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The Impact of the Cameroon's Anglophone Conflict on Maternal Health: A Cross sectional Analysis

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1. Introduction

Maternal health remains one of the most public health concerns in developing countries. According do World Health Organization 2021), 94% of all maternal deaths occur in low- and lower-middle-income countries. The Maternal Mortality Rate in these countries is 462 per 100 000 live births versus 11 per 100 000 live births in high income countries, and Sub-Saharan Africa alone accounted for roughly two-thirds (196 000) of maternal deaths. In Cameroon, according to the last Demographic Health Survey (DHS 2018), the levels of maternal mortality were estimated at 467 deaths per 100 000 live births and have shifted with respect to the estimates of DHS 2011. Nevertheless, these levels are still above those of the world average evaluated at 211 deaths per 100 000 live births according to the 2019 WHO report.

As argued by many evidences (Kamiya, 2011; Khatiwada et al., 2020; Kareem et al., 2021; Sserwanja, Nabbuye and Kawuki, 2022; Mokam and Zamo, 2022), 37% to 90% of maternal mortality worldwide would be preventable if women had access to reproductive health care, especially through pre-pregnancy family planning, antenatal care during pregnancy, health care deliveries at the time of delivery and postnatal care during the postpartum. Penchansky and Thomas (1981) described five dimensions of access to health care: availability, accessibility, affordability, acceptability and accommodation. The impact of armed conflict on health care access and utilization, can be understood through the mechanisms that influence the above dimensions (Chukwuma and Ekhator-Mobayode, 2021).

Reducing the frequency and intensity of armed conflicts constitute a key goal and a common theme of the 2030 Sustainable Development Goals (UN, 2020). In fact, armed conflict has been described as creating a public health problem and an important contributor to the social and political determinants of health and a driver of poverty and health inequity. Of the armed conflicts that have taken place since World War II, about 90% have been in developing countries, with Sub Saharan African (SSA) countries experiencing more conflicts than any other region of the world (Bendavid et al., 2021). The impact of these conflicts on health systems often extends beyond the period of active warfare, working its way through specific diseases and conditions, thus indirectly affecting the health of women.

This study focused on a specific conflict, notably the Cameroon's anglophone conflict that occurred in 2016 in the North-West and South-West regions of the country. It was set off by a series of demands by lawyers, teachers and students who sought to create a two-state federation that would protect the Anglophone legal and educational systems from being subsumed by their Francophone counterparts. On 1 October 2017, secessionists proclaimed an independent Federal Republic of Ambazonia, as they called the North West and South West regions, the former British Southern Cameroons (International Crisis Group, 2017). Authorities in the capital Yaoundé responded with a heavy-handed crackdown on those they perceived as secessionist sympathizers, killing dozens and arresting hundreds, which in turn spurred the formation of Anglophone militias (International Crisis Group, 2022). As the conflict in Cameroon has evolved, so has the range of roles that women have played in it.

The security situation in almost all health districts in these regions has been extremely delicate and access to healthcare services has become a major concern. The protracted nature of the conflict has led the destruction of health facility and infrastructure and access and utilization of reproductive health services by those who need it has become extremely challenging (Saidu and al., 2021). Then, it would be interesting to investigate the impact of conflicts on various reproductive health services outcomes in the two anglophone regions. To the best of our knowledge, there is no work on this subject in Cameroon which used the last DHS data.

2. Objective

The main objective of this study is to evaluate the impact of Cameroon's anglophone conflicts on maternal health. Specifically, this research aims to:

- Evaluate the impact of Cameroon's anglophone conflicts on access and utilization of reproductive health services by mothers living in anglophone zones;
- Evaluate the impact of Cameroon's anglophone conflicts on access and utilization of reproductive health services by mothers living in regions closed to anglophone zones.

3. Hypothesis

The main hypothesis of this research suggests that Cameroon's anglophone conflicts have a negative impact on maternal health. Specifically,

- Cameroon's anglophone conflicts have a negative impact on access and utilization of reproductive health services by mothers living in anglophone zones;
- Cameroon's anglophone conflicts have a little negative impact on access and utilization of reproductive health services by mothers living in regions closed to anglophone zones.

4. Methodology

4.1. Data

The data used in this study comes from the fifth and the sixth edition of the Demographic and Health Survey (DHS) conducted, respectively, in 2011 and 2018 in Cameroon by the National Institute of Statistics and other international partners. Four questionnaires were used to collect data during the survey: the household questionnaire, the woman questionnaire, the man questionnaire and the biomarker questionnaire. These different questionnaires have generated six specific modules: woman, man, child, births history, household and couple. Since the study focused on women's utilization of reproductive health services, the woman module is used. a representative sample of 11 973 and 13 537 women aged between 15 and 49 was drawn up in 2011 and 2018 respectively. Armed Conflict Location and Event Data Project (ACLED) dataset will also be used to illustrate the spatial and temporal intensity of conflict, and more specifically, to identify the exact dates and locations of violent incidents during the conflict, including riots, protests, armed battles, and violence against civilians.

4.2. Measurement of Variables

Outcomes

The outcome of this study is the women's health, measured by the utilization on reproductive health services. Four indicators are used: *(i)* the number of antenatal visits carried out during pregnancy (at least 4 visits or not); *(ii)* the place of delivery (if the birth took place in a health facility or not); *(iii)* the person

who provide assistance during the delivery (a skilled provider or not); *(iv)* the timing of first postnatal check for the mother (whether the mother received postnatal care during the first two days after delivery or not).

Measurement of conflict

Armed conflict is difficult to measure since it is basically not observable. To overcome this obstacle, we apprehend the armed conflict by a women's exposure to anglophone conflict. Two measures of a woman's exposure to anglophone conflict are used in this study, where all are related to region-birth and cohort level. The first measure is the interaction of a binary indicator of residence in a conflict region (at the time of the conflict) with a binary variable indicating whether the woman has a living birth during the conflict. This measure is denoted *ConflictRegion*LivingBirth*.

The second measure of a woman's exposure to conflict accounts for a woman's proximity to conflict zones. The argument behind this measure is that a woman may not reside in crisis regions, but reside in a region close to conflict zones and be affected by externality mechanisms. Thus, the second measure is the interaction of a binary indicator of residence in a region closed to conflict area with a binary variable indicating whether the woman has a living birth during the conflict. This measure of armed conflicts is denoted *ClosedConflictRegion* LivingBirth*.

Control variables

The control variables are divided into three categories: woman characteristics (education, age, religion, marital status, employment status and decision power), partner characteristics (education, age, employment status) and household characteristics (place of residence, household size, distance to the nearest health facility and wealth index).

4.3. Empirical Identification Strategy

It is worth recalling that the main objective of this study is to evaluate the general impact of anglophone armed conflicts on maternal health, measured by the of reproductive health services utilization. The difference-in-differences (DID) method is used to evaluate this impact since from the data, it could be possible to compare change in women's health over time. More precisely, by using DHS 2011 and DHS 2018, the DID method helps to compare the reproductive health of mothers exposed to conflicts before and after the conflict starts with the situation of non-exposed mothers. Since the dependent variables (number of ANV, place of delivery, person providing assistance during delivery and PNC) are binary variables, the DID estimator will be estimated through a parametric model, and more precisely a probit model. The following empirical specifications with region and year fixed effects will be estimated:

(i) Empirical specification 1: Considering women living in anglophone regions

$$RHO_{irt} = \alpha_r + \delta_t + \beta_1(ConflictRegion_r * LivingBirth_t) + \varphi X_{irt} + \mathcal{E}_{irt} \quad (1)$$

Where RHO_{irt} represents reproductive health outcomes for mother *i* born at period *t* in region *r.* α_p are region fixed effects and δ_t are survey year fixed effects (given the two rounds of data). Controlling for region fixed effects allows us to account for region-specific unobserved characteristics, and thus removes any bias caused by the correlation between these characteristics and exposure to the conflicts. β_1 measures the conflict's impact on reproductive health for women who were living in conflict-affected zones during the conflicts. X_{ipt} are mother, partner and household characteristics, and $\mathcal{E}$ is a random, idiosyncratic error term.

(ii) Empirical specification 2: Considering women living in region closed to anglophone regions

Elsewhere, we conceive in this study the fact that the conflicts could have external effects on the health of mothers living in region closed to anglophone areas. Thus, we also estimate fixed effects regressions with a binary measure of conflicts exposure:

$$RHO_{irt} = \alpha_r + \delta_t + \beta_2(ClosedConflictRegion_r * LivingBirth_t) + \varphi X_{irt} + \mathcal{E}_{irt} \quad (2)$$

The coefficient β_2 measures the effect of proximity to conflict zones on women's access to reproductive health services.

(iii) Identification Assumption

Correct identification of β_1 (respectively β_2) relied on the implicit assumption that differences across mother cohorts (cohort of mothers exposed to the conflicts and cohort of mothers not exposed to after the war) average reproductive health outcomes would be similar across conflicts and non-conflicts regions in the absence of the conflict.

4.4. Robustness analysis

Robustness analysis will be performed by:

- Considering migrations that could have occurred during conflicts, whereas migration could affect the results by changing the size and composition of the sample;
- Separating mothers from different types of households: poor household vs non-poor households, household headed by men vs household headed by women.