Development, UNFPA: 978-1-61800-009-5

World Health Organization (2002) Reducing risks, promoting healthy life: WHO, Geneva