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Effect of oral contraception on anemia in 12 low- and middle-income countries

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Abstract

Context: In low- and middle-income countries, anemia is a major public health issue in women of reproductive age for a series of factors including iron deficiency.

Objective: To estimate prevalence of anemia and to assess the association of low level of hemoglobin versus duration of use of oral contraceptives (OC).

Methods: Demographic and Health Surveys of 12 countries, conducted between 2005 and 2012, were analyzed. The status of anemia was separately evaluated for nonpregnant women using OC for at least 6 months, 1 year and 2 years, and for women using no method of contraception and/or using nonhormonal contraception.

Results: The total study population comprised 201,720 women, with 40% diagnosed with anemia; around 1 out of 25 women was using oral contraception.

The current and continuous use of oral contraception was of benefit against anemia, with the risk for anemia decreasing from odds ratio (OR) 0.68 [95% confidence interval (CI) 0.64–0.73] for use of at least 6 months to OR 0.56 (95% CI 0.52–0.61) for use of at least 1 year and to OR 0.50 (95% CI 0.46–0.54) for use of at least 2 years.

Conclusions: Findings reinforce evidence of the noncontraceptive benefit of long-term use of OC and provide valuable information for policy makers, family planning staff and clinicians working in low- and middle-income countries in efforts to control anemia.

Keywords: Anemia; Demographic and Health Survey; Oral contraceptives; Low- and middle-income countries

1. Introduction

Anemia, defined as low concentration of hemoglobin (Hgb), is a major public health issue with a prevalence of 43% in countries with low development [1].

Women of reproductive age (15–49) represent a particularly high-risk category [2] due to iron-deficiency anemia consequences for morbidity and mortality: preterm delivery, miscarriage, placental abruption and low birth weight are associated to low Hgb levels [3,4,5,6] which contribute to more than 115,000 maternal deaths and 591,000 perinatal deaths annually [7].

Oral contraception, whose steroid mechanism of action is inhibition of follicular development and prevention of ovulation by suppression of follicle-stimulating hormone and luteinizing hormone [8], is being used by more than 100 million women worldwide [9]. The protective effect of oral contraceptives against excessive menstrual flow has been highlighted along with the reduction of pelvic inflammatory disease, menstrual cramps and pain [10,11,12].

Prolonged use of oral contraception results in progressive endometrial atrophy [13], and this property has been used for the treatment of anovulatory bleeding and endometrial hyperplasia. However, studies investigating the association between oral contraceptive and iron deficiency have led to discordant results, with some findings revealing benefit on preventing iron deficiency [14,15], while others did not identify consistent associations [16,17].

We used Demographic and Health Surveys (DHS) data from 12 low- and middle-income countries to separately assess the association between anemia and current use of oral contraception for 6 months, for 1 year and for 2 years of use.

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2. Methods

We based our analysis on datasets publically available from the DHS [18]. The DHS are cross-sectional nationally representative surveys, usually conducted over 18–20 months and covering 5000–30,000 households [19]. Inter-country comparability of data is ensured by the deployment of similar instruments and procedures in each setting. Questionnaires include several modules, covering household and individual characteristics, fertility, maternal and child health, as well as anthropometrics measurements and biomarkers tests such as anemia and malaria. Final results are published in reports, and datasets are available online through a process of electronic registration.

We included data from 12 countries, which represented the most recent DHS, conducted in the past 15 years, and with less than 10% missing values on anemia testing in the surveyed women. The national DHS under study were: Albania 2008–2009, Ethiopia 2011, Guyana 2009, Honduras 2011–2012, India 2005–2006, Moldova 2005, Mozambique 2011, Peru 2012, Sao Tome 2008–2009, Swaziland 2006–2007, Tanzania 2010 and Zimbabwe 2010–2011.

Our study population included all women nonpregnant at the time of interview; we also excluded women using other hormonal contraceptives (intrauterine device, injections and Norplant). After merging all countries' data sets and excluding individuals with missing values on the outcome "Anemia" and/or on the analysis covariates, the pooled sample size resulted in 210,720 women (see flowchart for selection of participants in Fig. 1).

Our main outcome was anemic status. Women with Hgb levels below 12 g/dl [20] were classified as anemic. DHSs use the HemoCue® analyzer for Hgb detection [21], which is performed onsite after collection of blood samples.

We stratified the duration of oral contraceptive use as "at least 6 months," "at least 1 year" and "at least 2 years" and compared oral contraceptive users to nonusers of this method.

The adjusted analysis was conducted using the following covariates: age of women categorized in seven groups ("15–19" to "45–49" years); a wealth index [22] variable defining five categories of wealth ("poorest" to "richest"); educational attainment categorized as "no education," "primary," "secondary" and "higher"; women's residence ("urban" and "rural"); parity subdivided in five subgroups ("0," "1," "2," "3" and "more than 3" previous births); cigarette smoking; body mass index (BMI) in its four categories "underweight," "normal," "overweight" and "obese"; and if health care was sought in the past 12 months ("yes" and "no"). Also, we considered in the analysis whether participants had any birth over the 12 months preceding each survey and current breastfeeding status.

We tabulated the distribution of the anemic status and use of oral contraception for each DHS as well as for the pooled dataset. We also report the pooled and country average Hgb

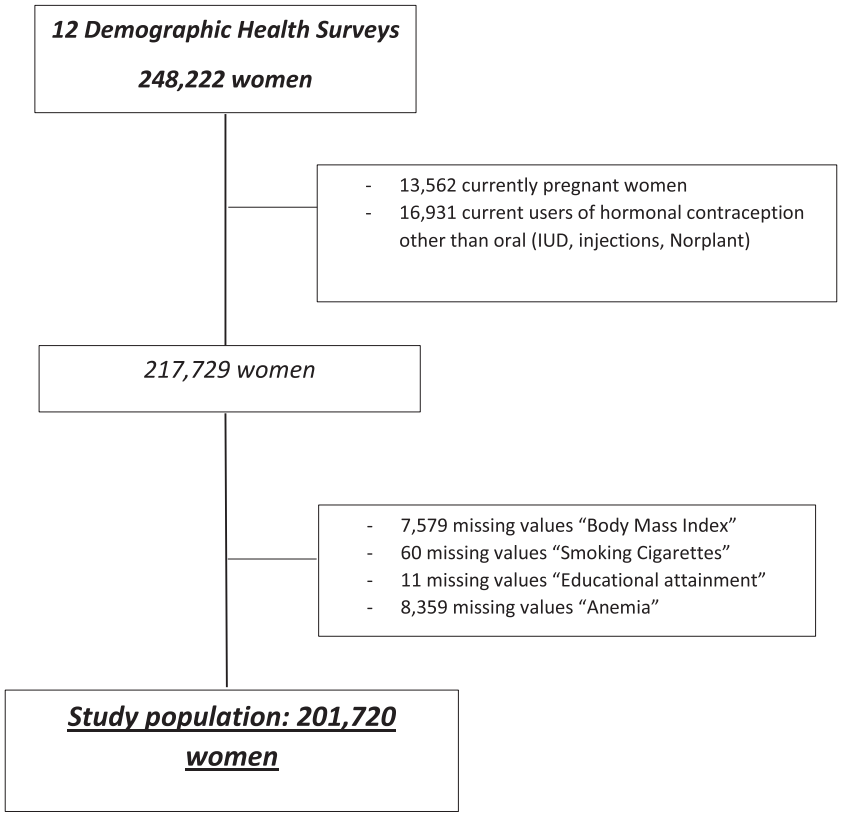

Fig. 1. Flowchart.