

# **Towards Fertility Regulation Measures to Reduce Fertility Levels in Sudan**

By

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## **Abstract**

The paper aims to suggest fertility regulation measures that are, reasonable, learned and consistent with Sudanese society, to affect negatively the current levels of the fertility. Sudan faces dilemma in balancing between population and economic growth. Sudan, has total fertility rate estimated at 5.2 , young population structure with high fertility potentiality and suffer from lack of programs and policies to change population variables. The paper adopts descriptive method, data collected from the censuses and surveys done in Sudan also literature review kept into consideration. Frequent comparisons ,analytical interpretation through time and deep investigations of cross sectional data ,has taken place. Bongaarts and Potter indices used to clarify impact of some approximate determinants on fertility, SPSS software applied for simple statistical analysis and graphical presentation.

The paper come up with such findings: 38% of women age group(20-24) married before age 18, high adolescent birth rate(87),long postpartum amenorrhea duration(14.4 month), high percentage unmeet need for contraception (26.6%), graduate women has lower fertility-earlier married-higher contraceptive use rate, than women with no education, weak relation between employed women fertility and work because the compatibility between work pattern and childbearing in Sudan, high infant mortality(52), high urban rural fertility differential as result of urban norms, the poorest quintile characterized by lower contraception rate and earlier childbearing than the case in richest quintile, and such stereotypes associated with reproductive behavior like son preference.

The paper recommend such fertility regulation measures: determine legal minimum age at marriage not less than 18, adopt UNCEF recommendation regarding breastfeeding behavior, develop efficient management approach to make contraceptives available- accessible and attainable to bridge unmeet need gab, encourage urban norms like individualism-nuclear family-child development process-healthy behavior, adopt women empowerment tactics and strategies through better education and higher women involvement in modern sector with fair payment and equal treatment for both sexes, realize millennium development goals regarding child mortality(reduce by two thirds under five mortality rate) and poverty(halve the population whose income less

than one dollar) and fight against such misconception associate with reproductive behavior like sex preference at birth.

## **1-introduction**

Sudan population was 10.4 millions in 1955, the figure raised to 39.1 millions in 2008 i.e increased by 275% during 53 years .After separation of South Sudan state in 2010 the population reduced to 33 million with population growth rate 2.8%, thus the population will doubled in year 2035(assuming constant growth rate). Total fertility rate decreased from 7.3 in 1955 to 5.2 in 2014 which is considered very high. Sudan characterized by fragile structure of population:30% urban, 43% under 15 years,5% above age 60 , 50% inactive economically, female unemployment rate estimated at 37%, life expectancy at birth 57 years, dependency ratio 85,has high level under- five children malnutrition(13%), high infant mortality rate(52),high maternal mortality rate (216),47% of the Population below the National Poverty line, Literacy rate for age 15+ equals 50% and households without safe drinking water Source estimated at 40%.(CBS,Sudan,2012)

Sudan economic growth rate estimated at 6% in 2016, mainly driven by agriculture and extractive industries. Sudan economy faces such challenges: meeting the country's Millennium Development Goals (MDGs) ,high unemployment, poverty and unequal distribution of wealth and the external-debt problem in the context of the civil war still remain. Inflation rate was 33% in the first quarter of the year 2017, while real GDP growth remained buoyant at 5.3%, supported by agriculture, minerals, services, oil-transit fees and foreign direct investment(African Development Bank). A comprehensive economic reform should take place to cope with population growth rate.

## **2-literature Review:**

Population policies are distinctive prerogative of man's intelligence and his ability to organize his life, not merely to survive but also to have better live (Omer,2007). Sudan National Population Council (NPC) was established in 1994 as part of a National Comprehensive Strategy (NCS ).The NPC prepared National Population Policy (NPP) document. The document was revised many times then approved by the council of ministers and obtained a formal declaration from the president Omer Elbasheer in year2002. This process is considered as political commitment towards population policies. The strategic objective of Sudan NPP is to improve the quality of life of Sudanese people and rational utilization of human resources to improve population

characteristics. One of sub-objectives of NPP is to manage to balance interaction between comprehensive development requirements and the population growth rate to enhance quality of life in Sudan (Sudan, NPP document, 2002).

### **3-Methodology**

The paper adopts descriptive method, data collected from five Sudan censuses and surveys done in Sudan such as Sudan Fertility Survey(SFS,1979), Sudan Health and Demographic Survey (SHDS,1989), Sudan Multiple Indicators Cluster Survey(SMICS,2000),Sudan Household and Health Survey(SHHS,2006),Sudan Household and Health Survey Second Round(SHHS2,2010) and Sudan multiple indicators cluster survey(SMICS,2014) which considered the main and the recent source of the data .also literature review kept into consideration. Regressive and frequent comparison ,analytical interpretation through time and deep investigations of cross sectional data ,has taken place. Bongaarts and Potter indices used to clarify impact of some approximate determinants on fertility. Statistical package for social science(SPSS) software used for simple analysis and graphical presentation.

### **4-Discussion**

#### **Female child marriage**

Early female marriage forces girls out of education and into a life of poor prospects, with increased risk of violence, abuse, ill health or early death(plan international) . Female child marriage increases her risk of domestic violence, and puts her at risk for early, frequent, and very high-risk pregnancies, thus child marriage effectively ends a girl's childhood, curtails her education, minimizes her economic opportunities.

Because the lack of documentation, no one knows for certain the level of female child marriage. According to the international centre for research on women(ICRW), one third of girls in the developing world are married before the age 18 and one in nine married before the age 15. African child brides are most likely found in rural areas and among the poorest segment of the population, girls in rural areas or poorest segment are twice as likely to become child brides as girls from urban areas or richest segment, (United Nation children fund, UNICEF).

Regarding the situation in Sudan, the Personal Status of Muslims Act of 1991 allows children - boys or girls - as young as 10 to marry (National Council for Child Welfare -NCCW).There is no adequate studies around the issue of child marriage, one can drive statistics from (1973,1983,1993, and 2008) censuses data and surveys. The main driver of child marriage in Sudan is to prevent girl from misbehavior or keeping her save from premarital sex (Khalid,2013). In 1993 census 2% of women in age 12-14 was currently married the percentage increased to

3.2% in 2008 census, approximately one fifth of women in age group 15-19 was currently married in 1993 census and it was one quarter in 2008 census, table(1)

**Table(1) percentage of married women by census and specific age group.**

source	Age group	
	12-14	15-19
1993 census	2	19.5
2008 census	3.2	24.4

*Source: principal report of censuses(1993 and 2008)*

Age one of the most important variables which determine individual participants in the fertility process. Similarly age structure is one the major determinants of society's fertility patterns. The age of the potential parent plays an important role in fertility outcomes because fertility is, in most senses, a cumulative process closely related to the lifecycle of each parent and of the family unit. Thus, age is closely associated with marriage, divorce or widowhood, menarche, the frequency of intercourse, the probability of conception and with menopause. Singulate mean age at first marriage(SMAM) for female in Sudan increased from 18.7 in 1973 to 22.7 in 1993. According to MICS,2014 , about 12% of women in age group15-19 married before age 15, 38% of women in age group 20-49 married before age 18. The paper assumes that early marriage in Sudan associates with earlier and higher fertility. In Sudan, percentage of women in age group (15-19) have begun childbearing was 15.1% , about 21.5% of women in age group 20-24 have birth before age 18, adolescent births (age specific fertility rate for age group (15-19) was 87 births per thousand (MICS,2014). If we adopt any policy to eliminate adolescent births ,TFR (5.2) will decrease by 8.4% table(11).

### **Breastfeeding and fertility**

UNICEF and WHO recommend that infants be breastfed within one hour of birth, breastfed exclusively for the first six months of life and continue to be breastfed up to 2 years of age and beyond.

According to SMICS 2014 findings: Percentage of women with a live birth in the last 2 years who breastfed their last live-born child at any time was 95.6%, Percentage of infants under 6 months of age who are exclusively breastfed estimated 55.4%,Percentage of infants under 6 months of age who received breast milk as the predominant source of nourishment during the previous day was 80.8%, Percentage of children age 12-15 months who received breast milk during the previous day was 89.4%, Percentage of children age 20-23 months who received

breast milk during the previous day was 48.8% and the Median duration of breastfeeding of children age 0-35 was 21.2%

Direct measures of the postpartum amenorrhea interval are breastfeeding and postpartum amenorrhea. Long interval of infecundability exerts a powerful fertility inhibiting effect because large proportion of the women's reproductive years are spent in amenorrheic state. The temporary absence of menstruation after birth called lactation amenorrhea because breastfeeding is the principal determinant of amenorrhea, the length of lactional amenorrhea is determined primary by the duration, intensity and pattern of breastfeeding . Without breastfeeding the average a menorrhea interval is short usually 1.5 to 2 months (Bongaarts and Potter **1983**).

Regarding Sudan the paper suggests that the duration of postpartum infecundability equals the duration of amenorrhea because the postpartum abstinence is short according to Islam teaches. To estimate mean duration of postpartum a menorrhea, the paper focuses on breastfeeding interval as approximation for a menorrhea and applies Bongaarts and Potter function as follows:

$$A = 1.753 e^{.1396 \times B - .001872 \times B^2}$$

Where:

A: mean duration of postpartum a menorrhea in months

B: mean duration of breastfeeding

During the period (1999-2014) the mean duration of breastfeeding not changed and estimated at 21 months. Based on Bongaarts and Potter equation mentioned previously the paper estimates amenorrhea duration to be around 14.4 months in Sudan. Mahfouz(2009)calculated Bongaart indexes namely infecundability index (Ci) on basis of data collected from Sudan fertility survey(1979) and Safe motherhood survey(SMS,1999) in the two surveys, the index around ( .64)-no change- so we not expect any change in the index during the period(1999-2014) because average of breast feeding duration and mean duration of a menorrhea not changed during the period (1999-2014) .There for the trick hidden here, women in Sudan getting more: urbanized, employed and

educated which may lead to lower breastfeeding duration and the index (Ci) (postpartum a menorrhoea) has lower impact on TFR, assuming that change in breastfeeding not compromised by change in contraceptive use.

### **Unmet need**

Contraception is central to the whole question of fertility control. By definition, some forms of contraception or abortion must be used if married couples wish to reduce their fertility. Unmet need for contraception refers to fecund women who are not using any method of contraception, but who wish to postpone the next birth or who wish to stop childbearing altogether.

In Sudan percentage of women age 15-49 years currently married who are using (or whose partner is using) a (modern or traditional) contraceptive method was 12.2%(Contraceptive Prevalence Rate). Percentage of women age 15-49 years who are currently married, fecund, want to space their births or limit the number of children they have, and not currently using contraception is 26.6% (Unmet Need) (SMICS,2014).Contraceptive prevalence rate increased from 7% in 2000 to 12.2% in 2014, unmet need rate increased from 5.7% in 2006 to 26.6% in 2014 (SMICS,2000,SHHS,2006 and SMICS2014).On basis of MICS 2014 data, Bongaarts and Potter contraceptive index (Cc) calculated and it was 89 and lower 5% than the index calculated in 1999 (SMS) by Mahfouz (2009), however its impact on TFR weak. assuming that we meet all unmet need(26.6%), the index will decrease to( .69). Thus, it will have powerful impact on TFR and fertility transition will take place.

### **Female education and fertility**

Sudan education policies encourage female education, as result gender parity index on average not differ much from one which reflects equal opportunities for both sexes(Sudan in Figures,2012). According to the table (2), about 55% of female in Sudan illiterates, school readiness for female 73%, school attendance for female, 76% and 29% for primary and secondary respectively.

**Table(2)Education Indicators by sex (percentage)**

<b>indicator</b>	<b>male</b>	<b>female</b>
School readiness	66	73
Net intake rate in primary school	36	38
Primary school completion	85	74
Transition rate to secondary	90	91
Attendance to early childhood education	22	23
Primary school attendance	77	76

Secondary school attendance	27	29
Children reaching last grade of primary school	80	81
Literacy rate 6+	58	45

Source: SMICS-2014

The relation between education and fertility debatable, however, data in Sudan reflects that a women with no schooling has total fertility higher two times than those with higher education, adolescent birth rate level was 169 for women with no schooling then decrease inversely with education level till reaches 8 for women with higher education table(3).

**Table(3) Adolescent birth rate and total fertility rate by education level**

School level	Adolescent birth rate	TFR
No schooling	169	6.4
primary	112	5.4
Secondary	34	4.2
higher	8	3.2
total	87	5.2

Source: SMICS 2014

The paper assumes that education affects fertility through age at marriage and higher level of contraception. According to previous studies changing nuptiality pattern affects fertility in Sudan, such studies calculated Bongaarts and Potter marriage index which decreased from (.8),(SFS,1979) to (.58) in (SMS1999) Mahfouz(2009).Discussion of how nuptiality affects fertility beyond the paper consideration but it tries to reflect impact of female age at first marriage and level of female education attainment on fertility.

Singulate mean age at first marriage(SMAM) in Sudan increased from 21.7 (SFS-1979) to 24.2(SMS-1999) . Change in SMAM can be attributed to such factors, changing values, economic hardship....ect but paper focuses on the relation between education attainment level and age at marriage. A woman with no education marries ten years earlier than a woman with at least senior secondary education table(4).

**Table(4) -Median age at first marriage women 15-49 by education level**

Education level	median age at first marriage
No education	16.2
Primary incomplete	17.7
Primary compelte	20.1
Junior secondary	22.9
Senior	26.4

Source: Sudan demographic health survey-1989

Regarding statistics of child marriage and education level, percentage of women age group(15-49) with no education and percentage with secondary education who married before their fifteenth birthday 19.7 % and 3.7% respectively. percentage of women in age group (20-49) with no education and percentage with secondary education who married before their eighteenth birth day 54.3 % and 20.8% respectively. Thus early marriage incidence related negatively to the level of education attainment table(5).

**Table(5): percentage of women age(15-49) who married before age 15 and percentage of women age (20-49) who married before age 18,by the level of education attainment**

Education level	Women age group	
	(15-49) married before 15	(20-49) married before 18
No schooling	19.7	54.3
Primary	13.9	43.5
Secondary	3.7	20.8
higher	.2	3.1
sudan	11.9	38

*Source:SMICS,2014*

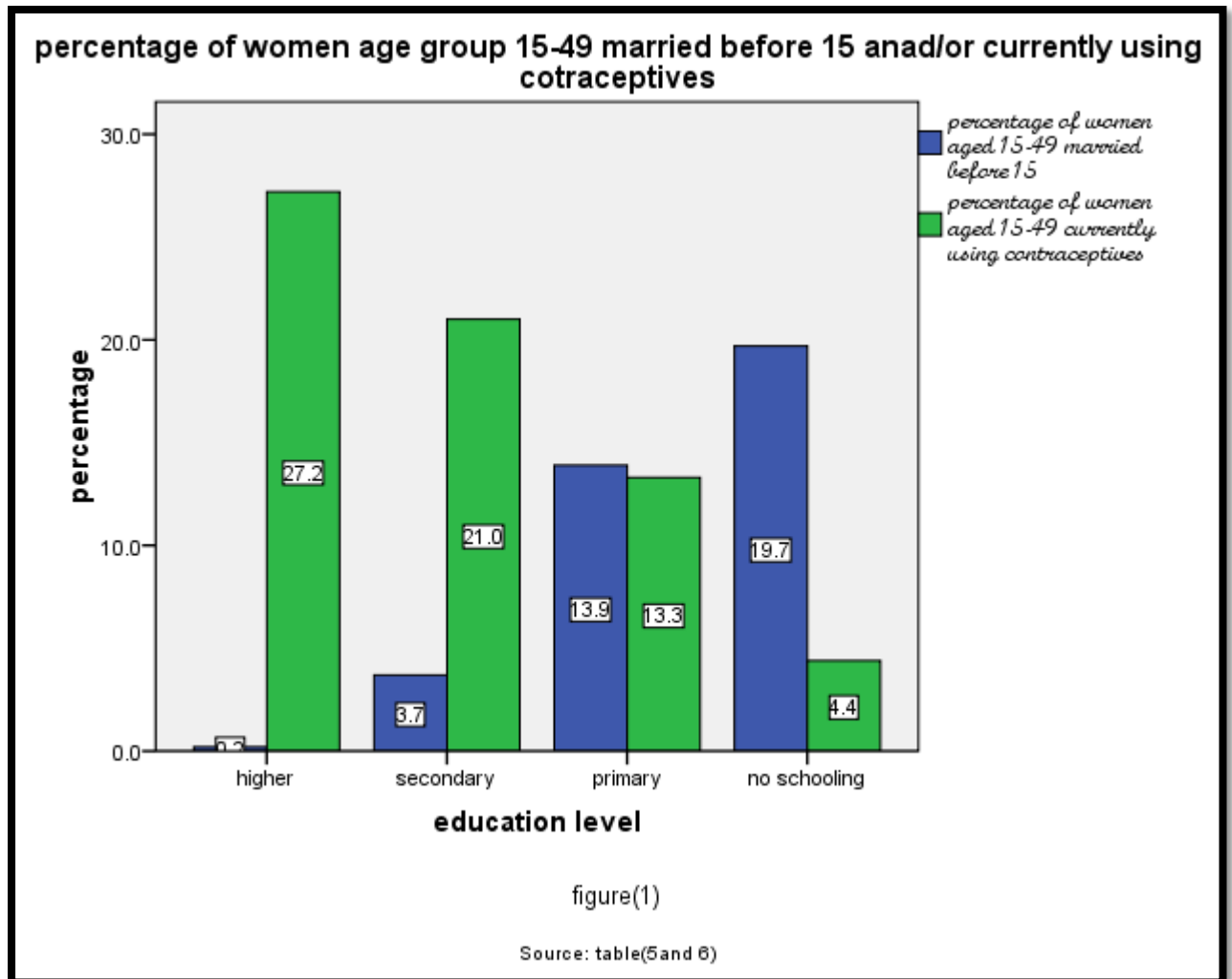
The proportion of women using contraception increases dramatically from 4.4 percent among women with no schooling to 13.3 percent among those with primary education and then rises to 21 and 27.6 percent for women with secondary and higher education respectively table(6). **As shown in figure (1) there is inverse relation between education attainment level and early marriage whereas positive relation between education attainment level and contraceptive prevalence rate.**

***Table(6) Percent of women currently using contraceptives by education level***

<i>Education level</i>	<i>percentage</i>
<i>No education</i>	<i>4.4</i>
<i>primary</i>	<i>13.3</i>
<i>secondary</i>	<i>21</i>
<i>higher</i>	<i>27.6</i>
<i>Sudan</i>	<i>12.2</i>

*Source: SMICS,2014*





### **Women employment and fertility**

The main findings of Sudan labor force survey 2011 stated as follows: "Among working age population (15+), 50% are in labor force and the remaining half of the population is not economically active. Amongst the economically inactive, 50% are students, remaining homemakers, old aged, income recipients etc. ....7.30 million employed persons aged 15 years and above, comprising of 5.6 million males and 1.7 million females. The Employment to Population Ratio (EPR) is 41.1% for aged 15 and above. There is a significant gender gap (61.4% for males, 19.6% for females). The EPR for youth (15-24 years of age) was 20.4% and adult (25+) was 52%. There was significant gender gap in these two ratios, almost three times. Females labor force participation rates are substantially lower than those of males (e.g., on average three out of ten females participate in the labor force, compared to seven out of ten males). Women unemployment is significantly higher, up to three times as high compared with males. These indicate sharp inequality in labor market behavior which reflects the cultural factors.....". table(7)

**Table(7):Some selected labor force indicators -2011**

indicator	percentage		
	female	male	both
Employment ratio to population	19.6	61.1	41.1
Economically inactive population	72.6	32.1	52
Labor force participation rate	23.9	70.8	50.5
Labor force participation rate(Urban)	26.1	66.8	46.8
Labor force participation rate (rural)	30.7	73.3	52.8
Unemployment rate 15+	37	11.4	18.5
Unemployment rate 15+( urban)	43.7	14.9	22.8
Unemployment rate 15+( rural)	29.9	11.8	15.3
Unemployment rate 15+ for youth(15-24)	57.9	22.2	33.8
Unemployment rate 15+ for youth(15-29)	51.1	21.9	31.6

*Source: Sudan labor force survey 2011*

In this section the paper focuses on female employed in modern sector and hypothesizes that female employment affects fertility negatively as result of: a qualified employed women expected to marry later, An employed women with paid occupation likely to participate in decision making regarding family formation and family size and the incompatibility between work and childbearing may enforce a women to space births if not lessen her fertility. Globally it is difficult to say that women employment affects negatively fertility, the surrounding environment should be considered.

Regarding Sudan we have no access for recent data concerning employed women fertility and this gab should be bridged. According to SFS-1979 we cannot depict clear trend between work pattern and life time fertility table(8), The weak relation may be attributed to compatibility between

work and childbearing in Sudan. Sudan act of personnel gives such prestige for maternity such as full year holiday during reproductive span, two month holiday for any birth, shorter daily working hours for breastfeeding mother, permanent financial support for every additional birth and flexibility for spouses to work in similar geographical area. However, Saghyroum(1985) states that *" In terms of employment, women who report no work experience have the highest fertility, those who are self-employed or are family workers have an intermediate level of fertility, while those women who work for others have the lowest level of fertility."*

**Table(8) Mean number of children by the pattern of work**

Before and after marriage	4
After marriage	4.5
Before marriage only	3.9
Never worked	4.3

*Source:SFS,1979-principal report*

### Child mortality and fertility

childhood mortality is interrelated with fertility. Reductions in child mortality used to be regarded as a key trigger for the fertility transition (it reduces the ‘ demand’ for children by improving the chances of survival to adulthood. The latest estimates of infant mortality from the UN Interagency Group for Child Mortality Estimation (UN IGME) show that Sub-Saharan Africa is the region with the highest level of child mortality, with an infant mortality rate of 64 deaths per 1,000 live births in 2012 .Nearly half of all infant deaths round the world occur in Sub-Sah aran Africa. There were 2.1 million deaths in the region in 2012.

In this paper childhood mortality rates are expressed by conventional age categories and are defined as follows:

- Neonatal mortality (NN): probability of dying within the first month of life
- Post-neonatal mortality (PNN): difference between infant and neonatal mortality rates
- Infant mortality (1q0): probability of dying between birth and the first

birthday.

- Child mortality (4q1): probability of dying between the first and the fifth birthdays
- Under-five mortality (5q0): the probability of dying between birth and the fifth birthday

According to Sudan MICS 2014 data, table(8), from each 1000 live births 32.6 births die before completing their first month (neonatal mortality (NN)), 52 births die before their first birthday (infant mortality rate (1q0)) and 68.4 die before their fifth birthday (under-five mortality rate (5q0)). Thus, 63% of infant deaths occur in the first month and 76% of under five deaths take place in the first year so infant and children under high risk of mortality in earlier periods.

**Table(8): Childhood mortality rates**

mortality	Neonatal mortality rate	Post neonatal mortality	Infant mortality rate	Child mortality rate	Under-five mortality rate
rate	32.6	19.4	52	17.3	68.4

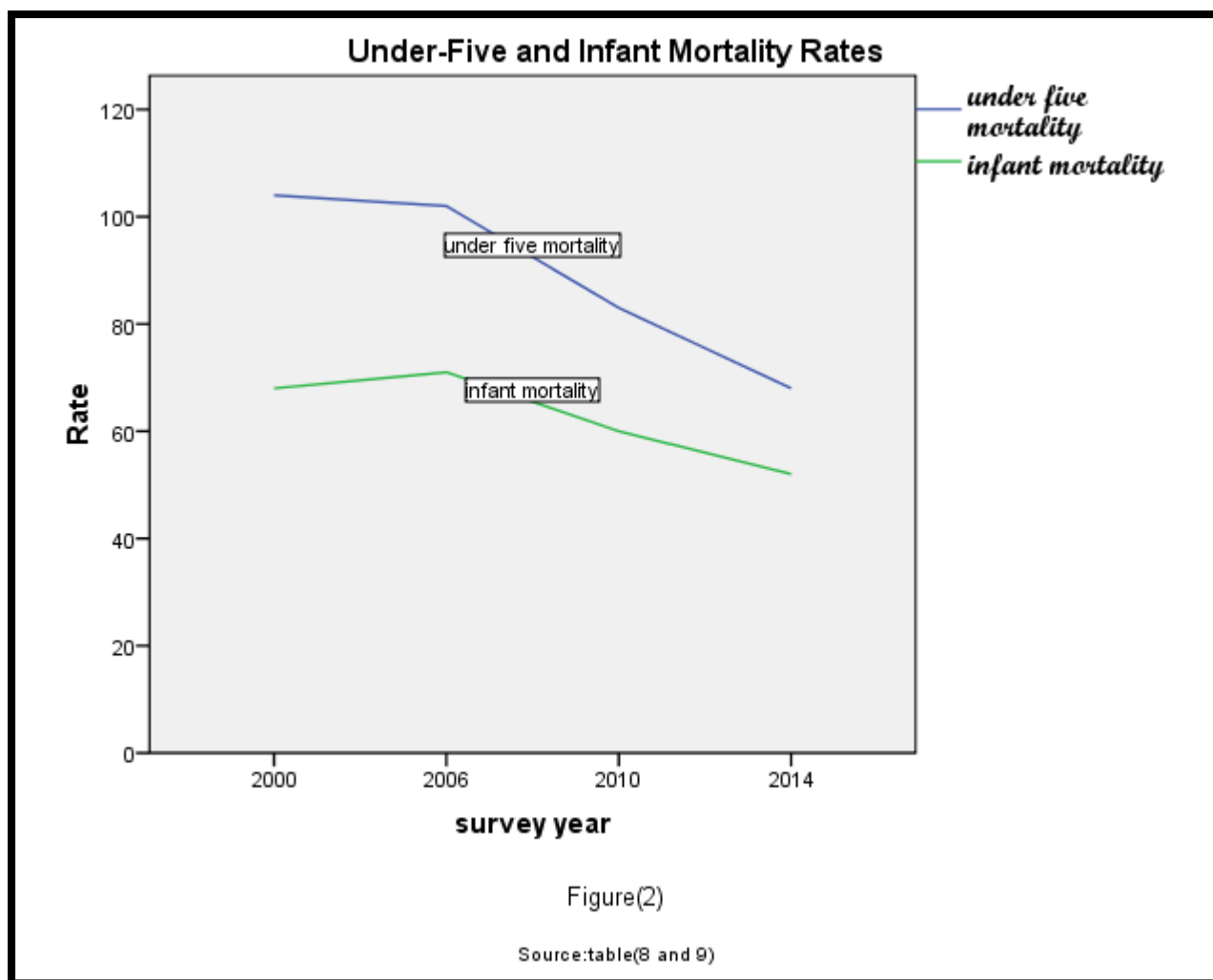
*Source: SMICS, 2014 principal report*

During the period (2000-2014), infant mortality rate decreased by 19% whereas under five mortality rate decreased by 35% , however, the level of both rates considered high table(9)

**Table(9): The Trend in child mortality(2000-2014)**

source	SMICS2000	SHHS2006	SHHH2 2010	SMICS2014
Under five mortality rate	104	102	83	68
Infant mortality rate	68	71	60	52

We have no access for recent studies reflecting the relation between fertility and child mortality, (Elamin 2010) found that Lower fertility is the most important factor to discriminate between two groups of mothers, one group experiencing child loss and another group of no child loss. Khalifa and Dalaal (1995) stated that all women experienced shorter birth intervals after the death of their first child compared to women with surviving birth. To compare IMR to under-five we should keep in our mind that IMR is the earlier part of under-five mortality, however, the two rates decrease during the period (2006-2014) and the difference sharpen relatively as indicated in figure(2).



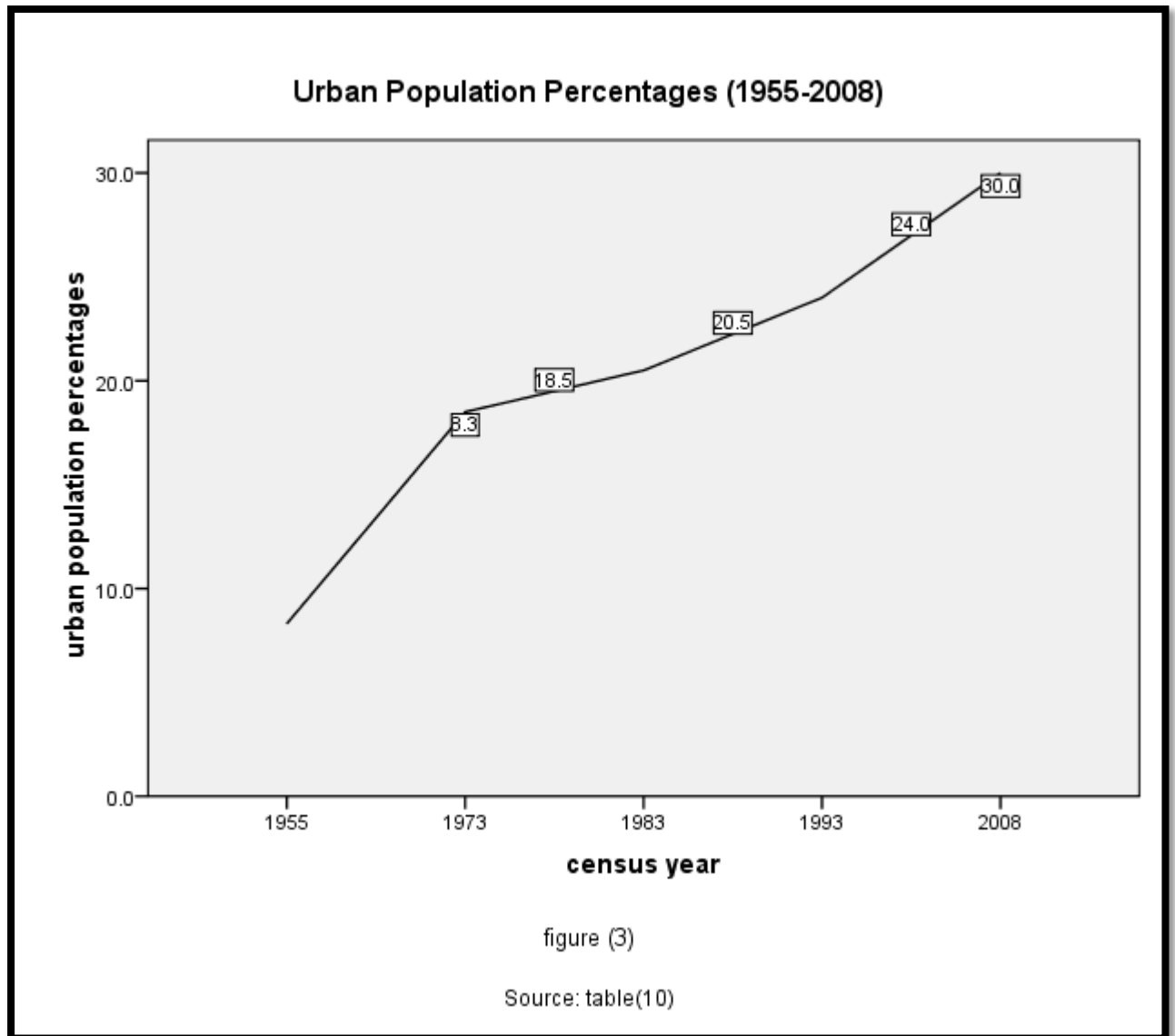
### Urban norms

It is known in demographic theories that urban population characterized by lower fertility than rural population ,fertility transition begins in urban before rural and Sudan fertility has no exception. Urban population percentage in Sudan dramatically increased from 8% in 1955 to 30% in 2008(275% within 53 years)table(10),figure(3).

**Table(10):Urban Population Percentage during period (1955-2008)**

census	1955	1973	1983	1993	2008
percentage	8.3	18.5	20.5	24	30

Source: CBS-Sudan



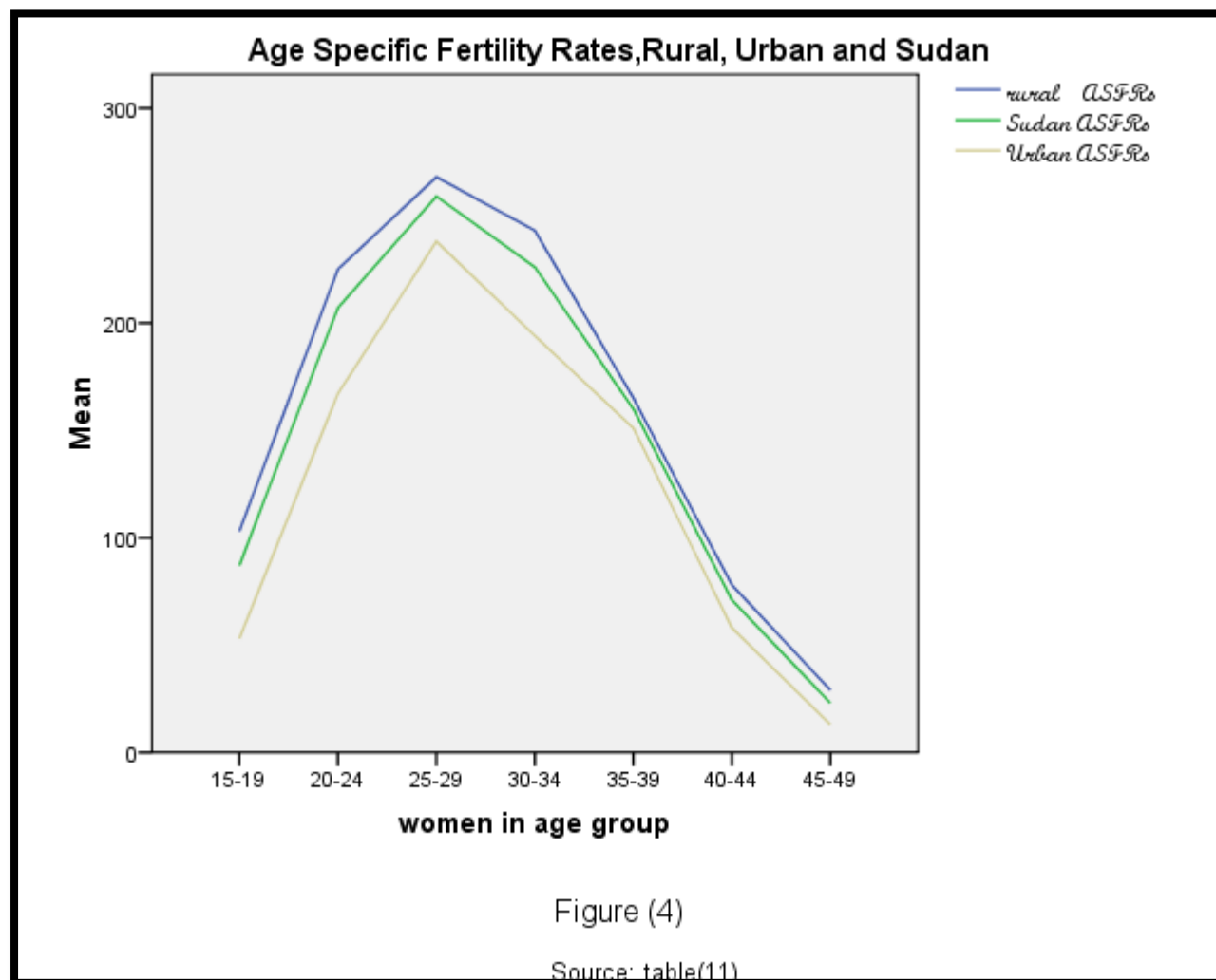
Regarding rural urban fertility differential ,TFR in rural is higher by 1.2 births than urban, adolescent fertility in rural areas higher twofold than urban table(11). As reflected in figure(1) elder women age group(40-49) participate by 10% in rural TFR and 7% in urban TFR. younger women(15-24) participate by 25% of TFR in urban and 29% of TFR in rural. The intermediate women group(25-39) participate by 66% and 60% in TFR of urban and rural respectively. The performance of women in age group(25-39) is higher in urban than rural (relatively) table(12).

**Table(11):Age specific fertility rate by residence**

Age group	Sudan	urban	rural
<b>15-19</b>	<b>87</b>	<b>53</b>	<b>103</b>
20-24	207	167	225
25-29	259	238	268

30-34	226	194	243
35-39	160	151	165
40-44	71	58	78
45-49	23	13	29
TFR	5.2	4.4	5.6

Source: SMICS, 2014



**Table(12): Participation percentage in TFR by age group and area**

Area	Age Group					
	15-24	25-39	40-49	missed	TFR	total
urban	25%	66%	7%	2%	4.4	100%
rural	29%	60%	10%	1%	5.6	100%

Source: calculated from table(11)

Here we attribute partially rural urban differential in fertility to norms and values associated with urban reproductive behavior : urban population

have better access for media through radio and T.V, poverty prevalence in urban area lower than rural, child and infant mortality predominant in rural than urban, urban characterized by lower malnutrition than the situation in rural, the two areas has similar breastfeeding practices, children vaccination rate higher in urban for both child and mother, healthy behavior regarding water and sanitation better in urban, urban reflects relatively late childbearing age, urban has higher contraception level, urban women have better neonatal and post-natal care for both mothers and babies, urban people have higher education rates both for males and females, urban has lower child labor , marriage occurs earlier in rural than urban, the rate of women in polygynous union lower in urban than rural, age difference between spouses lower in urban, urban women relatively aware of domestic violence and sexually transmitted disease and urban households have better food than rural (appendix )

### **Poverty and fertility**

Reduction by half the population whose income less than one dollar is among millennium development goals(MDGs).

According to National Baseline Household Survey (NBHS)-2009 ,Overall, 46.5 percent of the population in Sudan is below the poverty line(poverty line defined as persons with the value of monthly total consumption below 114 Sudanese pounds or 8 US dollars in 2009),poverty gab ratio was16.2 and dependency ratio 86 per 100.

Demographic theories consider that poor families associated with high fertility. The paper has no access for data regarding poor fertility in Sudan but uses proxy variables namely wealth quintile, age at child bearing and contraception level in poor society. One third of women age 20-24 in poorest quintile had live birth before age 18 double than women in richest quintile. Only 3.8% of women in poorest quintile currently using contraceptives whereas the percentages in richest quintile 26% table(13).Thus women in poorest quintile characterized by earlier childbearing and lower contraceptive prevalence than women in richest quintile figure(5).

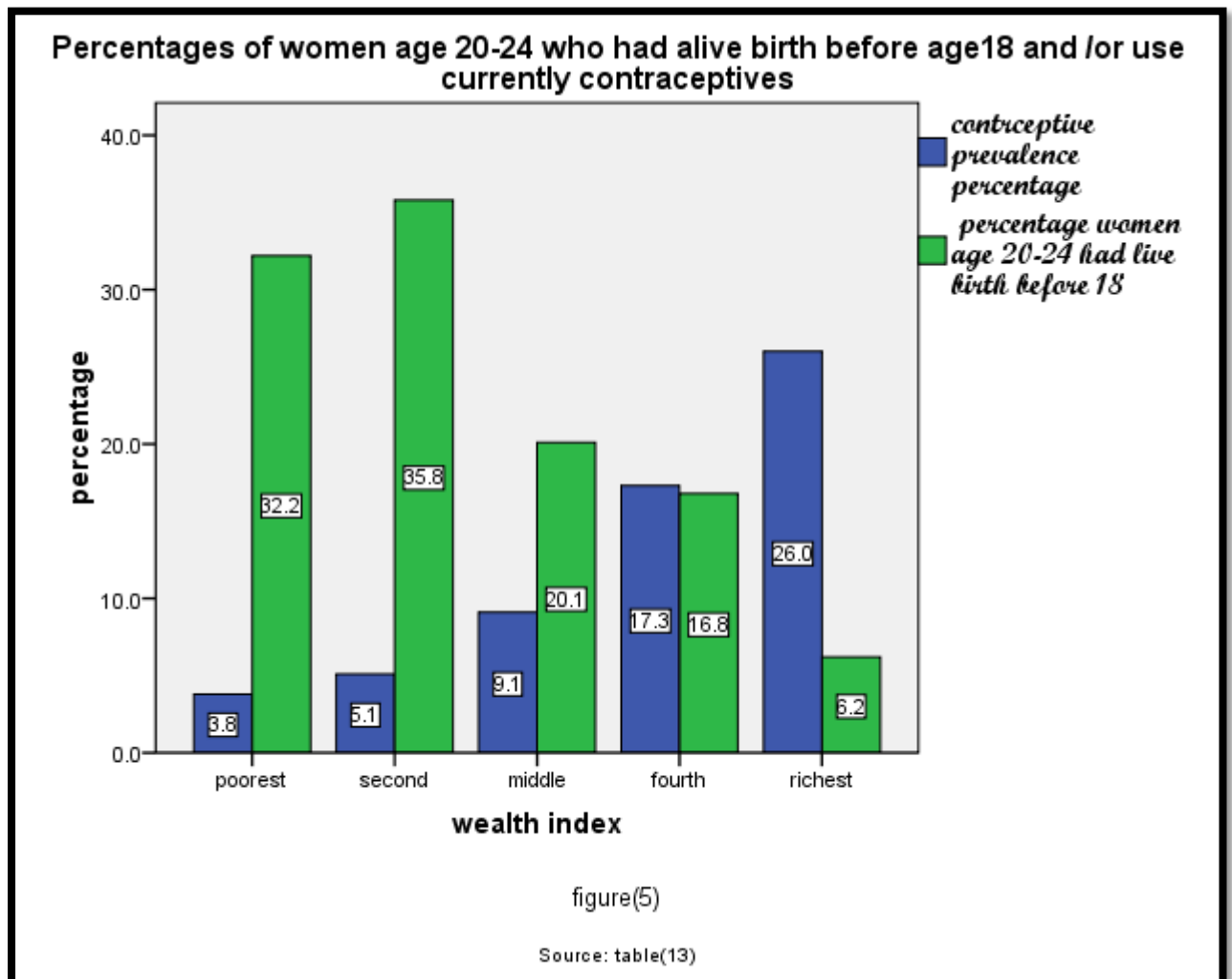
**Table(13): Percentage of women age 20-24 had alive birth before age 18 and contraceptive prevalence rate by wealth quintile**

Wealth quintile	Contraception prevalence	Women age 20-24had alive birth before 18
poorest	3.8	32.2
second	5.1	35.8
middle	9.1	20.1
fourth	17.3	16.8
richest	26	6.2



Sudan	12.2	21.1
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Source: SMICS,2014



### Child Labor

International Labor Organization (ILO) defines the term child labor as "work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. Sudan labor act 1997 states that employment of children below 16 years prohibited but act allows for exception(Sudan National Council for Child Welfare ,(SNCCW) ).According to SMICS-2014 data: 21% of children age(11-15),39.1% of children age(12-14) and 41.1% of children(15-17) involved in economic activities in Sudan, regardless harmful activities or not. The phenomenon reflected clearly in rural area table(14).The direct economic costs and benefits of children are important consideration for parents in Sudan. General financial and material assistance and expected help in old age are among the most frequent cited advantages of children (SMS, 1999). We assume that prohibition of child labor expedites the demographic transition process and shifts child from assets to cost.

**Table(14):percentage of children involved in economic activity by age group and place of residence**

Residence	Child age group		
	5-11	12-14	15-17
Sudan	21	39.1	41.1
urban	11	23.5	21.8
rural	24	46.2	49.5

*Source: MICS-2014*

**Son preference :**

The relation between gender preference and fertility debatable and Chinese experience with low fertility well known. In Sudan we have no documented data regarding sex preference but it is obvious that parents prefer sons because they considered them as capital asset, qualification for social prestige and source of power. The paper suggests deep studies in Sudan to answer the questions:

If gender current composition of specific family affects parents desired family size?

If the sex of a baby affects birth interval?

If the sex of a birth affect breastfeeding duration?

Is there any relation between infant sex and mortality risk of specified sex?

Do parents have trend to not have same sex children?

Does a mother without male child under high risk to be divorced or be in polygynous status?

As observer and a member in Sudanese society I can answer yes.

**5-Findings:**

The paper come up with such findings: 38% of women age group(20-24) married before age 18, high adolescent birth rate(87),long postpartum amenorrhea duration(14.4 month), high percentage unmeet need for contraception (26.6%), graduate women has lower fertility-earlier married-higher contraceptive use rate than women with no education, weak relation between employed women fertility and work pattern because the compatibility between work pattern and childbearing in Sudan, high infant mortality(52), high urban rural fertility differential as result of urban norms, the poorest quintile characterized by lower contraception rate and earlier childbearing than the case in richest quintile, and such stereotypes associated with reproductive behavior like son preference.

**6-Recommendations:**

The paper recommend such fertility regulation measures: determine legal minimum age at marriage not less than 18, adopt UNCEF recommendation regarding breastfeeding behavior, develop efficient

management approach to make contraceptives available- accessible and attainable, encourage urban norms like individualism-nuclear family-child development process-healthy behavior, adopt women empowerment tactics and strategies through better education and higher women involvement in modern sector with fair payment and equal treatment both sexes without exception , realize millennium development goals regarding child mortality(reduce by two thirds under five mortality rate) and poverty (halve the population whose income less than one dollar) and fight against such misconception associate with reproductive behavior like sex preference at birth.

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## Appendix

### Some selected social and demographic indicators in Sudan by residence

indicator	residence		
	Sudan	urban	rural
Percentage of households own radio	35.5	41.5	32.6
Percentage household own T.V	39.6	71.1	26.3
Percentage of households in poorest quintile	20	2.8	27.7
Percentage of households in richest quintile	20	42	10.2
Infant mortality rate	52	45.1	54.5
Under-five mortality rate	68.4	56.5	72.8
Malnutrition rate	33	23.3	37
Percentage ever breastfed	95.6	96	95
Percentage exclusively breastfeeding	55.6	53	56
Continued breastfeeding at 2 years	48.8	46.7	49.8
Median duration of breastfeeding (months)	21.2	21	21.2
Percentage of children age 12-23 vaccinated BCG	85.3	92	82.8
Percentage of women protected against tetanus	58.2	65.9	55.4
Percentage of households using solid fuel	58.2	40.7	66
Percentage of households with improved source of drinking water	68	78.3	63.5
Percentage of households with open defecation	29.2	5	40.4
Adolescent birth rate	87	53	103
Total fertility rate	5.2	4.4	5.6
Percentage of women(15-19) have begun childbearing	15.1	8.7	18.2
Percentage of women(20-24) have had live birth before 18	21.5	12.3	26
Percentage have live birth before 15	5.2	3.6	6
Percentage have live birth before 18	23	18	25.5
Percentage of women currently using any method	12.5	20	9
Percentage unmeet need for contraception	26.2	24.5	27.5
Percentage of women with no antenatal care	19.9	8.9	23.9

Percentage of children age 36-59 month attending early childhood education.	22.3	44.6	13.9
Percentage literate	59.8	79.8	50
Net intake rate (grade one-primary)	36	56.6	29.5
Net attendance ratio for primary school	76.4	91.4	70.6
Net attendance ratio for secondary school	28.4	42.2	22.2
Gender parity index for primary school	.98	1	.96
Gender parity index for secondary	1.07	1.12	1.02
Percentage of children age (5-11) involved in economic activity	21	11	24.9
Percentage of women married before age 15	11.9	8	13.74
Percentage of women in age group(20-49) married before 18	38	29.1	42.3
Percentage of women in polygynous marriage union	21.7	16.9	23.6
Pomenercentage of currently married women whose husband 10 years older(15-19)	7.9	4.9	9.4
Percentage of women who have any form of FGM	86.6	85.5	87.2
Percentage of women who believe that a husband justified for beating his wife	34	24	38.4
Percentage of women who have heard of AIDS	74.8	90.5	67.1
Percentage of household with poor food consumption relatively	5.4	2.4	6.7