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# Contraceptive Use Patterns among Women of Reproductive Age in Two Southeastern States

Nathan Hale, PhD [a,*], Michael Smith, DrPH [a], Katie Baker, DrPH [b], Amal Khoury, PhD [a]

[a] Department of Health Services Management & Policy, East Tennessee State University, College of Public Health, Johnson City, Tennessee
[b] Department of Community & Behavioral Health, East Tennessee State University, College of Public Health, Johnson City, Tennessee

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A B S T R A C T

*Background:* Unintended pregnancies remain an important public health issue. Modern contraception is an important clinical service for reducing unintended pregnancy. This study examines contraception use among a representative sample of women residing in two southeastern U.S. states.
*Methods:* A cross-sectional statewide survey assessing women's contraceptive use and reproductive health experiences was conducted in Alabama and South Carolina. Characteristics of the study population were compared across contraceptive use categories and multivariable regression analysis was performed examining relationships between covariates of interest and contraceptive use outcomes.
*Results:* Approximately 3,775 women were included in the study population. Overall, 26.5% of women reported not using any contraception. Short-acting hormonal methods were the most commonly reported (26.3%), followed by permanent methods (24.4%), long-acting reversible contraception (LARC; 14.3%), and barrier/other methods (8.5%). Nonuse was more prevalent among women with some college or an associate's degree, incomes between $25,000 and $50,000, no health insurance, and longer gaps in care. LARC use among women with Medicaid as a pay source was higher than use among privately insured women and higher in South Carolina than Alabama. Both nonuse and LARC use were higher among women with no insurance.
*Conclusions:* Study findings are largely consistent with previous research using similar population-based surveys. LARC use was higher among the study population relative to what is observed nationally. Factors enabling access to contraceptive services, particularly for lower income women, were associated with contraception use patterns. These findings provide important context for understanding individuals' access to resources and are important for fostering increased access to contraceptive services among women in these two states.


Unintended pregnancies, those that are unwanted or mistimed, remain a priority public health issue (Finer & Zolna, 2016). Modern contraception is safe and effective in reducing unintended pregnancy and improving well-being for women and families (Trussell et al., 2013). Factors influencing women's use of contraception vary widely, ranging from concerns about side effects to fluid feelings toward pregnancy (Frost, Lindberg, & Finer, 2012; Frost, Singh, & Finer, 2007; Mosher, Jones, & Abma, 2015; Rocca & Harper, 2012). Additionally, structural barriers—inconvenient office hours, clinical screenings that are not medically necessary for contraception, return appointment policies for contraceptive services after the initial counseling, and a limited range of method availability—pose challenges in accessing contraception, as do financial barriers such as lack of insurance or high out-of-pocket costs (American College of Obstetricians & Gynecologists, 2015; Dennis & Grossman, 2012; Horvath, Bumpus, & Luchowski, 2020; Mosher et al., 2015; Peipert, Madden, Allsworth, & Secura, 2012; Stewart et al., 2001; Tepper, Curtis, Steenland, & Marchbanks, 2013).

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* Correspondence to: Nathan Hale, PhD, Department of Health Services Management & Policy East Tennessee State University, College of Public HealthEast Tennessee State University, College of Public Health, Box 70264, Johnson City, TN 37614. Phone: (423) 439-4429; fax: (423) 439-6710.
*E-mail address:* halenl@etsu.edu (N. Hale).

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Nationally, contraception nonuse among reproductive-aged women ranges from 10.5% to 35% depending on the study population of interest (Daniels and Abma, 2018; Kavanaugh & Jerman, 2018; Kaye, Suellentrop, & Sloup, 2009; Mosher et al., 2015). Female sterilization remains the most common contraceptive method, followed by contraceptive pills, long-acting reversible contraception (LARC), and coital or barrier methods. Although previous research has examined contraception use nationally, few population-based studies have examined use patterns within smaller geographically defined populations of reproductive-aged women (Douglas-Hall, Kost, & Kavanaugh, 2018; Hale, Khoury, & Smith, 2018). Although these studies provide important information, they do not examine drivers of variation in contraceptive use at the state level and may not be fully representative of women's experiences in states that experience higher unintended pregnancy rates.

This study examined variation in contraceptive use among a representative sample of women residing in two southeastern U.S. states—Alabama and South Carolina—that were among four states with the lowest prevalence of women who reported wanting to be pregnant at the time of pregnancy or sooner (Kost, Maddow-Zimet, & Kochhar, 2018). Both states operate Title X programs offering a wide range of contraception on a sliding fee scale through a centralized network of local health departments. Although neither state expanded Medicaid eligibility with the Affordable Care Act, Medicaid remains an important program enabling access to contraceptive services in both states. Alabama extends Medicaid coverage for family planning services through a Family Planning Waiver for women up to 146% of the federal poverty level (FPL); Medicaid family planning coverage in South Carolina is extended to women up to 194% of the FPL and is operated under a State Plan Amendment.

Using the Andersen (1995) framework of health services use, this study examined predisposing, enabling, and need factors that may influence contraceptive use in these two states. Predisposing factors include sociodemographics, pregnancy attitudes, and beliefs that may influence contraception use. Enabling factors examine individual and community resources that foster access to contraceptive care, and measures of individual need reflect experiences or circumstances that may influence contraception seeking patterns. This study contributes to the broader knowledge base by providing additional context related to contraception use among women in two southeastern states.

## Methods

### *Study Population and Data Source*

A cross-sectional statewide survey assessing women's contraceptive use and reproductive health experiences was conducted in Alabama and South Carolina. The initial survey was developed by researchers at the University of Maryland (DelCAN, 2020) and, following cognitive testing in Alabama and South Carolina, was adapted for use in this study population. Cognitive testing was conducted by The National Opinion Research Center (NORC) at the University of Chicago and included 10 reproductive-aged women in South Carolina and 9 in Alabama. The think-aloud technique, along with verbal probing on predetermined items of interest and items with which respondents had difficulty, was used during testing. Minor wording changes and additional clarifications were added to the survey instrument items incorporating cognitive testing feedback.

NORC surveyed a probability-based sample of reproductive-aged women (18–44 years) in each of the two states. Approximately 18,400 households in each state were randomly selected from an address-based sampling frame derived from the U.S. Postal Service computerized delivery sequence file and supplemented with age-targeted lists to improve sample efficiency. Census tracts with higher proportion of non-White households and those with lower population density were oversampled to ensure adequate representation from historically underserved and rural populations. NORC sought 2,000 complete surveys in each state to ensure a representative sample.

A sequential multimode approach with a series of mailings and nonresponse follow-up was used. Respondents were initially offered a web survey. Those who did not complete the web-based survey after two contact attempts were mailed a paper self-administered questionnaire. A subset of nonrespondents was sent a second self-administered questionnaire, and another subset was contacted and offered a computer-assisted telephone interview. The initial contact letter included a $5 cash incentive, regardless of participation. Individuals completing the survey received a $10 Amazon gift code. When appropriate, email invitations were sent to women rostered by the initial respondent from the sampled household. Surveys were administered in English and Spanish.

The overall response rate using the American Association for Public Opinion Research Response Rate 3 definition was 24.1% (The American Association for Public Opinion Research, 2016). Post-stratified sample weights adjusting for differences in the initial probability of selection and differential nonresponse were created using a raking procedure that included respondents' age, education-by-income, race/ethnicity, nativity, marital status, children under 18 years of age in the household, housing tenure, and employment.

### *Measures*

Contraception use patterns among women residing in these two states were of primary interest. A categorical variable reflecting the hierarchical effectiveness of methods was constructed. Women who responded "no" when asked, "Are you currently using any method or methods of birth control?" were categorized as nonusers. Women answering "yes" were subsequently asked, "What kind(s) of birth control method(s) are you currently using?" Responses were categorized by method type. Intrauterine devices and implants were categorized as LARCs; birth control pills, patches, hormonal shot, and vaginal rings were categorized as short-acting hormonal methods; and withdrawal, male condoms, natural family planning, and other female barrier methods were categorized as barrier/other methods. We also included a category for permanent methods, including both women who indicated having a tubal ligation and those indicating reliance on partner vasectomy, as a primary form of birth control. Consistent with previous research, when multiple methods were selected, the highest level of method effectiveness was retained (Dehlendorf et al., 2014; Kavanaugh & Jerman, 2018).

Andersen's model (1995) served as a conceptual framework for selecting factors associated with contraceptive use. Predisposing factors included age, race/ethnicity, education, relationship status, and attitudes and beliefs toward pregnancy and pregnancy timing. Age was categorized as 18 to 24, 25 to 35, and 36–44 years. Race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, non-Hispanic other, and Hispanic/

Latina. Education was categorized as high school diploma/equivalent or less, some college or an associate's degree, bachelor's degree, and higher. Relationship status was defined as currently married, not married and living with a romantic partner, and single and not living with a romantic partner.

Three measures related to pregnancy attitudes and beliefs were included (Higgins, Popkin, & Santelli, 2012). Women's feelings toward having a child now or in the future were assessed using a five-level variable indicating that they want a child within the next two years, want a child 2–5 years from now, want a child 5 or more years from now, want a child but are unsure when, or do not want to have children/additional children. Women were asked to identify the current importance of avoiding pregnancy using a 5-point Likert-type scale with response options ranging from very important to not important at all. A three-level categorical measure was created: very/somewhat important; neither important nor unimportant; and somewhat unimportant/not important at all. Women were also asked to respond to the following statement that reflects a fatalistic belief about pregnancy: "It doesn't matter whether you use birth control or not, when it's your time to get pregnant, it will happen." Responses were categorized into a three-level variable reflecting women who strongly agreed/agreed with the statement, neither agreed nor disagreed, and disagreed/strongly disagreed.

Enabling factors included household income, insurance status, having a usual source of care, and time since last provider visit. A three-level categorical income variable was created reflecting household incomes below $25,000, $25,000 to $50,000, and greater than $50,000. Insurance was categorized as having coverage from private sources, Medicaid (family planning or traditional Medicaid), other sources (Tri-care, Medicare, Indian Health Service, or other), and no insurance. A variable noting whether women had at least one person they thought of as a personal doctor or health care provider was also included in the analysis. Timing of the last reported routine checkup utilized the following categories: within the past year, within the past 2 years, and 3 or more years. The survey question specific to the timing of routine checkups did not differentiate the provider source.

Measures reflecting individual need included parity, reported delays in obtaining birth control, and sexual activity. A measure of parity reflecting women with no children (nulliparous) and those with one, two, or three or more children was included. Two dichotomous variables were created for women who indicated they delayed or had trouble getting a wanted birth control method in the past 12 months, and those who reported current sexual activity.

### *Analysis*

Characteristics of the study population were compared by state and differences examined using $\chi^2$ tests of independence. Within-state differences in contraception use by method type were also examined using $\chi^2$ tests of independence. Between-state differences by method type were assessed by interacting each measure with a dichotomous variable for state and using a margins command (dydx) in Stata with a contrast operator to test for significant differences. Significant interactions were included in the adjusted models and those remaining significant were retained. Multivariable analysis was conducted using a series of pairwise regression models derived from dichotomous outcomes comparing method types. We compared contraceptive nonuse to any contraceptive use; LARC use to permanent methods; LARC use to short-acting hormonal methods; LARC use to barrier/other methods; and short-acting hormonal methods to barrier/other methods.

Although not the primary focus of this analysis, we also examined differences in contraception use patterns between non-Hispanic White women and non-Hispanic Black women for each of the select measures included in the analysis among the pooled sample of women (results in Supplemental Table 1). Given the small proportion and subsequent small values for non-Hispanic other and Hispanic/Latina women represented in the sample, results for these women are not shown.

Our primary interest in these regression models was to estimate the relative probability of contraceptive method use by calculating adjusted risk ratios. A modified Poisson regression has been shown to provide a reliable estimate of risk ratios for dichotomous outcome variables when outcomes are not rare, as is the case for most of the contraceptive use outcomes in this analysis (Cummings, 2009a,b; Spiegelman & Hertzmark, 2005; Zou, 2009). Given these data were collected through a cross-sectional survey, the results are presented as prevalence ratios rather than risk ratios.

The study was reviewed by the East Tennessee State University Institutional Review Board and deemed nonhuman subjects research, because these data were collected by NORC and provided to the research team as a de-identified dataset. All analyses were carried out using StataMP 15.

## Results

The initial study population included 4,281 women of reproductive age. Women who were pregnant at the time of the survey ($n = 47$), trying to get pregnant ($n = 52$), or indicated a history of infertility ($n = 146$) were removed from the study population. An additional 261 women (6%) were missing responses or preferred not to answer questions used in the exclusion criteria and were also removed from the analysis. After exclusions, 3,775 women (89% of the original weighted sample) remained in the study population, including 1,887 from Alabama and 1,888 from South Carolina.

Overall, no differences in the type of method used by women in each state were noted (Table 1). Overall, 26.5% of women reported not using any contraception. Short-acting hormonal methods were the most commonly reported (26.3%), followed by permanent methods (24.4%), LARC (14.3%), and barrier/other methods (8.5%).

The greatest proportions of women were between 25 and 35 years of age. The study population was primarily non-Hispanic White and non-Hispanic Black. State differences were noted in fatalistic beliefs about pregnancy, with a higher proportion of South Carolina women (50.8%) disagreeing or strongly disagreeing with the statement that "It doesn't matter whether you use birth control or not, when it is your time to get pregnant, it will happen" compared with 44.6% of Alabama women ($p = .02$). State differences were also noted for income, with the largest proportional difference occurring in the $25,000 to $50,000 category (19% in Alabama compared with 25% in South Carolina; $p = .01$). The majority of women in both states were covered by private insurance sources and nearly one in five women had Medicaid as a pay source.

### *Bivariate Analyses*

Contraception use patterns varied significantly across most measures within each respective state (Table 2). Nonuse was

**Table 1**
Characteristics of the Study Population by State (2017; $N = 3,775$)

| Characteristics | Alabama ($n = 1,887$) | South Carolina ($n = 1,888$) | Total ($n = 3,775$) | $p$ Value |
|---|---|---|---|---|
| Method | | | | .368 |
| Nonuse | 27.1% | 26.0% | 26.5% | |
| Barrier/other* | 7.1% | 9.8% | 8.5% | |
| Short-acting hormonal | 26.5% | 26.2% | 26.3% | |
| LARC | 14.0% | 14.6% | 14.3% | |
| Permanent | 25.3% | 23.5% | 24.4% | |
| Predisposing factors | | | | |
| Age, years | | | | .520 |
| 18–24 | 26.6% | 24.3% | 25.4% | |
| 25–35 | 40.2% | 40.7% | 40.5% | |
| 36–44 | 33.2% | 35.0% | 34.1% | |
| Race/ethnicity | | | | .374 |
| Non-Hispanic White | 61.2% | 60.2% | 60.7% | |
| Non-Hispanic Black | 30.3% | 28.7% | 29.5% | |
| Non-Hispanic other | 4.7% | 6.6% | 5.6% | |
| Hispanic/Latina | 3.9% | 4.5% | 4.2% | |
| Relationship status | | | | .406 |
| Married | 40.7% | 37.6% | 39.2% | |
| Not married, living with partner | 17.6% | 19.4% | 18.5% | |
| Not married, not living with partner | 41.6% | 43.0% | 42.3% | |
| Education | | | | .153 |
| Bachelors degree or (+) | 26.3% | 28.8% | 27.6% | |
| Some college/associates degree | 47.4% | 48.6% | 48.0% | |
| High school diploma/equivalent or less | 26.3% | 22.5% | 24.4% | |
| Future pregnancy intention | | | | .763 |
| Want child within next 2 years | 12.4% | 14.7% | 13.6% | |
| Want child within next 2–5 years | 16.5% | 16.8% | 16.7% | |
| Want child, but ≥5 years | 9.8% | 8.9% | 9.3% | |
| Want children but not sure when | 27.9% | 26.4% | 27.1% | |
| Never want children | 33.5% | 33.3% | 33.4% | |
| Importance of avoiding pregnancy | | | | .102 |
| Very or somewhat | 75.2% | 78.8% | 77.1% | |
| Neither important/unimportant | 12.3% | 12.3% | 12.3% | |
| Somewhat unimportant/not important | 12.5% | 8.9% | 10.6% | |
| Feelings about pregnancy | | | | |
| Birth control use doesn't matter if it's your time to get pregnant | | | | .023 |
| Strongly agree/agree | 35.5% | 32.6% | 34.0% | |
| Neither agree or disagree | 20.0% | 16.6% | 18.3% | |
| Disagree/strongly disagree | 44.6% | 50.8% | 47.8% | |
| Enabling factors | | | | |
| Income | | | | .008 |
| $0–$25,000 | 32.7% | 27.0% | 29.7% | |
| $25,000–$50,000 | 19.0% | 25.0% | 22.1% | |
| ≥$50,000 | 48.3% | 48.1% | 48.2% | |
| Insurance status | | | | .431 |
| Private | 54.6% | 56.5% | 55.6% | |
| Medicaid | 18.6% | 19.0% | 18.8% | |
| Other sources | 14.8% | 15.1% | 15.0% | |
| No insurance | 12.0% | 9.3% | 10.6% | |
| Usual source of care | | | | .487 |
| Source of care | 76.3% | 74.8% | 75.6% | |
| No source of care | 23.7% | 25.2% | 24.5% | |
| Most recent provider visit | | | | .898 |
| Within past year | 73.3% | 73.4% | 73.4% | |
| Within past 2 years | 13.0% | 12.4% | 12.7% | |
| Within past 5 years | 13.7% | 14.3% | 14.0% | |
| Individual need | | | | |
| No. of live births | | | | .849 |
| 0 | 42.6% | 43.0% | 42.8% | |
| 1 | 17.6% | 16.8% | 17.1% | |
| 2 | 22.2% | 23.6% | 22.9% | |
| ≥3 | 17.7% | 16.7% | 17.2% | |
| Delay obtaining birth control | | | | .508 |
| No | 92.4% | 91.5% | 91.9% | |
| Yes | 7.6% | 8.5% | 8.1% | |
| Sexual activity | | | | .080 |
| No sex with male in past 3 months | 47.0% | 42.8% | 44.9% | |
| Sex with male in past 3 months | 53.0% | 57.2% | 55.1% | |

*Abbreviation*: LARC, long-acting reversible contraceptive.
* Other includes withdrawal, male condoms, natural family planning, and other female barrier methods.

**Table 2**
Contraception Use by State and Characteristics of the Study Population (2017; $N = 3,775$)

| | Alabama ($n = 1,887$)* | | | | | South Carolina ($n = 1,888$)† | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Nonuse (27.1%) | Barrier/Other (7.1%) | Short-Acting Hormonal (26.5%) | LARC (14.0%) | Permanent (25.3%) | Nonuse (26.0%) | Barrier/Other (9.8%) | Short-Acting Hormonal (26.2%) | LARC (14.6%) | Permanent (23.5%) |
| Predisposing factors | | | | | | | | | | |
| Age years*,† | | | | | | | | | | |
| 18–24 | 36.6% | 4.6% | 42.1% | 15.7% | 0.9% | 35.6% | 10.0% | 39.1% | 12.4% | 3.0% |
| 25–35 | 24.4% | 9.4% | 28.4% | 18.4% | 19.4% | 22.6% | 10.9% | 27.2% | 20.5% | 18.8% |
| 36–44 | 22.3% | 6.5% | 11.4%‡ | 7.5% | 52.4%‡ | 23.4% | 8.5% | 16.3%‡ | 9.2% | 42.7%‡ |
| Race/ethnicity† | | | | | | | | | | |
| Non-Hispanic White | 23.9% | 8.0% | 28.7% | 13.2% | 26.2% | 21.6% | 10.9% | 29.4% | 15.2% | 23.1% |
| Non-Hispanic Black | 33.8% | 4.7% | 21.7% | 17.0% | 22.9% | 28.9% | 4.3% | 25.2% | 16.8% | 24.8% |
| Non-Hispanic other | 23.2% | 13.9% | 36.4%‡ | 10.2% | 16.4% | 45.6% | 19.2% | 11.8%‡ | 3.8% | 19.6% |
| Hispanic/Latina | 28.5% | 7.7% | 19.7% | 15.3% | 28.8% | 36.5% | 9.9% | 17.3% | 13.3% | 23.1% |
| Relationship status† | | | | | | | | | | |
| Married | 17.2% | 10.6% | 18.5% | 14.1% | 39.7% | 15.7% | 13.6% | 20.9% | 12.8% | 37.1% |
| Not married, living with partner | 21.0% | 9.1% | 37.2%‡ | 17.0% | 15.8% | 25.9% | 8.4% | 23.6%‡ | 26.7% | 15.4% |
| Not married, not living with partner | 39.5% | 2.9%‡ | 30.1% | 12.7% | 14.7% | 35.3% | 7.4%‡ | 31.9% | 11.0% | 14.4% |
| Education*,† | | | | | | | | | | |
| Bachelors degree or (+) | 19.9% | 10.3% | 32.2% | 14.1% | 23.6%‡ | 20.2% | 13.0% | 31.9% | 17.0% | 17.8%‡ |
| Some college/associates degree | 29.4% | 6.2%‡ | 25.8% | 14.8% | 23.8% | 28.3% | 10.9%‡ | 22.6% | 14.2% | 24.1% |
| High school diploma/equivalent or less | 30.5% | 5.2% | 22.5% | 12.3% | 29.4% | 28.2% | 3.6% | 26.6% | 13.0% | 28.5% |
| Future pregnancy intention*,† | | | | | | | | | | |
| Want child within next 2 years | 32.9% | 12.2% | 34.1% | 19.7% | § | 35.4% | 6.4% | 26.2% | 28.2% | § |
| Want child within next 2–5 years | 24.9% | 10.7% | 44.8% | 19.4% | § | 31.5% | 12.1% | 34.6% | 20.4% | § |
| Want child, but ≥5 years | 38.5% | § | 41.3% | 19.3% | § | 38.4% | § | 46.1% | 8.0% | § |
| Want children but not sure when | 26.7% | 4.9% | 17.9% | 5.2% | 45.2% | 24.1% | 5.8% | 14.5% | 7.2% | 48.4% |
| Never want children | 28.8%‡ | 10.5% | 28.6% | 15.9% | 16.2% | 20.4%‡ | 13.8% | 31.8% | 17.4% | 16.7% |
| Importance of avoiding pregnancy*,† | | | | | | | | | | |
| Very or somewhat | 28.4% | 9.1%‡ | 36.8% | 18.7% | 7.0% | 26.4% | 12.9%‡ | 35.4% | 17.0% | 8.3% |
| Neither important/unimportant | 34.3% | 9.6% | 31.7% | 14.8% | 9.6% | 36.1% | 8.4% | 22.6% | 23.0% | 9.8% |
| Somewhat unimportant/not important | 60.0% | 8.6% | 13.1% | 9.5% | 8.9%‡ | 62.5% | 4.6% | 11.7% | 19.3% | 1.9%‡ |
| Feelings about pregnancy*,† | | | | | | | | | | |
| Birth control use doesn't matter if it's your time to get pregnant | | | | | | | | | | |
| Strongly agree/agree | 30.5% | 5.5% | 24.2% | 14.7% | 25.1% | 35.4% | 6.7% | 19.3% | 12.7% | 25.8% |
| Neither agree or disagree | 27.3% | 5.8% | 23.0% | 10.7% | 33.2% | 22.2% | 10.3% | 24.1% | 14.2% | 29.3% |
| Disagree/strongly disagree | 23.8% | 9.3% | 31.5% | 15.3% | 20.1% | 20.3% | 12.2% | 32.0% | 16.7% | 18.7% |
| Enabling factors | | | | | | | | | | |
| Income† | | | | | | | | | | |
| $0-$25,000 | 30.1% | 6.9% | 28.7% | 13.8% | 20.5% | 33.7% | 5.7% | 22.0% | 18.8% | 19.8% |
| $25,000–$50,000 | 24.6% | 8.9% | 27.9% | 13.3% | 25.3% | 31.3% | 7.6% | 25.5% | 10.6% | 25.0% |
| ≥$50,000 | 22.2% | 7.9%‡ | 24.8% | 15.9% | 29.2% | 17.7% | 13.3%‡ | 28.8% | 16.2% | 24.1% |
| Insurance status*,† | | | | | | | | | | |
| Private | 23.3% | 7.7% | 30.6% | 12.6% | 25.9% | 22.0% | 10.8% | 31.2% | 13.8% | 22.1% |
| Medicaid | 26.2% | 6.4% | 30.8% | 14.6% | 22.0% | 24.2% | 4.4% | 19.7% | 24.0% | 27.8% |
| Other sources | 26.8% | 7.8% | 22.1% | 20.3% | 23.1% | 26.3% | 11.3% | 26.8% | 11.2% | 24.5% |
| No insurance | 41.2% | 6.2% | 9.5% | 14.9% | 28.3% | 39.0% | 8.8% | 14.6% | 13.0% | 24.6% |
| Usual source of care*,† | | | | | | | | | | |
| Source of care | 23.9% | 7.2% | 28.6% | 13.5% | 26.8% | 23.5% | 9.3% | 27.0% | 15.0% | 25.1% |
| No source of care | 36.8% | 7.3% | 20.6% | 14.8% | 20.4% | 32.8% | 11.8% | 24.2% | 14.2% | 17.0% |
| Most recent provider visit*,† | | | | | | | | | | |
| Within past year | 22.9% | 6.6% | 30.3% | 14.5% | 25.7% | 22.3% | 8.4% | 29.8% | 16.2% | 23.3% |
| Within past 2 years | 35.2%‡ | 7.0% | 15.9% | 17.7% | 24.3% | 23.1%‡ | 13.6% | 21.7% | 12.1% | 29.5% |
| Within past 5 years | 38.0% | 11.1% | 19.7% | 7.5% | 23.7% | 44.6% | 15.1% | 12.0% | 10.5% | 17.8% |
| Individual need | | | | | | | | | | |
| No. of previous live births*,† | | | | | | | | | | |
| 0 | 37.0% | 7.9% | 40.2% | 11.0% | 3.8% | 34.3% | 10.5% | 38.8% | 12.7% | 3.6% |
| 1 | 29.3% | 9.9% | 27.5% | 20.3% | 13.0% | 23.3% | 12.4% | 25.7% | 26.6% | 12.1% |
| 2 | 15.0% | 6.5% | 13.8% | 19.6% | 45.1% | 18.9% | 9.7% | 16.9% | 14.8% | 39.7% |
| ≥3 | 16.4% | 4.7% | 10.3% | 8.5% | 60.1% | 14.0% | 5.0% | 10.2% | 9.3% | 61.5% |
| Delay obtaining birth control † | | | | | | | | | | |
| No | 26.4% | 7.1% | 25.7% | 14.2% | 26.6% | 26.3% | 9.4% | 24.8% | 14.4% | 25.2% |
| Yes | 35.6% | 7.6% | 38.2% | 11.4% | 7.2% | 24.2% | 14.9% | 43.2% | 13.8% | 3.9% |
| Sexual activity*,† | | | | | | | | | | |
| No sex with male in past 3 months | 31.2% | 2.3% | 13.9% | 6.7% | 46.0% | 35.1% | 2.5% | 15.1% | 3.9% | 43.3% |
| Sex with male in past 3 months | 23.9% | 10.9% | 36.3% | 19.8% | 9.2% | 20.0% | 14.6% | 33.4% | 21.6% | 10.4% |

*Abbreviation*: LARC, long-acting reversible contraceptive.
* Significant differences ($p < .05$) in the distribution of contraception among Alabama women.
† Significant differences ($p < .05$) in the distribution of contraception among South Carolina women.
‡ Significant differences ($p < .05$) between Alabama and South Carolina women.
§ Cell values < 5 suppressed.

lower among non-Hispanic White women than other racial/ethnic groups. In Alabama, nonuse was the highest among non-Hispanic Black women, whereas in South Carolina, nonuse was higher among non-Hispanic other and Hispanic women. Nonuse was more common among women without a college degree, those who did not indicate a strong desire to avoid a pregnancy, women with no insurance, women without a usual source of care, and those with longer gaps between provider visits.

The use of short-acting hormonal methods was more common among younger women in both states. More women who were not married but living with a partner reported the use of short-acting hormonal methods in Alabama than their South Carolina counterparts. Higher proportions of women with a college degree and women with more frequent provider visits also reported short-acting hormonal use.

LARC use was more common among women aged 25 to 35 than among younger and older women. Higher proportions of non-Hispanic Black women indicated LARC use relative to other racial/ethnic categories, particularly in Alabama. In South Carolina, LARC use was highest among women with household incomes of less than $25,000 a year, whereas those reporting household incomes of $25,000 to $50,000 had the lowest proportion of LARC use. Also in South Carolina, LARC use was higher among Medicaid beneficiaries than other insured women.

The use of permanent methods was more common among married women. Women with a college degree in Alabama had higher proportions of permanent method use relative to their counterparts in South Carolina. In both states, permanent method use increased proportionally with an increasing number of previous live births.

The use of barrier/other, short-acting hormonal, and LARC methods was more common among women reporting sexual activity within the past 3 months, relative to women who were not sexually active. Overall, few differences in contraception method use was noted between non-Hispanic White women and non-Hispanic Black women across select measures (Supplemental Table 1). A higher proportion of non-Hispanic Black women with household incomes of more than $50,000 reported LARC use than non-Hispanic White women of the same income level. Nonuse was higher among non-Hispanic Black women, regardless of the time since last provider visit. We also noted that nonuse was higher among non-Hispanic Black women who report that avoiding a pregnancy is very or somewhat important than what was observed among non-Hispanic White women indicating the same desires.

### *Multivariable Analyses*

Nonuse was more common among women 36–44 years of age than among women aged 18–24 years (adjusted Prevalence Ratio [aPR], 1.45; 95% confidence interval [CI], 1.08–1.97; Table 3). Nonuse was more prevalent among women with some college or an associate's degree than among women with a bachelor's degree or higher (aPR, 1.28; 95% CI, 1.02–1.60). Nonuse was more prevalent among women who felt that avoiding pregnancy was somewhat unimportant/not important at all (aPR, 1.94 95% CI, 1.46–2.59). Furthermore, the likelihood of nonuse was lower among women with less fatalistic beliefs about pregnancy (aPR, 0.77; 95% CI, 0.61–0.96).

Among enabling factors, nonuse was higher among women with household incomes of $25,000 to $50,000 than among women with incomes of less than $25,000 (aPR 1.36; 95% CI, 1.06–1.75). The prevalence of nonuse was also higher among women with no health insurance (aPR, 1.43; 95% CI, 1.03–1.97) and those with long gaps in care (aPR, 1.47; 95% CI, 1.08–2.00). Among need factors, the prevalence of nonuse was lower among sexually active women.

Comparing LARC use to permanent methods, women 36–44 years were less likely to be using LARC methods than permanent ones. LARC use was more prevalent among single than married women. LARC use was less prevalent than permanent methods among women who never want children or want children but are unsure when. Women reporting not having a usual source of care were more likely to report LARC use than permanent methods.

State differences were noted with respect to LARC use relative to short-acting hormonal methods. Women with no health insurance were more likely to be using LARCs than short-acting hormonal methods when compared with privately insured women. Among South Carolina women specifically, LARC use among women with Medicaid as a pay source was more prevalent than what was observed among Alabama women. Women reporting delays in obtaining birth control were less likely to be using LARC than short-acting hormonal methods (aPR, 0.58; 95% CI, 0.36–0.92). LARC use was also more common among women with multiple children and women with a provider visit within the past 2 years.

Comparing LARC use with barrier/other methods, non-Hispanic other women were less likely to be using LARC methods than non-Hispanic White women (aPR, 0.30; 95% CI, 0.11–0.83). LARC use was more common than barrier/other methods among single women than married women. Women with one or two previous live births were also more likely to be using LARCs than barrier/other methods compared with women with no children. Women reporting a provider visit within the past 5 years were less likely to be using LARC than women with more recent visits (aPR, 0.63; 95% CI, 0.45–0.89).

The use of short-acting hormonal methods was more common than barrier/other methods among single women. Conversely, women with longer gaps between provider visits were less likely to be using short-acting hormonal than barrier/other methods compared with women with more recent visits.

## Discussion

Although differences in survey instruments and inclusion criteria make direct comparison with other population-based surveys difficult, our study found that one in four (26.5%) reproductive-aged women (18–44 years of age) reported not using any form of contraception, which closely mirrors national estimates of nonuse when excluding women who are sterile, postpartum, or seeking pregnancy (27.2%) (Daniels and Abma, 2018; Daniels, Daugherty, Jones, & Mosher, 2015). Permanent sterilization (including both male and female) among the study population (24.4%) was also consistent with recent national estimates (27.6%) (Daniels and Abma, 2018). The use of LARC methods among this study population (14.3%) was higher than what was observed nationally (10.3%) during the same time period and among a similarly defined population (Daniels and Abma, 2018; Daniels, Daugherty, & Jones, 2014).

Although contraception use patterns varied across predisposing, enabling, and need factors, enabling factors specifically emerged as being particularly important. Nonuse was more prevalent among women with some college or an associate's degree, incomes between $25,000 and $50,000, no health insurance, and longer gaps in care. These findings suggest that

**Table 3**
Adjusted Prevalence Ratios for Contraception Method Efficacy and Variables of Interest

| | Nonuse vs. Use | LARC vs. Permanent | LARC vs. Short Acting Hormonal | LARC vs. Barrier/Other | Short Acting Hormonal vs. Barrier/Other |
|---|---|---|---|---|---|
| | aPR (95% CI) | aPR (95% CI) | aPR (95% CI) | aPR (95% CI) | aPR (95% CI) |
| State | | | | | |
| Alabama | Reference | Reference | Reference | Reference | Reference |
| South Carolina | 0.97 (0.80–1.18) | 0.93 (0.82–1.06) | 1.02 (0.72–1.43) | 1.04 (0.88–1.23) | 0.98 (0.90–1.08) |
| Predisposing factors | | | | | |
| Age, years | | | | | |
| 18–24 | Reference | Reference | Reference | Reference | Reference |
| 25–35 | 1.09 (0.84–1.41) | 0.95 (0.85–1.06) | 1.13 (0.79–1.64) | 0.92 (0.74–1.15) | 0.95 (0.85–1.06) |
| 36–44 | **1.45 (01.08–1.97)** | **0.62 (0.49–0.79)** | 1.12 (0.71–1.77) | 0.80 (0.59–1.09) | 0.87 (0.74–1.03) |
| Race/ethnicity | | | | | |
| Non-Hispanic White | Reference | Reference | Reference | Reference | Reference |
| Non-Hispanic Black | 1.22 (0.94–1.58) | 0.99 (0.87–1.13) | 1.06 (0.80–1.41) | 1.00 (0.83–1.20) | 1.04 (0.92–1.17) |
| Non-Hispanic other | 1.13 (0.81–1.56) | 0.73 (0.43–1.23) | 0.54 (0.18–1.58) | **0.30 (0.11–0.83)** | 0.78 (0.56–1.09) |
| Hispanic/Latina | 1.20 (0.75–1.93) | 1.12 (0.78–1.62) | 0.94 (0.59–1.49) | 1.08 (0.72–1.62) | 1.03 (0.79–1.35) |
| Education | | | | | |
| Bachelors degree or (+) | Reference | Reference | Reference | Reference | Reference |
| Some college/associates degree | **1.28 (1.02–1.60)** | 0.97 (0.84–1.11) | 0.96 (0.71–1.29) | 0.92 (0.75–1.11) | 0.94 (0.84–1.05) |
| High school diploma/equivalent or less | 1.17 (0.87–1.58) | 1.04 (0.89–1.22) | 0.75 (0.51–1.10) | 0.90 (0.70–1.21) | 0.97 (0.84–1.13) |
| Relationship status | | | | | |
| Married | Reference | Reference | Reference | Reference | Reference |
| Not married, living with partner | 1.09 (0.76–1.55) | **1.20 (1.03–1.40)** | 1.14 (0.83–1.57) | **1.45 (1.17–1.79)** | **1.22 (1.04–1.43)** |
| Not married, not living with partner | **1.33 (1.01–1.76)** | **1.22 (1.03–1.45)** | 0.95 (0.64–1.41) | **1.30 (1.02–1.67)** | **1.21 (1.03–1.43)** |
| Future pregnancy intention | | | | | |
| Want child within next 2 years | Reference | Reference | Reference | Reference | Reference |
| Want child within next 2–5 years | 1.08 (0.75–1.55) | 0.98 (0.84–1.13) | 0.93 (0.63–1.37) | **0.73 (0.58–0.92)** | 0.88 (0.75–1.03) |
| Want child, but ≥5 years | 1.48 (1.00–2.20) | 0.89 (0.75–1.05) | 0.70 (0.40–1.21) | 0.96 (0.67–1.38) | 1.02 (0.84–1.23) |
| Want children but not sure when | 1.14 (0.84–1.56) | **0.84 (0.72–0.99)** | 0.98 (0.66–1.47) | **0.69 (0.49–0.97)** | 0.81 (0.65–1.01) |
| Never want children | 0.97 (0.70–1.35) | **0.74 (0.61–0.89)** | 0.77 (0.53–1.12) | 0.81 (0.66–1.00) | 0.94 (0.80–1.10) |
| Importance of avoiding pregnancy | | | | | |
| Very or somewhat | Reference | Reference | Reference | Reference | Reference |
| Neither important/unimportant | **1.51 (1.13–2.02)** | 0.92 (0.74–1.14) | 0.86 (0.60–1.23) | 0.92 (0.73–1.17) | 1.06 (0.88–1.27) |
| Somewhat unimportant/not important | **1.94 (1.46–2.59)** | 0.82 (0.66–1.03) | 1.03 (0.69–1.53) | 0.85 (0.63–1.14) | 0.82 (0.63–1.06) |
| Feelings about pregnancy | | | | | |
| Birth control use doesn't matter if it's your time to get pregnant | | | | | |
| Strongly agree/agree | Reference | Reference | Reference | Reference | Reference |
| Neither agree or disagree | 0.91 (0.68–1.22) | 1.04 (0.82–1.31) | 0.73 (0.50–1.08) | 0.81 (0.62–1.05) | 1.02 (0.90–1.17) |
| Disagree/strongly disagree | **0.77 (0.61–0.96)** | 0.97 (0.83–1.12) | 1.05 (0.79–1.39) | 0.84 (0.71–1.00) | 0.94 (0.85–1.05) |
| Enabling factors | | | | | |
| Income | | | | | |
| $0–$25,000 | Reference | Reference | Reference | Reference | Reference |
| $25,000–$50,000 | **1.36 (1.06–1.75)** | 1.12 (0.95–1.33) | 0.82 (0.56–1.18) | 0.95 (0.73–1.22) | 1.04 (0.91–1.19) |
| ≥$50,000 | 1.16 (0.86–1.56) | 1.04 (0.89–1.22) | 1.15 (0.77–1.70) | 1.14 (0.88–1.48) | 0.98 (0.87–1.11) |
| Insurance status | | | | | |
| Private | Reference | Reference | Reference | Reference | Reference |
| Medicaid | 1.32 (0.98–1.78) | 1.11 (0.96–1.29) | 0.86 (0.52–1.39) | 1.16 (0.95–1.41) | 1.01 (0.89–1.14) |
| Other sources | 0.81 (0.56–1.17) | 1.03 (0.80–1.33) | 1.00 (0.60–1.77) | 0.75 (0.49–1.12) | 0.90 (0.75–1.08) |
| No insurance | **1.43 (1.03–1.97)** | 1.08 (0.89–1.32) | **2.08 (1.35–3.20)** | 1.12 (0.88–1.43) | 0.80 (0.59–1.08) |
| Insurance status*state | | | | | |
| Medicaid*South Carolina | | | **1.98 (1.12–3.51)** | | |
| Other*South Carolina | | | 0.54 (0.19–1.51) | | |
| No insurance*South Carolina | | | 0.78 (0.40–1.49) | | |
| Usual source of care | | | | | |
| Source of care | Reference | Reference | Reference | Reference | Reference |
| No source of care | 1.04 (0.80–1.33) | **1.18 (1.01–1.38)** | 1.04 (0.75–1.43) | 1.14 (0.91–1.42) | 0.99 (0.86–1.13) |
| Most recent provider visit | | | | | |
| Within past year | Reference | Reference | Reference | Reference | Reference |
| Within past 2 years | 1.21 (0.92–1.59) | 0.88 (0.73–1.05) | **1.33 (1.00–1.76)** | 0.79 (0.61–1.03) | **0.76 (0.63–0.92)** |
| Within past 5 years | **1.47 (1.08–2.00)** | 0.93 (0.75–1.14) | 1.13 (0.80–1.60) | **0.63 (0.45–0.89)** | **0.75 (0.59–0.96)** |
| Individual need | | | | | |
| No. of live births | | | | | |
| 0 | Reference | Reference | Reference | Reference | Reference |
| 1 | 0.85 (0.64–1.14) | 1.08 (0.93–1.26) | **1.67 (1.20–2.33)** | **1.28 (1.03–1.59)** | 1.02 (0.89–1.17) |
| 2 | 0.82 (0.59–1.14) | 1.03 (0.84–1.25) | **1.99 (1.40–2.85)** | **1.44 (1.12–1.85)** | 0.95 (0.79–1.15) |
| ≥3 | 0.98 (0.66–1.45) | 0.72 (0.52–1.00) | **2.11 (1.36–3.26)** | 1.31 (0.98–1.75) | 0.84 (0.65–1.07) |
| Delay obtaining birth control | | | | | |
| No | Reference | Reference | Reference | Reference | Reference |
| Yes | 0.93 (0.67–1.28) | 1.19 (0.95–1.49) | **0.58 (0.36–0.92)** | 0.77 (0.56–1.07) | 1.08 (0.95–1.23) |
| Sexual activity | | | | | |
| No sex with male in past 3 months | Reference | Reference | Reference | Reference | Reference |
| Sex with male in past 3 months | **0.45 (0.36–0.57)** | 0.87 (0.71–1.06) | 1.43 (0.96–2.13) | 0.94 (0.70–1.25) | 0.89 (0.80–1.00) |

*Abbreviation*: aPR, adjusted Prevalence Ratio; CI, confidence interval; LARC, long-acting reversible contraceptive. Bold indicates significant $p<0.05$

women with lower incomes who may not be eligible for financial assistance to offset the cost of contraceptives may be experiencing financial barriers in accessing these services. Although we are not able to measure poverty directly in this study, single women with household incomes at the mid-point of our income category ($37,500) would be at 293% of the FPL and women with one dependent at 217% of FPL; both examples would fall outside the Medicaid income qualifying categories for family planning services in each state.

Our study noted that LARC use among women with Medicaid as a pay source, particularly in South Carolina, was markedly higher than what was observed among privately insured women. Income eligibility for family planning services is higher in South Carolina than in Alabama (194% of the FPL in South Carolina compared with 146% in Alabama), which could contribute to these differences. Furthermore, South Carolina has been at the forefront of Medicaid reimbursement policies specific to immediate postpartum LARC provision and was the first state to change reimbursement policies to cover these services outside of the global payment in 2012 (Mann, White, Rogers, & Gomez, 2019; Steenland, Pace, Sinaiko, & Cohen, 2019). Alabama also reimburses for immediate postpartum LARC, but did not begin until 2014 and initially did not cover the cost of the devices, which could also explain some of these observed differences between states (American College of Obstetricians & Gynecologists, 2019). While this study did not measure immediate post-partum LARC specifically, it is possible that the higher rate of LARC utilization observed at the population level may, in part, be driven by generous reimbursement policies in South Carolina that occurred 2 years earlier than in Alabama. While we are not able to account for method availability among safety net providers in each state, it is possible that LARC availability in Title X clinics differed between South Carolina and Alabama during the study period.

An interesting dichotomy emerged with respect to health insurance. In addition to having an increased likelihood of nonuse, women with no health insurance were more likely to use LARCs than short-acting hormonal methods. It is possible that uninsured women are more likely to seek family planning services at Title X or other federally funded clinics where LARCs are theoretically more accessible. Alternatively, it is possible that uninsured women choose LARCs to avoid purchasing pills or other methods requiring costly refills on a regular basis or that women with unstable sources of insurance are more likely to get a LARC when they are covered. These findings may suggest that gaps in access to important reproductive health services, including contraceptive counseling and the full range of contraceptive methods, remain an important barrier. This conclusion is further supported by the finding that longer gaps between provider visits was associated with both contraceptive nonuse and the use of barrier/other methods.

We also found that LARC use was more prevalent among non-Hispanic Black women in both states relative to non-Hispanic White women in the bivariate analyses. However, no differences were observed in the adjusted models. These findings mirror recent national studies also examining LARC use by race/ethnicity (Kavanaugh & Jerman, 2018; Kramer, Higgins, Godecker, & Ehrenthal, 2018).

This study is not without weakness. The study is cross-sectional and represents a snapshot of current contraceptive use among women in these two states. Self-reported items are subject to recall bias and socially desirable responses. Misclassification of nonuse is also possible in our study. It is possible women may not have perceived some methods (condoms or withdrawal) as using contraception and responded “no” when asked about current birth control use. This study grouped multiple contraceptive methods into categories for analysis. Findings based on grouped categories may be driven primarily by individual methods with a higher prevalence within the group. Furthermore, this study examines reported current contraception use. We were not able to examine women’s contraception preferences, which are also important for understanding the use of specific methods and contraception use patterns.

The study has several strengths. We examined contraceptive use and method effectiveness among a representative sample of reproductive-aged women living in the southeastern United States. Most population-based surveys focus on generating national estimates that are less representative of these populations. The survey included important elements specific to contraceptive care in these states, allowing for comparison with other national surveys. These are important for both informing the national dialogue on differences in reproductive health services within a distinct subregion of the United States and provide important information for state and local representatives for policy and planning purposes.

Many of our findings are consistent with previous research using similar population-based surveys. While we examined theoretically relevant, observable factors potentially associated with contraception use, the measures included in this study may not adequately capture the complex and dynamic association between pregnancy attitudes and contraception use (Potter et al., 2019; Kost & Zolna, 2019). Furthermore, the extent to which observed differences in contraception use noted in this study reflect women’s contraception preferences, structural or institutional influences, geographic differences in access to specific contraceptive methods, or some combination of factors remains largely unknown and warrants further investigation.

### *Implications for Practice and/or Policy*

Previous research has suggested that increasing Medicaid coverage is associated with increased utilization of more effective contraceptive methods among women seeking services in publicly funded clinics (Hale et al., 2018; Zolna & Frost, 2016). Our finding that LARC use is higher among women with Medicaid as a pay source supports these findings and further underscores the importance of Medicaid programs and publicly funded clinics in increasing access to contraceptive services. Furthermore, our finding that LARC use was higher among women enrolled in South Carolina Medicaid, which has a higher income threshold and more comprehensive reimbursement for these services compared with Alabama, also suggests that these policies are important for LARC access. This study also found that women with lower incomes who may not be Medicaid eligible are more likely to not be using contraception. Taken collectively, these findings suggest that increasing Medicaid eligibility income thresholds for family planning services is an important policy lever that could further expand access to contraceptive services for women with lower incomes. However, policies designed to increase access to these services face many challenges and continue to be undermined at the federal and state levels (American College of Obstetricians & Gynecologists, 2015).

Although LARC methods have demonstrated high effectiveness in preventing pregnancy (Frost, 2011; Harper et al., 2015; Stoddard, McNicholas, & Peipert, 2011; Thompson et al., 2016;

Trussell, 2011), our finding that LARC use was higher among women with Medicaid as a pay source warrants additional consideration. Ongoing concern about potential provider bias and the promotion of LARC methods among women of color and those with lower incomes has been described (Gomez, Fuentes, & Allina, 2014; Higgins, 2014; Higgins, Kramer, & Ryder, 2016; Horvath et al., 2020). Although increasing access to LARC methods among women facing financial and structural barriers who would otherwise not have access to these methods remains a priority, these efforts must be rooted in women's reproductive autonomy and personal preferences (Gomez et al., 2014; Higgins, 2014; Higgins et al., 2016; Horvath et al., 2020).

The goal of a responsive health care system is to provide women access to a full range of contraceptive methods to choose from, regardless of whether that choice is a LARC or another form of contraception (Kost & Zolna, 2019). Expanding the number of accessible clinics providing a full range of contraceptive options for women, continued focus on patient-centered contraceptive counseling, and removing important financial and structural barriers remain important priorities for women's reproductive health.

## Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.whi.2020.08.005.

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## Author Descriptions

Nathan Hale, PhD, is an Associate Professor in the Department of Health Services Management and Policy at East Tennessee State University. His primary research interests include access to health care services for vulnerable populations, maternal/child health, and health policy.

Michael Smith, DrPH, is an Assistant Professor in the Department of Health Services Management and Policy at East Tennessee State University. His research interests include maternal/child health, health policy, and applied statistical methods.

Katie Baker, DrPH, is an Assistant Professor in the Department of Community and Behavioral Health at East Tennessee State University. Her research interest include women's contraception decision making, community context, and women's health.

Amal Khoury, PhD, is a Professor in the Department of Health Services Management and Policy at East Tennessee State University. Her research interests include the organization/delivery of health care services to women, women's health policy, and access to care in underserved populations.