Original Study

# Beyond Routine Abortion Practice: Identifying Adolescents and Young Adults at Risk for Anemia

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A B S T R A C T

*Study Objective:* To evaluate the prevalence of anemia among female adolescents and young adults seeking abortion care at a county hospital, and to determine its associated factors.
*Design:* A cross-sectional retrospective study.
*Setting:* John H. Stroger, Jr. Hospital of Cook County, Chicago, Illinois.
*Participants:* Young women (N = 2916; ages 11-24 years) who underwent first trimester medical or surgical termination in 2016.
*Interventions and Main Outcome Measures:* Hemoglobin concentration at time of presentation, age, gestational age, body mass index, race/ethnicity, education, sexually transmitted infection status, and insurance status.
*Results:* On average, women were 21 (SD, 2.2) years old, 87% (2545 of 2916) African-American, and 64% (1863 of 2916) were Medicaid recipients. Gestational age at time of presentation ranged from 4 weeks 6 days to 13 weeks 6 days, and 58% (1695 of 2916) had surgical termination. Overall, 16% (451 of 2916) had hemoglobin concentrations of less than 11 g/dL. Categorization of severity showed that 4% (126 of 2916) of women had moderate and 11% (325 of 2916) had mild anemia. Only 2.6% of women (75 of 2916) had any history of anemia, and 91% (412 of 451) of anemic women did not have a preexisting anemia diagnosis. Fifteen percent of anemic women (51 of 451) had positive sexually transmitted infection screening, but positive status was not associated with anemia in crude or multivariable models ($P$ = .4-.6). In a multivariable model, later gestational age, decreasing body mass index, and multiparity were significantly associated with anemia prevalence after adjustment.
*Conclusion:* Our study showed an elevated prevalence of undiagnosed anemia. Ultimately, the abortion care setting can be an intersection for continued ambulatory care and provides an important opportunity to diagnose and educate young women on anemia management.
*Key Words:* Anemia, Abortion care, Adolescents

## Introduction

Anemia is a global public health problem with variations in its prevalence and trends. Anemia creates disease burden by causing fatigue, impairing physical capacity, work performance, reducing individuals' well-being, and work productivity.[1,2] Common causes of its occurrence are rapid growth and menstruation among teenage girls, in addition to iron deficiency from nutrition. Although universal screening remains controversial, screening is practiced when teenagers, especially female teenagers, are symptomatic. The Centers for Disease Control and Prevention guidelines recommend annual screening among women with risk factors for having iron deficiency such as heavy menstrual bleeding.[3]

The American Congress of Obstetricians and Gynecologists recommend routine screening for anemia among all pregnant women.[4] This is secondary to the multiple associated morbidities and mortalities in the mother and the baby, including the risks of prematurity, low birth weight, and perinatal mortality.[5–7] Less is known, however, on the screening of women who desire termination. Although the decision to terminate makes the risks of anemia to the fetus negligible, there remain inherent risks to the mother including transfusion should hemorrhage occur. Significant anemia might also shift provider counseling toward surgical termination instead of medical termination, because it allows efficient evacuation and supervised blood loss.[8]

There are few anemia prevalence studies in the reproductive care literature, and investigation is warranted because of the prevalence of unintended pregnancies and subsequent termination in the United States. Unintended pregnancies are high among low-income women, women ages 18-24 years, and minority women.[9] When including all sexually active women, women aged 15-19 years have the highest unintended rate of any age group.[10] Termination ratios are highest among adolescents, with the rate of abortion in adolescents as 10.7 per 1000 women.[11] With the large proportion of young women undergoing termination for their unintended pregnancies, demographic characteristics and comorbidities such as anemia should be explored.

Hemoglobin and hematocrit measurements are the most common laboratory tests used for screening for anemia. In our reproductive health services clinic, we screen every

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patient with a complete blood count (CBC) and gonorrhea and chlamydia testing. In the present study, we set out to evaluate the prevalence of anemia among female adolescents and young adults who presented for abortion care at our county hospital. We hypothesized there would be an elevated prevalence of undiagnosed anemia among adolescents seeking first-trimester termination.

## Materials and Methods

After institutional review board approval, we performed a retrospective chart review of women ages 11-24 years who received a medical or surgical first trimester termination at John H. Stroger, Jr. Hospital of Cook County from January 2016 through December 2016. We obtained a list of all patients who presented for termination, and each chart was manually reviewed by a member of the research team. A CBC was performed in addition to sexually transmitted infection (STI) screening at intake, or gonorrhea and chlamydia screening at time of surgical termination. Patients were not included if they did not undergo their termination or a CBC was not available.

Demographic characteristics of our patients were extracted from the medical record including their age, gestational age, body mass index (BMI), race/ethnicity, education, STI status, and insurance type. Age was grouped into categories of 11-15 years, 16-20 years, and 21-24 years. Race/ethnicity was self-identified as non-Hispanic African American, Hispanic, or Caucasian/other non-Hispanic. The latter category combined patients who identified as non-Hispanic white or American Indian/Alaskan Native into 1 category. Patients reported their partnering status at intake, and this was categorized into married, living with a partner, or not. Insurance status was categorized as Medicaid, private, or uninsured. Self-reported history of births and previous abortions was collected at intake. Self-reported history of anemia was also included in our evaluation. Patients are routinely tested for chlamydia, gonorrhea, and syphilis in our medical setting. STI status was considered positive in our chart review if patients tested positive for at least 1 STI from their intake or from screening performed at time of surgical termination. BMI was calculated using weight in kilograms divided by height in meters squared. Categories were constructed defining underweight as BMI less than 18.5, normal for BMI of 18.5-24.9, overweight for BMI of 25-29.9, and obese for BMI of 30 or over. Gestational age was measured using ultrasound, and categorized into less than 7 weeks or 7-13 weeks in addition to being used as a continuous variable. Medical or surgical abortion type was extracted from the medical record.

The main outcome of interest was the prevalence of anemia. The hemoglobin levels for anemia cutoffs were obtained by the World Health Organization criteria for pregnant women, with less than 11.0 g/dL considered anemic. Moreover, we used their cutoffs defining mild, moderate, and severe anemia for pregnant women, with mild as 10.0-10.9 g/dL, moderate as 7.0-9.9 g/dL, and severe as less than 7 g/dL.[12]

Of the 2944 patients who presented for termination, 24 were excluded because they did not undergo their termination, 1 was excluded because a CBC was not available, and 3 were excluded because they were missing height and weight to calculate BMI. The final analytic sample consisted of 2916 young women who underwent a first trimester termination in the study period. We used Statistical Analysis System version 9.4 (SAS Institute, Cary, NC) for all analyses. Means and SDs were calculated for continuous variables. Frequencies and proportions were calculated for categorical variables. Cochran–Mantel–Haenszel statistics and $\chi^2$ tests were used to assess bivariate associations between all demographic characteristics and risk factors with anemia status (overall, and divided into mild and moderate categorizations) using contingency tables. Log binomial regression models were used to estimate the relative prevalence of anemia in the study sample and to determine the overall association between demographic and risk factors with anemia after adjustment for other covariates. A final multivariable model to determine factors associated with anemia prevalence was created using forward selection to account for confounding. A $P$ value of .05 or less was used to determine statistical significance.

## Results

Demographic and clinical characteristics of the study sample are shown in Table 1. Within the total sample of 2916 patients, 451 girls were identified as having anemia. Thus, the overall prevalence of anemia was 15.5% (451 of 2916). In addition, the prevalence of moderate and mild anemia was 4.5% (126 of 2916) and 11.1% (325 of 2916), respectively. The average age was 21.2 (SD, 2.2) years old, 87.3% (2545 of 2916) African-American, and 63.9% (1896 of 2916) had Medicaid insurance. Only 2.6% of women (75 of 2916) had any history of anemia, and most who presented with anemia did not have a preexisting anemia diagnosis (91%; 412 of 451). African American women were more likely to present with anemia compared with Hispanic or women of other races ($P < .0001$), and anemia prevalence differed according to BMI categorization with a trend toward decreasing prevalence as BMI increased ($P < .0001$). Gestational age at the time of termination in our sample ranged from 4 weeks 6 days to 13 weeks 6 days. Women who presented at higher gestational ages were more likely to present with anemia ($P = .004$). Overall, the proportion of young women who chose surgical abortion was 58.1% (1695 of 2916). Prevalence among women who opted for surgical abortion was 16.6% (281 of 1695) compared with 13.9% in women (170 of 1221) who chose medical abortion ($P = .05$).

As shown in Table 2, the relative prevalence of anemia increased with decreasing BMI, and increased with parity. Compared with obese women, women who were overweight, normal, or underweight had 1.4, 1.6, or 1.8 times higher prevalence of anemia, respectively. With nulliparous women as the comparison group, women with 1 previous live birth had 1.3 times higher prevalence of anemia, and women with 2 or more previous births had 1.7 times higher prevalence. Hispanic women appeared to have lower prevalence of anemia compared with the white/other group, whereas African American women had a higher prevalence of anemia compared with the white/other group. Gestational age was positively associated with