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Comparison of contraceptive choices of rural and urban US adults aged 18-55 years: an analysis of 2004 behavioral risk factor surveillance survey data

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ABSTRACT

Introduction: Although sexually active US adults wanting to prevent pregnancy have a wide variety of birth control methods readily available, there is little research that documents the contraceptive choices of rural adults in comparison to urban adults. This study compared the contraceptive choices of rural with urban adults. The comparative analysis joins the recent dialog in population health focused on assessing health related differences to detect if these are indicative of rural health disparities.

Methods: Design: This was a cross-sectional study analyzing 2004 Behavioral Risk Factor Surveillance Survey (BRFSS) data. Place of residence was ascertained by re-coding the state/county FIPS code as either urban or rural, based on 2003 Rural-Urban Continuum Codes from the US Office of Management and Budget (setting: US households; participants: US adults 18–55 years). Main outcome measures: characteristics and contraceptive method choice of rural adults using birth control

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Results: A multivariate regression model performed with 'use of birth control' as the dependent variable yielded that rural in comparison with urban adults 18–55 years were more likely to use female or male sterilization, non-injectable and injectable hormones for birth control. They were less likely to use: condoms, a diaphragm or NuvaRing®, emergency contraception, withdrawal or rhythm methods. Additionally, in comparison with urban adults, rural persons younger than 35 years, those who had children younger than 18 years living with them, those who were partnered, males and those living in households with an income of less than US$35,000 were more likely to report using some form of contraception.

Conclusion: There were differences in the contraception choices of urban and rural adults. How much primary care provider preferences explains the differences is not known and bears further exploration. These results should prove useful to healthcare providers as well as public health family planning programs.

Key words: Behavioral Risk Factor Surveillance System (BRFSS), contraceptive choices, rural US adults, USA.

Introduction

The study of contraception use is an important topic of research for multiple disciplines, including sociology, demography, epidemiology, public health and medicine. By examining patterns of contraception choices made by sexually active adults, insights about population control and family planning[1-5], intentionality regarding pregnancy[5-7] and sexually transmitted disease prevention[8] are forged. Much of the current research on birth control choices overall has been conducted on non-US populations[9-11], with the majority of the research performed on populations in developing countries[1-3,12]. This is doubly true when examining contraceptive choices made by rural in comparison with urban populations[1-4,13-14].

Even though sexually active US adults have a wide variety of birth control methods to choose from, there is limited population-based research comparing the contraceptive choices of non-metropolitan or rural US adults with metropolitan or urban US adults. There are two exceptions. The first is the research of Hartlagea et al[4] which examined by urban/rural place of residence the contraceptive choices made by *mid-western* US women aged 13–55 years. This study is limited, however, by the choice of studying a single region in the country and by excluding men. The second exception is the research of Rosenfeld and Everett[14] in which women aged 18–50 years in rural Tennessee and in suburban-urban Baltimore were interviewed about their memories of early contraceptive use. This study was limited by the same issues because it studied regional groups and excluded men.

The study reported here sought to address the gap in the current literature on contraception choice by comparing the birth control choices made by US rural adults with urban ones. This research should help reduce the paucity of studies in this important area of inquiry.

The analyses undertaken in this study involved a number of social variables including: race/ethnicity, household income, gender, educational attainment and marital status. Health service variables (health insurance status, whether or not children less than 18 years were living in the household, deferring medical care because of cost and having a personal healthcare provider) were also included in the analyses.

As a comparative analysis of urban and rural adult populations, this research effort joins a recently formed dialog in population health focused on assessing health-related differences between rural and urban populations to detect whether these are indicative of health disparities.

Education and healthcare delivery may need to be adjusted to respond to differences identified.

Methods

The database

Data were obtained from the 2004 Behavioral Risk Factor Surveillance System (BRFSS) database. The BRFSS is a cross-sectional, random digit telephone survey that was a collaborative project of the Centers for Disease Control and Prevention (CDC), and all US states and territories, targeting adults from age 18 to 99 years. The survey's objective wais to collect uniform, state-specific data on non-institutionalized adult's preventive health practices and risk behaviors. Data are self-reported responses to mostly forced-choice questions.

The 2004 data were used because they were the most recent data collected where the family planning module questions were asked of *all* respondents from *all* states. Reported analyses were performed on weighted data to provide a stratified representation of the US adult population[15]. A detailed description of the BRFSS survey design and sampling measures can be found elsewhere[16].

Preparing data for analysis

Six original BRFSS variables (age, education, annual household income, marital status, race/ethnicity, and birth control method used) were re-coded for the analyses presented here. Since the data were collected in multiple categories, in order to have more meaningful analyses, this approach required collapsing the multiple response categories into fewer ones. For each of the re-coded variables, respondents refusing to answer the questions were coded as missing and removed from the analysis. Table 1 displays the re-coded variables according to their original format and response categories, their re-coded format and the rationale supporting the re-coding decision.

Urban or rural place of residence was determined by computing a single state/county FIPS code from individual state and county FIPS codes and then re-coding the state/county FIPS code as either urban or rural, based on the 2003 Rural-Urban Continuum Codes from the US Office of Management and Budget. Only respondents with both a state and county FIPS code were included in the analyses conducted. All analyses were performed on weighted data.

Statistical analysis

In addition to univariate and bivariate descriptive analyses, a multivariate regression model was performed with rural or non-metropolitan adults using 'birth control' as the dependent variable. The independent variables entered into the model were: birth control choices, race/ethnicity, age, sex, education, household income, health insurance status in the past 12 months, having an identified healthcare provider, deferring medical care in the past 12 months because of cost, marital status, have children less than 18 years living at home, and feelings about having a child. Alpha was set at .05 for all tests of statistical significance. The Statistical Package for Social Scientists Complex Samples v17.0 (SPSS, Chicago, IL, USA) was used to complete the analyses to account for the complex survey design. The research was approved by the Institutional Review Board of the University of Illinois-Chicago College of Medicine at Rockford.

Results

In 2004, 29 311 adults (unweighted), identifiable as rural, aged 18–55 years responded to the BRFSS survey. Weighted they represented 8222, 794 people. Slightly more that 64% of these respondents reported using contraception of some sort. Table 2 displays demographic and health services information about this population.

Table 1: Original variables and response categories with re-coded response categories and rationale for changes, 2004 BRFSS data[17]

Variable	Original format	Re-coded format	Rational for re-coding
Age	Continuous variable with possible responses from 18 to 99 years	1. 18–34 years 2. 35–55 years	- Fecundity for females typically does not extend past 55 years - 34/35 Years was selected as the mid-range cut-off point because maternal age ≥35 years qualifies a pregnancy as high risk and may influence contraception choices.
Education	Categorical variable with six response choices: 1. Never attended school or only kindergarten 2. Grades 1–8 (elementary) 3. Grades 9–11 (some high school) 4. Grade 12 or GED 5. College years 1–3 years (some college or technical school) 6. College 4 years or more (college graduate).	1. <High school education 2. At least a high school education 3. College graduate	- Examination of 2003 census data revealed that overall only 15% of US adult population have not graduated from high school and have not completed a GED - While at least 85% of the overall adult population has at least a high school education, only 27% have completed a 4 year college degree.
Annual household income	Categorical variable with eight response choices: 1. <$10,000 2. $10,000 to <$15,000 3. $15,000 to <$20,000 4. $20,000 to <$25,000 5. $25,000 to <$35,000 6. $35,000 to <$50,000 7. $50,000 to <$75,000 8. ≥$75,000	1. <$35,000 2. ≥$35,000	- 2003 Census data revealed that the median household income in the USA was $44,482 - When stratified by the race/ethnic groups included in this analysis, median household income ranged from a low of $30,442 for African Americans to a high of $46,857 for Caucasians[17]
Marital status	1. Married 2. Member of an unmarried couple 3. Divorced 4. Separated 5. Widowed 6. Never married	1. Partnered 2. Not partnered	- For analysis purposes partner status is the most important factor for this variable
Race/ethnicity	Computed from responses to two questions: 1. Are you Hispanic or Latino? (yes/no) and 2. Which one of these groups would you say best represents your race? (White, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian, Alaska Native, and Other).	1. Caucasian (non-Hispanic) 2. African American (non-Hispanic) 3. Hispanic 4. Other (non-Hispanic)	- Re-coded categories merge the variables of race and ethnicity

Table 1 cont'd

Variable	Original format	Re-coded format	Rational for re-coding
Birth control method used	1. Tubal ligation 2. Vasectomy 3. Pill 4. Contraceptive patch 5. Contraceptive implants 6. Shots 7. Condoms 8. Withdrawal 9. Rhythm 10. Emergency contraception 11. IUD 12. Diaphragm 13. Cervical ring 14. Cap 15. Other	1. Female sterilization 2. Male sterilization 3. Non-injectable hormones 4. Injectable hormones 5. Withdrawal 6. Rhythm 7. Emergency contraception 8. IUD 9. Diaphragm, cervical ring, or cap 10. Other	- Original categories were collapsed in a manner that both reduced the categories but maintained the original intent of the question

GED, High school graduation; IUD, intrauterine device.

Table 2: Rural adult population aged 18–55 years, 2004 BRFSS data (weighted *n* = 8222794)

Variable	Factor	Percentage
Sex	Male	51.1
	Female	48.9
Age 18–55 years	<35	42.1
	≥35	57.9
Race and ethnicity	Caucasian (non-Hispanic)	79.7
	African American (non-Hispanic)	8.2
	Hispanic	6.7
	Other (non-Hispanic)	5.5
Education completed	<High school	10.8
	At least high school	64.5
	College graduate	24.7
Marital status	Partnered	64.2
	Not partnered	35.8
Contraception use	Not using contraception	36.8
	Using contraception	63.2
Have children	Have children <18 years at home	55.2
	Do not have children <18 years at home	44.8
Feelings about having child	Don't want children	35.9
	Want children	42.8
	Not sure if I want children	21.3
Have primary-care provider	Yes	75.5
	No	24.5
Health insurance status	Have health insurance	77.7
	Do not have health insurance	22.3
Household income	<$35,000	45.3
	≥$35,000	54.7
Medical care deferred because of cost	Yes	17.8
	No	82.2

Table 3 presents the aggregated data of the rural group who reported using contraception, compared with their urban counterparts. There were three relationships emergent from the bivariate analysis worth noting. First, when comparing adults using contraception by place of residence and gender, non-metropolitan adults using contraception were more likely to be have an income of less than $35,000 (OR 1.367, 95% CI 1.364–1.369). Second, when comparing adults using contraception by place of residence and deferring medical because of cost, rural adults using contraception were more likely to have deferred medical care because of cost (OR 1.210, 95% CI 1.207–1.213). Third, when comparing adults using contraception by place of residence and health insurance status, rural adults using contraception were less likely to have health insurance (OR .784, 95% CI .783–.786).

Table 4 shows the comparison of contraception choices and preferences of rural and urban adults. The most frequently reported choice for urban adults was non-injectable hormones ('the pill'); whereas, for rural adults it was female sterilization closely followed by non-injectable hormones. For males and females alike, rural residents were more likely to use permanent sterilization than their urban counterparts. Urban adults were more likely to use condoms than rural adults. Surprisingly, neither group reported a high use of intrauterine devices (IUD).

Multivariate regression analysis performed with 'rural adult use of birth control' as the dependent variable is presented in Table 5; it confirmed that rural adults were more likely to use sterilization and less likely to use condoms for birth control. They were also less likely to use: a diaphragm or NuvaRing® (see footnote to Table 4), emergency contraception, and/or withdrawal or rhythm methods. This analysis also confirmed that rural individuals using contraception were more likely to have an income less than $35,000 or to be without healthcare insurance. In addition, they are more likely to have a primary or a personal healthcare provider.

Discussion

Since rural or more remote areas of the USA are perpetually faced with difficulties accessing general healthcare services such as providers, pharmacists and pharmacy services[18,19], rural adults could find their choices of contraceptive methods limited. These recognized limitations to healthcare service access might lead rural adults to choose birth control methods not requiring medication prescription or frequent office visits. Adults faced with these challenges would more likely use rhythm or withdrawal methods, or over the counter (OTC) products such as condoms or spermacide.

The results of this study highlight some differences in contraceptive choices between rural and urban US adults. Rural adults were more likely to choose sterilization, either male or female, as a preferred form of contraception. This finding is somewhat similar to that of an earlier, more limited study that found that rural Illinois women of childbearing years were more likely to choose sterilization for birth control than their urban counterparts[4].

Our study found that rural adults were also less likely to use condoms as a form of contraception. This finding was unexpected, not consistent with other studies[4,12] and does not seem consistent with limitations in access to health care. However, lack of healthcare access may lead those adults who have completed their planned families to seek out the most permanent form of contraception, namely sterilization, because they would no longer require continued care from healthcare providers, prescriptions or trips to the pharmacy.

Furthermore, in rural communities people are very likely to personally know and possibly be friends of their physicians, pharmacists and other healthcare providers and, as a result, may feel that their privacy is being compromised when having to regularly purchase prescription or OTC products. This factor may lead to more individuals seeking permanent sterilization for contraception. Further study may help determine the reasons behind these choices.

Table 3: Comparison of urban and rural adults aged 18–55 years using contraception, 2004 BRFSS data

Variable		Urban %	Rural %	Unadjusted odds ratio (CI 95%) or Chi-square
Sex	Male	56.8	59.8	When comparing adults using contraception by place of residence and gender, rural adults using contraception were more likely to be male. OR = 1.119 (1.117, 1.121)
	Female	43.2	40.2	
Medical care deferred because of cost	Yes	14.3	17.1	When comparing adults using contraception by place of residence and deferring medical because of cost, rural adults using contraception were more likely to have deferred medical care because of cost. OR = 1.210 (1.207, 1.213)
	No	85.7	82.9	
Household income	<$35,000	34.4	42.5	When comparing adults using contraception by place of residence and household income, rural adults using contraception were more likely to earn <$35,000. OR = 1.367 (1.364, 1.369)
	≥$35,000	65.6	57.5	
Health insurance status	Have health insurance	82.2	77.9	When comparing adults using contraception by place of residence and health insurance status, rural adults using contraception were less likely to have health insurance. OR = .784 (.783, .786)
	Do not have health insurance	17.8	22.1	
Have primary health provider	Yes	72.7	74.2	When comparing adults using contraception by place of residence and having a primary care provider, rural adults using contraception were more likely to have a primary care provider. OR = 1.072 (1.070, 1.075)
	No	27.3	25.8	
Age 18-55 years	<35	51.2	50.6	When comparing adults using contraception by place of residence and age, non-metropolitan adults using contraception were less likely to be <35 years of age. OR = .977 (.975, .978)
	≥35	48.8	49.4	
Marital status	Partnered	68.2	69.6	When comparing adults using contraception by place of residence and marital status, rural adults using contraception were more likely to be part of a married or unmarried couple. OR = 1.064 (1.062, 1.066)
	Not partnered	31.8	30.4	
When want child	Within the year	8.8	9.4	When comparing adults using contraception by place of residence and time when wanting a child, rural adults using contraception were more likely to want a child within the year. OR = 1.060 (1.052, 1.067)
	>1 year	91.2	90.6	
Have children >18 years at home	Yes	64.1	65.2	When comparing adults using contraception by place of residence and have children <18 years at home, rural adults using contraception were more likely to have children <18 years at home. OR = 1.043 (1.041, 1.045)
	No	35.9	34.8	
Race and ethnicity	Caucasian (non-hispanic)	65.7	80.2	All differences by factor levels were statistically significant by Chi-square test (p <.000).
	African American (non-hispanic)	10.6	7.4	
	Hispanic	21.6	6.7	
	Other (non-hispanic)	2.1	5.7	
Education completed	< High school	10.2	10.1	Differences between <high school factor not statistically significant by Chi-square test. All other differences by factor levels were statistically significant by Chi-square test (p <.000).
	At least high school	52.8	64.7	
	College graduate	37.1	25.2	

Table 4: Comparison of contraception choice preferences of urban and rural adults aged 18–55 years, 2004 BRFSS data

Birth control method	Place of residence %	
	Urban	Rural
Female sterilization	18	27.7
Male sterilization	14.8	17.4
Non-injectable hormones	29	27.3
Injectable hormones	4	4.1
Condoms	24.6	16.6
Diaphragm or NuvaRing†	1	0.7
Emergency contraception	0.1	0
Withdrawal and other	2.6	2
Rhythm	3.2	2.1
IUD	2.7	2

Table 5: Logistic regression analysis: rural adults aged 18–55 years using contraception, 2004 BRFSS data

Independent variable	Factor	Adjusted odds ratio (95% CI)
Birth control method	IUD	--**
	Female sterilization	1.664 (1.650,1.677)
	Male sterilization	1.289 (1.279,1.300)
	Non-injectable hormones	1.054 (1.046,1.063)
	Injectable hormones	1.103 (1.093,1.114)
	Condoms	.757 (.751, .764)
	Diaphragm or NuvaRing	.705 (.693, .716)
	Emergency contraception	.618 (.564, .677)
	Withdrawal and other	.929 (.919, .939)
	Rhythm	.798 (.789, .806)
Race and ethnicity	Caucasian (non-Hispanic)	--**
	African American (non-Hispanic)	.440 (.438, .442)
	Hispanic	.164 (.163, .165)
	Other (non-Hispanic)	1.896 (1.886, 1.906)
Education completed	College graduate	--**
	<High school	1.865 (1.856, 1.874)
	At least high school	1.701 (1.696, 1.705)
Marital status	Not partnered	--**
	Partnered	1.163 (1.160, 1.167)
Sex	Female	--**
	Male	1.255 (1.252, 1.258)
Age (years)	≥35	--**
	<35	1.185 (1.182, 1.188)
Have children	No children <18 years at home	--**
	Have children <18 years at home	1.076 (1.074, 1.079)
Household income	≥$35,000	--**
	<$35,000	1.706 (1.701, 1.710)
Primary care provider	No	--**
	Yes	1.114 (1.111, 1.117)
Health insurance	Do not have health insurance	--**
	Have health insurance	.741 (.739, .744)
Medical care deferred because of cost	No	--**
	Yes	1.018 (1.014, 1.021)

IUD, intrauterine device.
** Reference category.

Our results also indicated that even though rural adults were more likely to choose either female or male sterilization, injectable hormones were the next most likely choice of a contraception method. This is a prudent choice for young adults who have not completed their families and who also want to avoid frequent office or pharmacy visits.

Socioeconomic factors, in particular healthcare insurance and income levels, also appeared to influence contraception choices of rural adults. In particular, higher income levels and the presence of health insurance have been associated with greater use of contraception. Interestingly, when compared with their urban counterparts, rural adults making less than $35,000 or without healthcare insurance were more likely to use contraception. Awareness of the costs associated with both pregnancy and raising children may explain why rural adults with limited financial resources seek out reliable means of contraception. Further study may provide insight to explain these differences between rural and similar urban adults.

Limitations

There are several potential limitations to this study. First, the survey is based on telephone-derived data and may be skewed if those who did not participate were less likely to use contraceptives or to use contraception methods in proportionally different ways to those who did respond. For example, persons of lower socioeconomic status are less likely to be included because of poorer phone access. Becuase lower socioeconomic status correlated with different contraception choices, our findings could underestimate the use of birth control reported. However, the fact that the vast majority of the US population live in households with telephones minimizes this bias.

A second limitation is that the survey consists of self-reported answers to close-ended questions. This format is subject to recall bias. A different format to the survey may have yielded different results. Third, the survey was only conducted in either English or Spanish. While English and Spanish are the most commonly spoken languages in the USA, other minority groups who do not use these languages may be under-represented.

Finally, although the survey may be conducted in Spanish, new immigrant Hispanics who might not speak English, or have access to a phone or have health insurance could have inflated the selection bias. Also, a number of newly arrived immigrants may not be willing to participate in a phone survey if they fear their immigration status could be jeopardized.

On the positive side, a strength of this study is the large number of individuals surveyed yielding a nationally representative sample.

Conclusion

The analysis presented here suggested that there were identifiable differences between urban and rural adults in terms of the contraceptive methods they chose. In addition to the influence of primary care provider preferences, other areas for future research include closer examination of socioeconomic factors that are associated with contraceptive choices. These data could assist healthcare providers as well as public health family planning programs when providing counseling to different groups.

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