Sociodemographic determinants of Population-Level Fertility Change in rural Malawi

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Abstract:

This paper aims to investigate determinants of population level fertility change in rural Malawi using data from Karonga Health and Demographic Surveillance System. Survival data analysis techniques were used to compute crude fertility rates by different socio-demographic factors. Our results show that fertility has been declining from 2005-2007 to 2020-2022 for all sociodemographic groups. Our descriptive analysis show that sharp fertility rate declines have been observed in age specific fertility rates and in fertility rates by education status. For instance fertility fell from 331.9 (315.4-349.2) births per 1000 person years in 2005-2007 to 215.2 (204.7-226.2) in 2020-2022 among women aged 20-24 years. Our descriptive analysis is ongoing, and will continue to include, proximity of other family members, age at marriage and divorce experiences. This will be followed by analytical investigations of factors that are explaining changes in fertility rates over the analysis period

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Background

Over the past half-century, the world has witnessed a steep decline in fertility rates in virtually every country on Earth (1). Many factors have contributed to this universal decline in fertility in low and middle in countries. Using census data and large scale population level survey data, reduction in under-five mortality and increase in female education were associated with declining fertility in India (2). Bongaarts fertility framework was applied to three Bangladesh Demographic and Health Surveys data collected between 1993 and 2014. The results shown that use if modern methods of contraception and induced abortion had the largest fertility inhibiting effects compared to inhibiting effects of marriage, and postpartum infecundability for both urban and rural areas of Bangladesh (3, 4). In Ethiopia, studies revealed that drivers of the recent fertility decline were increased age at first marriage, a decreased proportion of currently married women, shift in women's birth to later age, and a higher women's educational status(5).

While countries are experiencing sharp declines in fertility, a number of Sub-Saharan African countries are experiencing stalling or slow fertility decline with very high fertility compared to the rest of the world (6, 7). Persistent high fertility in Sub-Saharan African countries have been driven by a number of factors ranging from high fertility desires emanating from economy and costs; marriage; the influence of others; education and status; health and mortality; and demographic predictors(8, 9), limited access to and use of modern methods of family planning among poorer adolescent girls and young women, those in female-headed households, those in urban areas and those who take healthcare decisions alone(10, 11); early marriages and high prevalence of teenage pregnancies (12).

In Malawi, although use of modern methods of contraception increase, unmet need for contraception still remains high in the context of prevalent norms favouring high fertility (13, 14), early marriages (15, 16) fertility continues to fall over time. Using data from Karonga Health and Demographic Surveillance System from 2005 to 2022 years we investigate changes in fertility by different socioeconomic factors in rural Malawi in order to understand population growth and socioeconomic development in rural settings

Methodology

The Karonga Health and Demographic Surveillance Site (HDSS), established in 2002, captures information on births, deaths, and in-and out-migrations in a population of approximately 50,000 residents living in a rural area of northern Malawi. The HDSS has also collected socioeconomic information, including highest attained education level and marital status, from annual surveys since 2007 (17, 18). We conducted a longitudinal analysis, including person years for the period of follow-up for the entire population of women aged 15–49 and all livebirths (with multiple births contributing separately) born to these women between 2005 and 2022.We examined fertility trends over 4 periods. We calculated age-specific fertility rates by education status. We then used these age-specific rates to calculate the total fertility rate (TFR). We also used Cox proportional hazards regression models to compare fertility rates by different education and residence status (living close or far away from the main road

Results

We are investigating changes in fertility rates in rural Malawi by different socioeconomic characteristics. Our preliminary analysis shows that fertility has been declining. We present birth rates by different socio-demographic characteristics followed by crude fertility rates for each of the socio-demographic characteristic

Table 1. Number of Births, Person Years, Crude Fertility Rates by age group, education, level of under 5 mortality and place of residence from 2005 to 2022.

	Number of births	Female person years age 15-49	Rate per 1000	Lower	Upper
OVERALL					
All	29556	165849.2	178.21	176.19	180.25
AGE GROUP					
15-19	6213	39992.3	155.3549	151.5395	159.2663
20-24	8766	32411.3	270.4614	264.8584	276.1828
25-29	6804	26476.8	256.9797	250.9456	263.159
30-34	4431	22465.1	197.2394	191.5166	203.1333
35-39	2429	18350.3	132.3683	127.2076	137.7384
40-44	784	14728	53.2318	49.633	57.0914
45-49	129	11425.4	11.2906	9.5011	13.4172
SCHOOLING					
1-3y primary	1635	11736.2	139.31	132.72	146.23
4-7y primary	9753	55229.8	176.59	173.12	180.13
Primary completed	6903	41535.2	166.2	162.32	170.16
JCE completed	4502	25922.5	173.67	168.67	178.82
MSCE completed	2950	19958.5	147.81	142.57	153.24
Missing	3813	11467.1	332.52	322.13	343.24
DISTANCE TO ROAD					
<1km	13516	82518.2	163.79	161.06	166.58
1km	3251	18336.2	177.3	171.31	183.5
2km+	12503	64443.1	194.02	190.64	197.45
U5 MORTALITY RATE					
low	6043	39497.4	153	149.19	156.9
medium	15288	88235.9	173.26	170.54	176.03
high	8225	38115.9	215.79	211.18	220.5

Table 2. Crude fertility rates per 1000 person years by age group
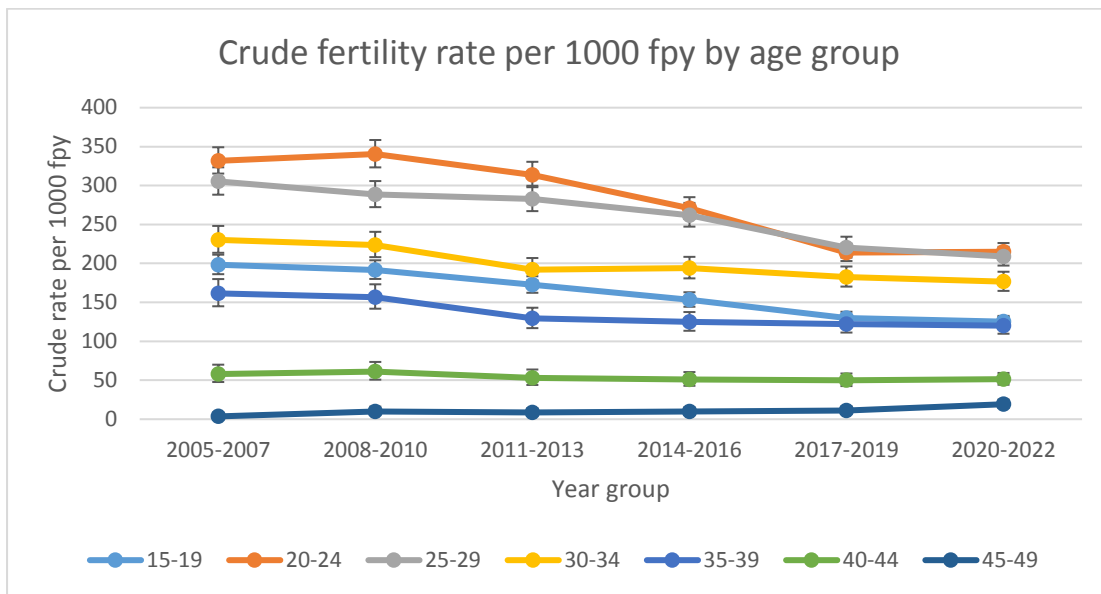

Crude fertility rate per 1000 fpy by age group

Table 2 shows highest fertility rates among women aged 20-24 and lowest among women aged 45-49. Fertility decline has been observe from 2005 -2007 period to 2017-2019 period.

Table 3. Crude fertility rates per 1000 person years by education status.

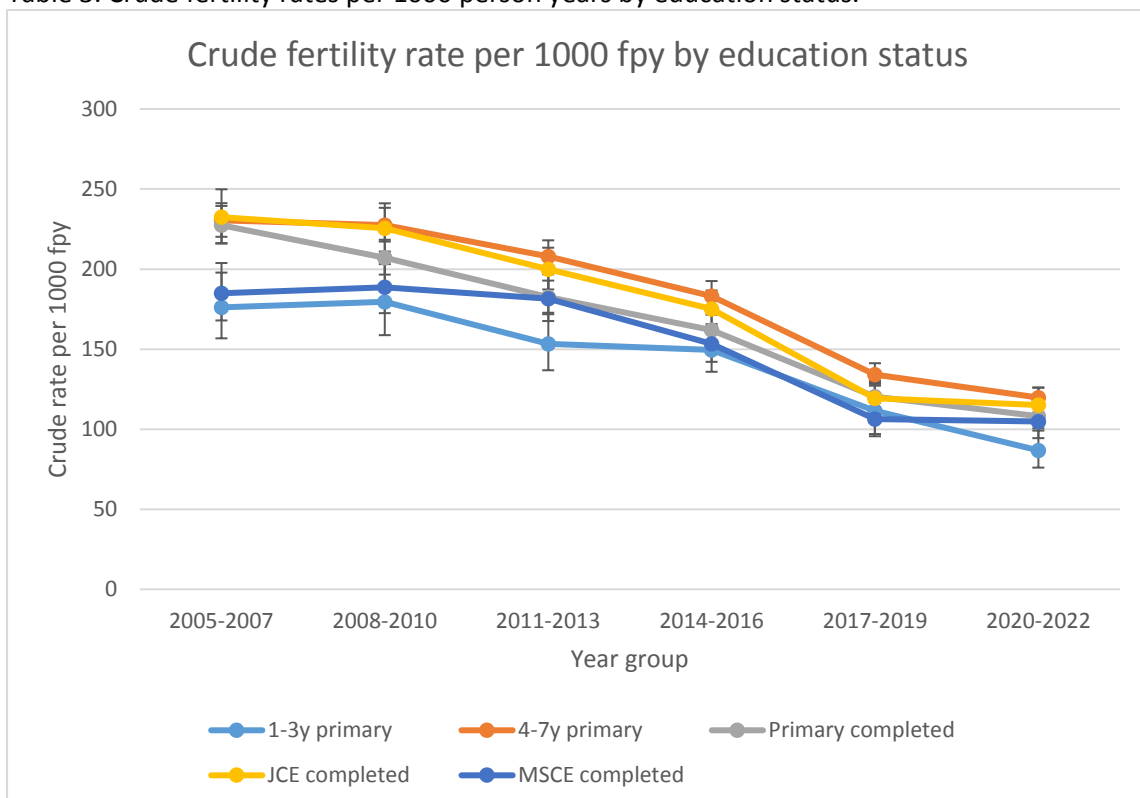Crude fertility rate per 1000 fpy by education status

Table 3 shows highest fertility rates among women of 4-7 years of primary education and lowest among women of who completed Malawi School Certificate of Education. Fertility decline sharply across all education categories

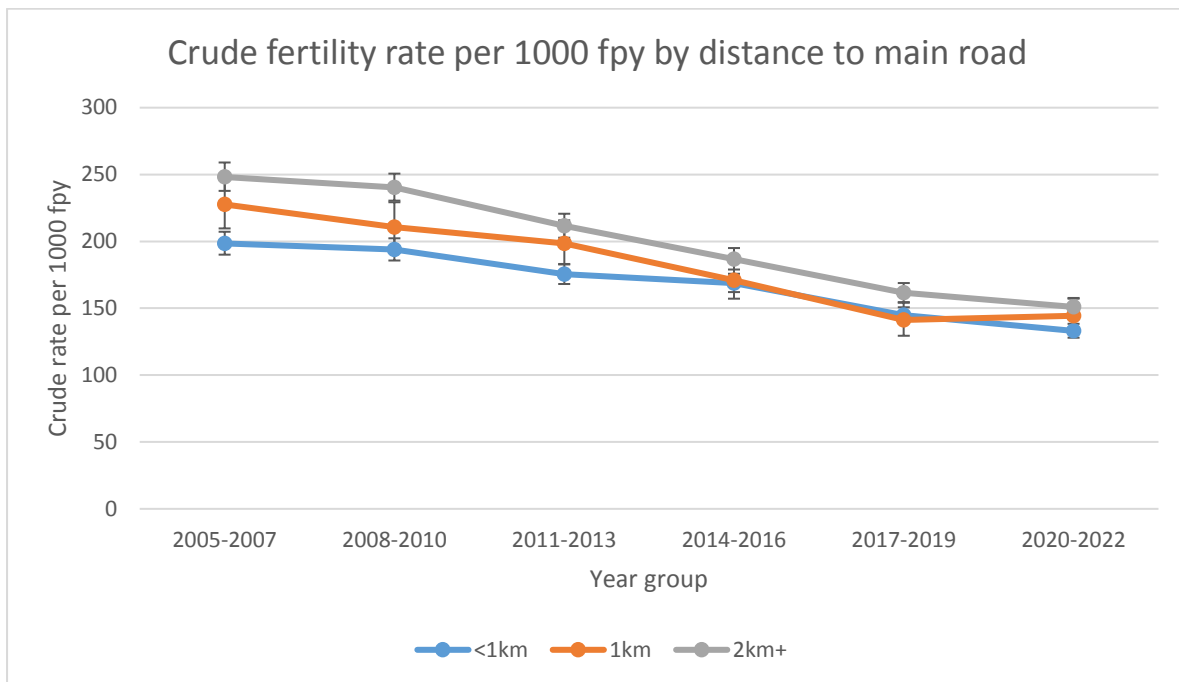Table 4 Crude fertility rates per 1000 person years by place of residence.

Table 4 shows highest fertility rates among women that live far away from a tarmac road and lowest among women who live close to the tarmac road. Fertility decline sharply across all categories of women depending on where they live

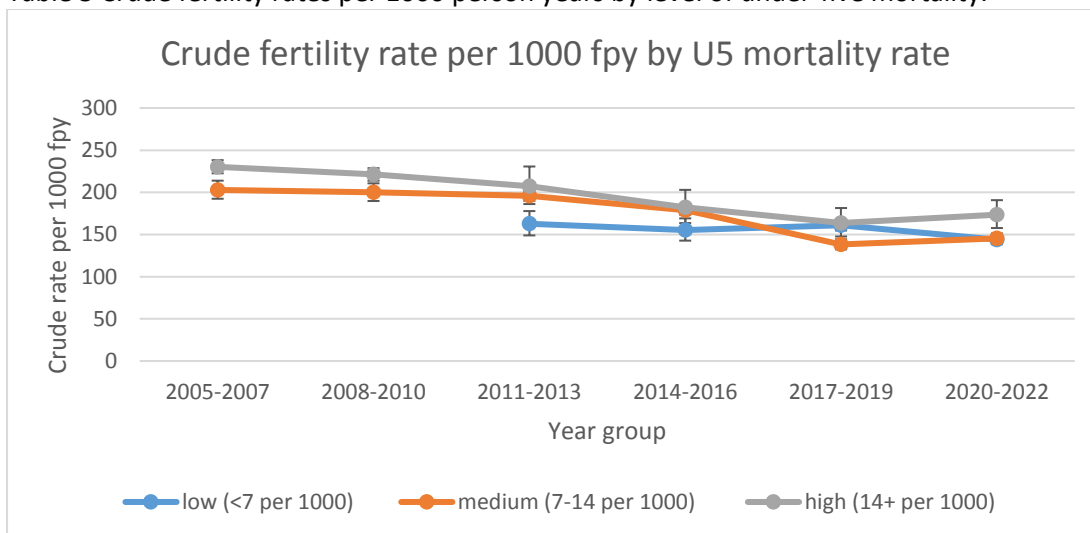Table 5 Crude fertility rates per 1000 person years by level of under-five mortality.

Table 5 shows highest fertility rates among women who experienced highest under-five mortality and lowest among women who experienced lowest under-five mortality until 2014-2016 period thereafter the experiencing under-five mortality seem not to clearly linked to changes in fertility rates.

Discussion

This paper presents preliminary descriptive analysis of changes in fertility rates in rural Malawi by different socioeconomic characteristics. The results show that fertility has been on the decline since 2005. We found that women aged 20-24, women of 4-7 years of primary education, women that live far away from a tarmac road, women who experienced highest under-five mortality had high fertility rates.

The results also show that fertility decline has be experienced across all women of different socio-demographic characteristics. Sharp fertility rate declines have been observed by age and education than declines with respect to whether women are living close to the main road and experience of under-five mortality.

Our descriptive analysis will continue to include, proximity of family, age at marriage, divorce experiences. This will be followed by analytical investigations of factors the factors that are explaining changes in fertility rates over the analysis period. Our understanding of changes in fertility is key for planning and development

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