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Fertility, Family Size Preference and Contraceptive Use in Sub-Saharan Africa: 1990-2014

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Abstract

In view of an unusual transition in sub-Saharan Africa (SSA) fertility, periodic re-appraisal is necessary. Using an ecological design, data from Demographic and Health Surveys between 1990 and 2014 were analysed to investigate trends in completed family size (CFS), total fertility rate (TFR), family size preference (FSP), and contraceptive prevalence rate (CPR). The correlates of changes in fertility levels, FSP and CPR were explored. Results showed that CFS declined and was lowest in Southern and Western Africa. However, average CFS for Central African countries appeared virtually the same over the period. Changes in TFR and FSP followed patterns similar to CFS. Western and Central region had very slow increase in CPR with many below 20% as at 2014. Eastern and Southern Africa had faster increase in CPR with some countries achieving almost 60%. Regression results showed that contraceptive prevalence (β= -1.96, p=0.027) and median age at first marriage (β= -0.23, p=0.06) were negatively related to TFR while employment (β= -21.7, p<0.001) was negatively related to FSP. In summary, fertility levels and family size preference declined while contraceptive use improved particularly in Southern and the Eastern Africa. Increased female labour force participation is another potential route to fertility decline in SSA. *(Afr J Reprod Health 2018; 22[4]: 44-53).*

Keywords: Fertility levels, Family Size Preference, Contraceptive use, Fertility behavior, sub-Saharan Africa

Résumé

Compte tenu de la transition inhabituelle de la fécondité en Afrique subsaharienne (ASS), une réévaluation périodique est nécessaire. À l'aide d'un modèle écologique, les données des enquêtes démographiques et de santé menées entre 1990 et 2014 ont été analysées pour étudier les tendances de la taille de la famille achevée (TFA), du taux de fécondité total (TFT), du facteur de préférence de la taille de la famille (PTF) et du taux de prévalence de la contraception (TPC). Les corrélats des variations des niveaux de fécondité, de la PTF et de la TPC ont été explorés. Les résultats ont montré que le TFA avait diminué et était le plus faible en Afrique australe et occidentale. Cependant, la TFA moyenne des pays d'Afrique centrale a semblé pratiquement identique au cours de la période. Les modifications du TFT et de la TFA ont suivi des tendances similaires à celles du PTF. Les régions de l'Ouest et du Centre ont connu une très lente augmentation de la TPC, beaucoup marquant moins de 20% en 2014. L'Afrique de l'Est et du Sud ont connu une augmentation plus rapide de la TPC, certains pays atteignant près de 60%. Les résultats de la régression ont montré que la prévalence contraceptive (β = -1,96, p = 0,027) et l'âge médian au premier mariage (β = -0,23, p = 0,06) étaient négativement corrélés au TFT alors que l'emploi (β = -21,7, p <0,001) était en relation négative avec le PTF. En résumé, les niveaux de fécondité et la préférence pour la taille de la famille ont diminué alors que l'utilisation des contraceptifs s'est améliorée, en particulier en Afrique australe et orientale. L'augmentation de la participation des femmes à la population active est une autre voie potentielle vers le déclin de la fécondité en ASS. *(Afr J Reprod Health 2018; 22[4]:44-53).*

Mots-clés: Niveaux de fécondité, préférence de la taille de la famille, utilisation des contraceptifs, comportement à la fécondité, Afrique subsaharienne

Introduction

With an estimated population of 949 million in 2015 and the highest birth rates in the world, sub-Saharan Africa is expected to be a major contributor to world population growth[1]. The high level of fertility and consequent high population growth in developing countries particularly sub-Saharan Africa has

remained a concern among population experts[2]. Worthy of note is the Programme of Action adopted at the Cairo 1994 conference which integrated feminist concerns into global drive for addressing population and health issues[3]. One significant issue that featured prominently at several development fora is the need to promote modern family planning, not only as a motivation for fertility reduction in developing countries, but also to enhance economic well-being of individuals and families[4].

At various times, previous studies have shown that family planning can impact on fertility level[5,6]. The empirical evidences from several rounds of Demographic Health Surveys (DHS) data have shown that SSA region has witnessed expansion in family planning or other programmes aimed at controlling population growth[7,8]. Given the existence of initiatives on contraceptives programming in many SSA countries, it is important to review fertility patterns periodically. More especially, as the global community transit to a new era of sustainable development goals, it is pertinent to review trends in fertility levels and its determinants to provide a basis for assessing further progress or otherwise. Therefore, the main thrust of this paper was to examine the trends in fertility, family size preference and family planning in SSA from 1990-2014. We also compared fertility intention to actual fertility performance to assess the dynamics in the attainment of fertility goals.

Review of trends and drivers of fertility levels in sub-Saharan Africa

Although the whole region has generally experienced decline in fertility levels between 1990 and 2000; wide variations still exist across countries. Countries in Southern Africa are taking the lead in the transition, followed by the Eastern region, while many countries in the Central and Western regions are lagging behind [9]. Analysis of census data at two time points also revealed that South Africa fertility is close to replacement level while there was a stall at higher levels in Senegal, Rwanda and Kenya[10].
Although there had been arguments about the factors responsible for persistently high fertility levels in SSA, studies have shown that, apart from the low level of economic development and cultural factors that are peculiar to the region, sustained high fertility levels in the region have resulted mainly from early marriage, low contraceptive use; and high family size preference[9,11-13]. Other emerging contributors are

non-marital births and teenage pregnancies[14]. Early and universal marriage in most countries in the region has resulted in many children being born to younger women and exposure of women to a long period of reproduction[15].

Evidence from research on trends in contraceptive use have shown that, unlike the other developing regions of the world, family planning (FP) practice in some SSA countries have been for birth spacing[16,17]. Although there are arguments on the demand and supply of FP services in the region, it is also apparent that countries that experienced sharp decline in fertility levels also experienced increased contraceptive uptake at some points before a declining trend in fertility[18]. This explains the obvious declines first noticed in the Southern Africa region followed by few countries in the eastern region[19].

Fertility intention is one of the several predictors of demand for and adoption of modern contraceptive methods[20]. This is directly related to wanted and unwanted fertility. The difference between fertility intention and actual fertility is an indication of uncertainties which is mediated by contraceptive use or non-use. Although studies have shown that there is high unmet needs for contraception among women of childbearing ages in SSA, which often result in actual fertility exceeding the intended[21,22]. Other available evidence shows that there is a growing intention among women of childbearing ages in SSA to limit rather than space birth, even at younger ages[23,24].

Another factor that contributes to the persistently high fertility levels in SSA is large family size preferences. Compared with other developing regions of the world, SSA have the largest family size preference[6]. Factors responsible for large family size preferences in the region include perception of children as old age security and leaving the prerogative of fertility decisions in the hand of men[11]. Socio-economic factors like women's education and labour force participation also have some influence on women's preference for large family sizes[6,25-27].

Low levels of education in SSA have encouraged early marriage among young women[7,27,28]. Due to the low exposure to tertiary education in most SSA countries, women continue to enter marriage early – this has further enhanced increased level of fertility[28]. Apart from the individual effect of education on fertility in SSA, studies have also shown relationships between communal level of education and fertility levels[29,30].

Urbanization has been identified as a factor that lowers fertility levels and also modifies other determinants[31]. Fertility is highest in rural areas of many countries in SSA; with factors hindering fertility decline in the region having stronger effect in rural areas[32].

Review of previous studies on fertility trends reveal that the common factors investigated are education, age at marriage and contraceptive use. Other drivers of fertility such as family size preference are often studied independently. In this paper, we add to the existing knowledge by updating analyses to include data till 2014- the penultimate year for the millennium development goal. We also took a holistic view of the key drivers of fertility change by including variables such as family size preference and women employment. Lastly, we provide approximate comparison of fertility intention and actual fertility performance across the four sub-regions of SSA.

Methods

Data sources

Data from Demographic and Health Surveys (DHS) conducted in sub-Saharan Africa from 1990 to 2014 were utilized. DHS is a nationally representative household survey of reproductive age women (15-49) and men (15-59) covering a broad range of reproductive and population health topics. Respondents were selected using stratified two-stage cluster sampling technique. The survey methodologies, questionnaires and sample design have been consistent over the years and thus permit cross-national comparisons based on pooled data from different rounds. In this study, individual women recode data for 110 surveys conducted in 36 SSA countries were analysed.

Measures

The main measures for fertility are total fertility rate (TFR) and completed family size (CFS) proxied by the number of children ever born to women aged 40-49 years. TFR is an age-standardized period measure of fertility while CFS captures the actual childbearing experience of a real age cohort. Specifically, CFS represents the cohort childbearing performance towards the end of the reproductive life cycle. In the DHS reports, TFR was estimated based on births that occured three years before the survey. For this study,

TFR was extracted using DHS Stat compiler[33] whereas CFS was estimated from the individual women recode files.

Family size preference (FSP) was estimated as the mean ideal number of children which was based on responses to the question: "*If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?*" The last measure is contraceptive prevalence rate. Contraceptive prevalence rate (CPR) was estimated as the percentage of married women currently using a modern contraceptive.

Other variables included residence (rural or urban); number of living children; median age at first marriage; percentage of women with at least secondary education; percentage of women currently working and percentage of women whose partners attained secondary or higher education. These were selected based on their relationship with fertility level as documented in the literature[34,35].

Analyses

We adopted an ecological approach to the analyses. This approach implies that each survey in the study represent a unit of analysis. As such, weighted estimate of the measures was computed from each survey to create an ecological time series data which was subsequently used for assessment of trends. These time series data were analysed using locally weighted scatterplot smoothing (lowess) technique to ascertain trends over the years[36]. The procedure pays greater attention to local data points, that is, the smoothed value of *y* corresponding to a data point x_i is obtained based on data points around it within a certain bandwidth. The data points within the specified bandwidth are assigned weights in a way that x_i has the highest weight while weights for the other data points decline with their distance from x_i according to a weight function. The weighted least square method is used to find the fitted value corresponding to x_i, and this is taken as the smoothed value for trend description[36]. Results were presented using graphical illustrations for each sub-region in sub-Saharan Africa.

A subset of 30 countries with more than one survey was further analysed to identify the correlates of changes in fertility levels, family size preference and contraceptive prevalence. For this part of the analyses, change-on-change regression was employed[37]. Using the first and most recent survey in

each country (stratified by type of residence), annual changes in TFR was determined by taking account of the interval between the first and most recent survey. In a similar manner, annual changes in other measures such as CPR, percentage with secondary education, median age at first marriage and family size preference were estimated to serve as explanatory variables. Change in the three outcome measures was then regressed separately on the explanatory variables. Stata SE version 12.0 was used for analyses.

Results

Fertility levels

Figure 1 showed the trends in the completed family size (CFS) across the four sub-regions. Reduction in CFS was fastest in southern region, closely followed by the Eastern region and then Western region. It also showed that while the decline in the western and eastern regions started around 2000s, the southern region have experienced steady decline since the 1990s. The pattern for Central African countries appeared to have remained virtually the same for the two and half decades covered by this study.

In order to provide a picture on the period measure of fertility, the trend in the TFR across the sub-regions are illustrated in Figure 2. It shows slow TFR decline and virtual stagnation in western and central region respectively. TFR decline in Eastern region became notable in the mid 2000s and was the fastest of all regions since 2010.

Family size preference

Trends in family size preference is presented in Figure 3 which showed that there were regional variations in the trends. In Western Africa, there was steady decline in the preferred family size in the late 1990s at which point it stagnated at about 6 children till late 2000s and began to decline slowly afterwards. Preferred family size remained high at about 7 children almost throughout the 1990s in central region but started to decline since year 2000. The eastern region had the most stable preferred family size at about 5 children per woman for nearly two decades (1990-2010). The southern region also recorded slight reduction in preferred family size between 1990 (about 6 children) and 2005 (about 4 children) and has been stable since then.

Contraceptive use

Figure 4 showed the trends in contraceptive prevalence rate among married women in sub-Saharan Africa between 1990 and 2014. Western and central regions had very slow increase in CPR and the rates were still generally below 20%. In contrast, Eastern and Southern African countries have had greater increase in modern contraceptive use with some countries in southern region acheiving almost 60%.

Correlates of changes in total fertility rate, contraceptive prevalence rate and family size preference

Results of change-on-change regression analysis to determine the correlates of changes in total fertility rate, family size preference and contraceptive prevalence are presented in Tables 1a. TFR was negatively correlated with contraceptive prevalence and median age at first marriage (Table 1a, panel 1). That is, increase in CPR and median age at first marriage were associated with declines in TFR. None of the factors analysed for contraceptive prevalence were found statistically significant (Table 1a, panel 2). The only factor associated with family size preference was employment status (Table 1a, panel 3). Increase in the percentage of women who were working was associated with reduction in the average preferred family size.

Fertility intention versus actual fertility performance

Further analysis was conducted to assess the difference between fertility intention and actual performance. Family size preference in the first survey was used as a proxy for fertility intention while the completed family size in the most recent survey was used as proxy for actual fertility performance. Actual performance was significantly lower than fertility intention in Western and Central Africa only. Results across all regions showed that the mean (SD) was 6.1(1.7) and 5.6(1.1) for fertility intention and fertility performance respectively (Table 1b). Results of paired t-test showed that the difference between the two indices was statistically significant (mean difference=0.54, t=3.358, p=0.001). This means that on the average, actual fertility performance was less than intended. A situation where the fertility intention exceeds the
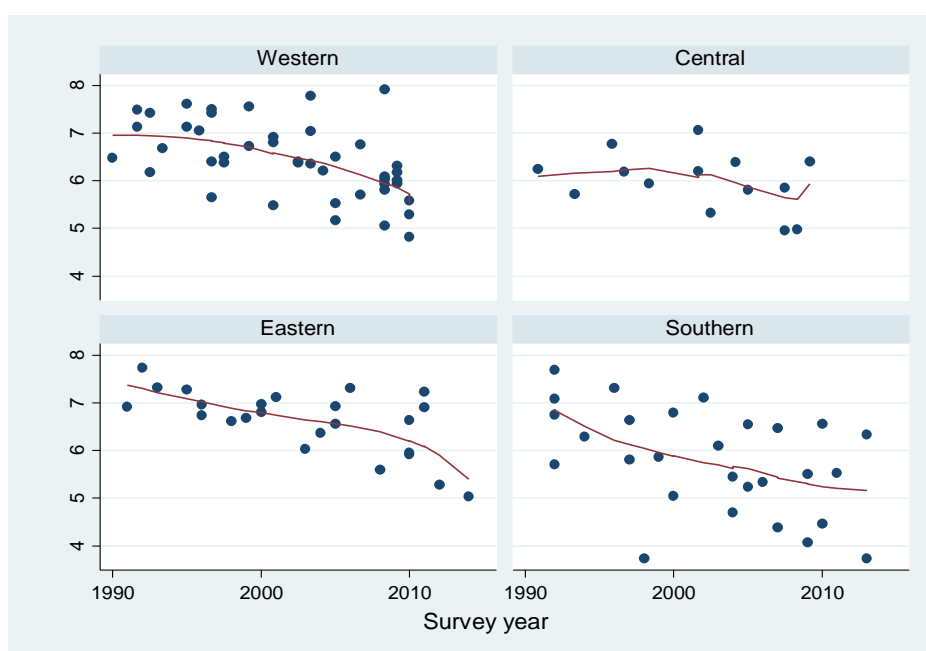
Figure 1: Trends in average completed family size (CFS) in sub-Saharan Africa, 1990-2014
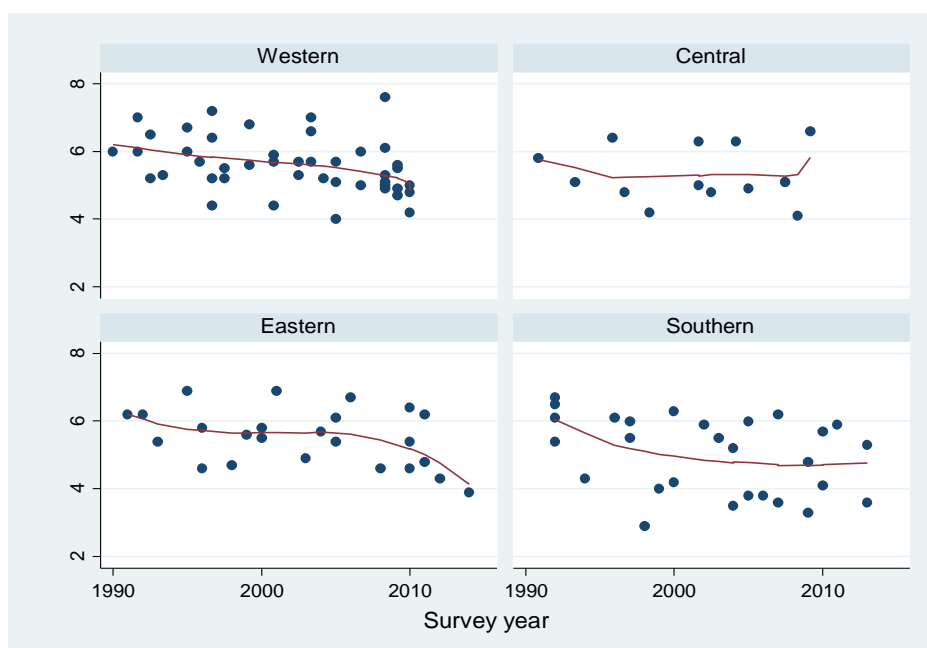

Figure 2: Trends in total fertility rate among women aged 15-49 years in sub-Saharan Africa, 1990-2014

actual performance implies wanted fertility; while unwanted fertility results from a situation where actual performance exceeds the intended fertility. Thus, this analysis shows wanted fertility.

Discussion

This study examined trends in fertility, family size preferences, and family planning over 2 decades in SSA. With respect to the trends in fertility as evidenced by the CFS, Southern Africa led in reduction, which was closely followed by the Eastern and Western Region, while central Africa remained stagnant. This result corroborates a previous study which argued that despite the fact that SSA have experienced some forms of fertility decline between 1990 and 2000, countries in Southern Africa
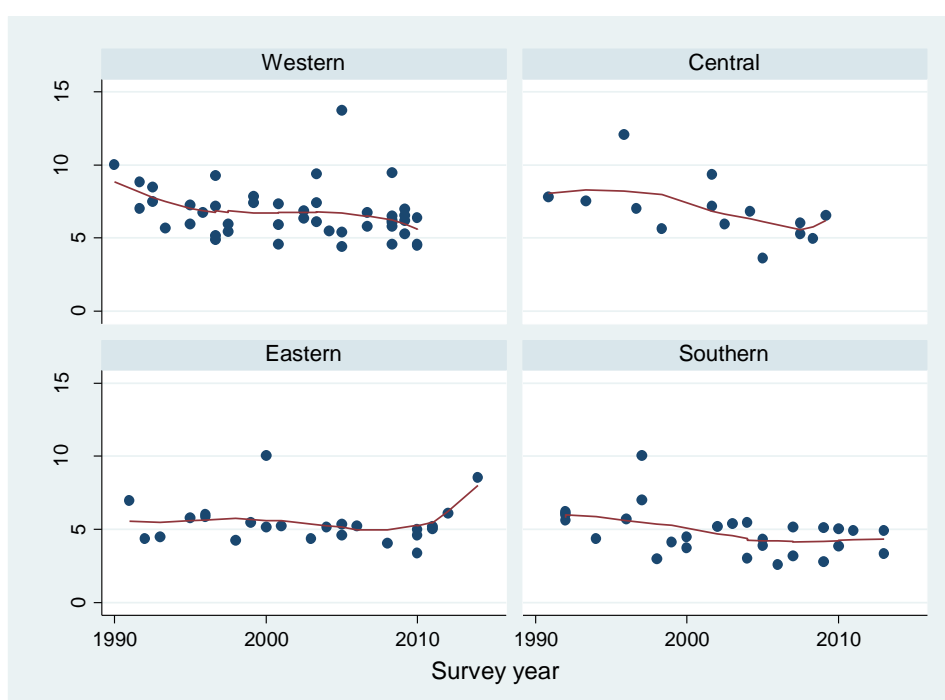
Figure 3: Trends in ideal family size by women aged 15-49 years in sub-Saharan Africa, 1990-2014
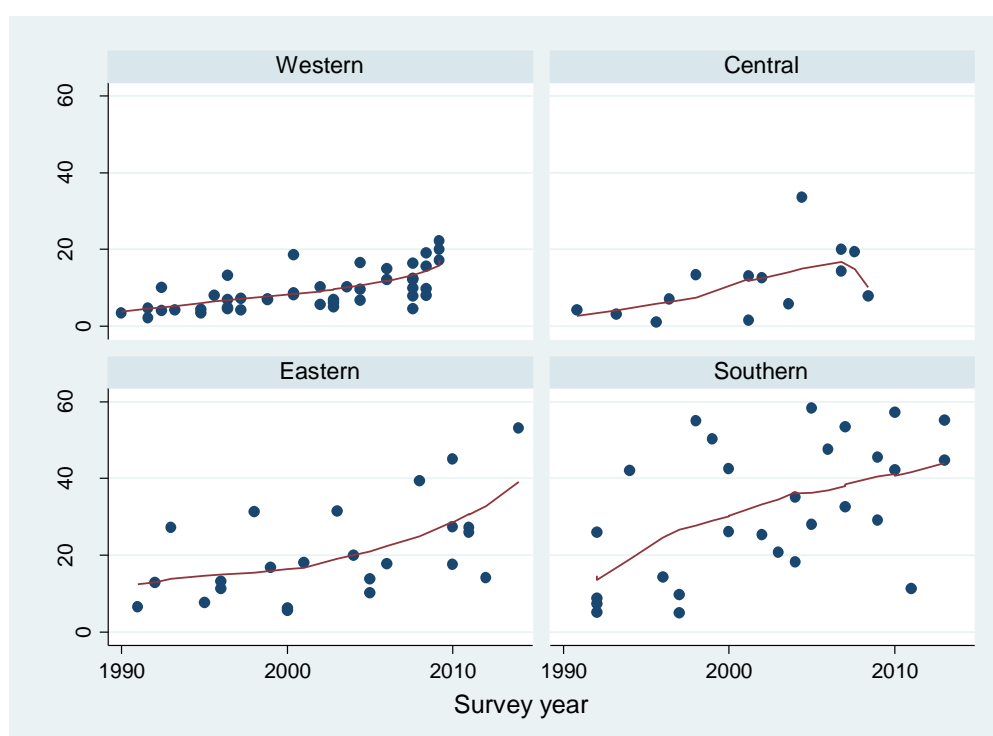

Figure 4: Trends in modern contraceptive use by married women aged 15-49 years in sub-Saharan Africa, 1990-2014

are taking the lead in the transition, followed by the Eastern region, while many countries in the Central and Western regions are lagging behind[9]. The observed pattern could be explained by the universal

and younger age at marriage which is predominant in Central and Western Africa[13,34]. Other factors responsible for this trend include poor uptake of family planning especially among adolescents and

Table 1a: Correlates of changes in TFR, CPR and FSP in sub-Saharan African countries, 1990-2014

Total Fertility Rate [TFR]	Coefficient (β)	Std error	P-value
Family size preference	0.000921	0.016529	0.956
Contraceptive prevalence	-1.96076	0.859777	0.027**
Median age at first marriage	-0.23270	0.121738	0.061*
% with secondary/higher education	-0.32999	1.180163	0.781
% of partners with secondary education	1.516843	1.59143	0.345
% of women currently working	-0.25063	0.624227	0.690
Contraceptive Prevalence Rate [CPR]			
Variable	Coefficient (β)	Std error	P-value
Family size preference	0.002464	0.002601	0.348
% wanted no more children	0.144121	0.186292	0.443
Average number of living children	-0.042354	0.047463	0.376
% with secondary/higher education	0.0709474	0.187323	0.706
% of partners with secondary/higher education	-0.210043	0.239939	0.385
% of women currently working	0.029529	0.095019	0.757
Family Size Preference [FSP]			
Variable	Coefficient (β)	Std error	P-value
% with secondary/higher education	10.69933	9.516233	0.266
% of partners with secondary/higher education	-12.34844	12.79633	0.339
% of women currently working	-21.70963	4.222188	0.000**
Median age at first marriage	-1.017617	0.985009	0.306

* p-value<0.1; ** p<0.05

Table 1b: Fertility intention and actual fertility performance in sub-Sharan Africa, 1990-2014

Sub-region	Fertility intention	Fertility performance	Difference	T statistic[+]	p-value
	Mean (SD)	Mean (SD)	Mean (SD)		
Western Africa	6.60(1.69)	5.78(1.01)	0.82(1.85)	2.976	0.007*
Central Africa	6.61 (0.92)	5.88 (0.89)	0.73(0.87)	2.648	0.027*
Eastern Africa	5.75(1.97)	5.59(1.07)	0.16(1.58)	0.348	0.734
Southern Africa	5.19(1.48)	4.92(1.25)	0.26(0.94)	1.054	0.311
All regions	6.10(1.68)	5.56(1.09)	0.54(1.25)	3.358	0.001*

* p<0.05 (statistically significant); [+] Paired t-test

young people; pronatal culture; high rate of dropout from schools[18]. Decline in CFS is known to be greater in urban than rural areas[31]. Similarly, secondary and higher education have been shown to accelerate fertility decline especially in Eastern and Southern African countries[7].

Several authors had earlier argued that large family size preference is one of the factors responsible for sustained high fertility levels in SSA[6,12]. Also, the use of children as old age security and leaving the prerogative of fertility decisions in the hands of men are some of the factors earlier identified to be responsible for large family size preference[11,32,38].

Furthermore, Western and Central regions had very slow increase in CPR and the rates were still generally below 20%, while the Eastern and Southern countries have had faster increase in modern contraceptive use with some countries in southern region acheiving almost 60%. The southern African countries had the most consistent steady rise in CPR throughout the study period. The main barriers to contraceptive use in Western and Central regions are cultural resistance, negative ideation and inadequate supply of family planning commodities[39].

The finding that increase in CPR and median age at first marriage were associated with declines in TFR corroborates previous studies that family planning practices can influence fertility level in most SSA countries[5,6]. It further confirms the arguments that women's exposure to tertiary education could increase the age at which they marry which will lower the level of fertility in the region[7,28]. Women's employment was negatively related to family size preference. This is not surprising because labour force participation has also been shown to be a motivation for smaller family sizes among women[26,27]. Also, the finding that actual fertility performance was less than the intended could be seen as a major contribution to the growing evidence that women in the childbearing ages now adopt FP methods[23,40]. Fertility performance is often less than

intended because women often revise their fertility goals downward based on their prevailing socio-economic status and other demographic realities[41].

The findings in this study have direct linkages to about 10 of the 17 Sustainable Development Goals (SDGs), touching maternal, neonatal, under-5 mortality, adolescent birth rate and family planning coverage[42,43]. Of specific importance is the implications for universal access to sexual and reproductive healthcare services including family planning, gender equality and women empowerment respectively[43].

Limitations of the Study

The pattern of trends may have been influenced by different policies and programmes in the respective countries/sub-regions. This study was not intended to evaluate these. Secondly, fertility behaviour cannot be totally separated from socio-cultural norms in sub-Saharan Africa. Changes in these values were not considered in the present study. These could represent critical areas for further research. The change-on-change regression could not be applied to explore the correlates of changes at the sub-regional level because there were no sufficient data points for such robust analyses.

Conclusion and Policy Implications

In this study, fertility behaviour in SSA over two decades was appraised. Findings from the study showed a declining fertility levels and family size preference coupled with increase in contraceptive prevalence. Although there were changes observed across regions, it was obvious that the Southern and the Eastern regions were leading in the transition, with the Western region following slowly while the Central region almost stagnated. Family planning programmes need to be intensified in the lagging regions to enhance faster fertility declines. The study has also made clear that the role of improved female education in fertility decline cannot be over emphasized. Although the relationship is not as direct, longer stay in school increases the age at marriage, which in turn reduces the number of years women are exposed to the risk of conception. An important policy concern is how to increase school enrollment among female children especially in Central and Western Africa. This could be another sure path to sustaining fertility decline and controlling population growth. It is also important to note that for persistent and significant fertility reduction, there is the need to promote FP programmes among women in rural areas; and among women with low or no education, particularly in the western and central regions.

Since the same regions (especially Central and Western Africa) with slow improvement and stagnated family planning (in this study) also have stagnated CFS and high PFS, family planning coverage needs to be improved if these regions are not to be left behind.

Authors' Contributions

Conception and study design: COO, JOA and OOB. Data retrieval, management, analysis and result interpretation: JOA, OOB and EO. Writing of manuscript: OOB, JOA, EOA. Review of manuscript for intellectual content: all authors.

Disclosure Statement

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Ethics and Consent

Not required.

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