Research Article

Unintended Pregnancy in Rural Communities

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Abstract

Background: Unintended pregnancy accounted for 45% of all pregnancies in the US in 2011. This is more prevalent than many other developed countries and has been studied in women with varying ages, races, income levels, and education; however little research has been dedicated to unintended pregnancy in rural populations.

Objective: To identify whether there is an association between unintended pregnancy and geographical location in New York State. Intent of pregnancy based on maternal age and education was also analyzed.

Methods: A retrospective cohort study using the Statewide Perinatal Database System (SPDS) to extrapolate maternal demographics including education level, age, and pregnancy intention for pregnancies between 2004 to 2015. RUCA codes delineated Rural, Suburban, or Urban residence. We analyzed the data using relative risk as a measure of association between geographical location and pregnancy intent. A confidence interval of 95% with a p <0.05 was considered significant.

Results: SPDS Data from 210,999 pregnancies between 2004 to 2015 were analyzed. Rural women had similar percentages of unintended pregnancy (34.5% *vs* 35.8%). Rural women were not at increased risk of unintended pregnancy based on geographical location. The risk for unintended pregnancy decreased as maternal age increased. There was an increased risk for unintended pregnancy with lower maternal education, illustrating an inverse relationship similar to maternal age.

Conclusion: Rural-Urban variation in health care is well documented, although rural women have similar percentages of unintended pregnancy. More attention is necessary to ensure sufficient distribution of family planning resources.

Keywords: Unintended Pregnancy; Geographical Residence

Abbreviations

RUCA: Rural-Urban Commuting Area Codes; SPDS: Statewide Perinatal Database System

Introduction

The incidence of unintended pregnancy is an important measure of reproductive health within a population. It measures the extent of autonomy women harness to decide freely when and if to have children. The aim to reduce unplanned pregnancy is multi-faceted. Women with unintended pregnancy have higher rates of suicide, depression, poor nutrition during gestation, unstable family relationships, risk of miscarriage, low birth weight infants, and delayed onset of prenatal care [1]. According to data obtained from the National Survey of Family Growth and the National Center for Health Statistics, 45% of all pregnancies were classified as unintended in the United States in the year 2011. Although this is an improvement from the 51% of unintended pregnancies in 2005, the United States unintended pregnancy rate is higher than that of other developed countries and there remains significant room to improve the nation's reproductive health [2].

Multiple studies have been conducted to investigate variation in

unintended pregnancy rates among women of different ages, races, income levels, and education levels. In 2010, the overall pregnancy rate was 57.4 pregnancies per 1000 women aged 15 to 19. Women aged 18 to 19 accounted for 69% of all teen pregnancies [3]. Previous studies have also shown that women with the least amount of education attained have the highest rates of unintended pregnancy [4]. In 2011, women without a high school degree had the highest unintended pregnancy among those of any education level (73 per 1,000), with rates declining further with each level of education attained). Poor and low-income women have an unintended pregnancy rate approximately five times the rate for women in the highest income bracket [4,5].

Most of these studies have been conducted in urban populations; there are few studies investigating unintended pregnancy rates among women in rural populations. Rural America accounts for 22.8% of women in the United States aged 18 years and older [6]. It has been shown that rural-urban variation exists in U.S family planning services, with geographical disparities permeating throughout [7]. Lack of access to family planning information such as with sex education courses, public library resources, internet access, etc. remains a serious barrier to obtaining contraceptive knowledge. Lack of education, financial stability, and ability to acquire health

Table 1: Intendedness of pregnancy based on place of residence.

Population	Intended (%)	Unintended	RR (95% CI)	P value
Rural	16095 (65.5)	8483 (34.5)	0.96	0.0001
Non-Rural	119718 (64.2)	66703 (35.8)	1	

Intended is defined as desiring a pregnancy sooner or now.

Unintended is defined as wanting a pregnancy but a later time or not wanting a pregnancy now or in the future.

Non-rural is defined as Urban + Suburban combined pregnancy data.

insurance all disproportionately affect rural women [7]. Only 46% of the agencies providing publicly funded family planning services reported that their clinic sites are located in mostly rural locations, the majority of which are health departments and Federally Qualified Health Centers [8]. This study was designed to compare pregnancy intention among urban, suburban, and rural populations. Our secondary aim was to identify trends between intent of pregnancy based on maternal age, maternal education, and a combination of those variables with geographical region of residence. This study is intended to be the first step in determining what unique barriers, if any, rural women face in terms of establishing successful family planning. In identifying any potential barriers, interventions may be developed to provide women in rural communities with better education and access to comprehensive family planning resources.

Methods

This is a retrospective cohort study conducted using the New York Statewide Perinatal Database System (SPDS), which was developed as a New York State Department of Health Initiative, existing in every hospital where maternal/newborn services are offered (Section 400.22-Statewide Perinatal Data System). It is a registry that collects clinically relevant data surrounding maternal and neonatal demographics to give hospitals and public health agencies information for quality improvement and improved public health efforts. Our sample used de-identified pregnancy data collected from the Perinatal Database from the years 2004 to 2015. De-identified pregnancy data collected included location of residence, pregnancy intention, maternal age, and maternal education level. The primary independent variable of interest is geographical location of residence based upon Rural-Urban Commuting Area Codes (RUCA). RUCA codes classify U.S census tracts using measures of population density, urbanization, and daily commuting. RUCA codes were used to delineate urban, suburban, or rural area of residence. Our dependent variable of interest is pregnancy intention, classified as either intended or unintended. The SPDS classifies pregnancy intention into "sooner, later, then, or not then or future." We define intended pregnancy as desiring a pregnancy sooner or now. We defined unintended pregnancy as desiring a pregnancy, but at a later time or not wanting a pregnancy now or in the future.

The 2004 to 2015 pregnancy data was aggregated into geographical residence (rural, suburban, or urban) and pregnancy intent (unintended or intended). We used relative risk as a measure of association between geographical location and pregnancy intent. The Relative Risk (RR) is used to determine whether geographical location is a risk factor for unintended pregnancy. We combined suburban + urban pregnancy data, denoted as "non-rural" to use as the comparison group against the rural pregnancy data. A Confidence Interval (CI) of 95% is used to estimate the precision of the OR with a P value <0.05 used to determine likely statistical significance. Intent of pregnancy based on maternal age and maternal education, was also analyzed.

This study was approved by State University of New York Upstate Medical University Institutional Review Board.

Results

De-identified pregnancy data from 210,999 pregnancies between the years 2004 to 2015 was included. Rural women accounted for 24,578 of the total pregnancies (11.6%) with 16,095 intended pregnancies and 8,483 unintended pregnancies. Urban women accounted for 127,319 of the total pregnancies (60.3%) with 82,346 intended pregnancies and 44,973 unintended pregnancies. Suburban women accounted for 59,102 of the total pregnancies (28.1%) with 37,372 intended pregnancies and 21730 unintended pregnancies.

Similar percentages of unintended pregnancy between rural women (34.5) and non-rural (suburban + urban) women (35.8) were found (Table 1). Rural women did not have increased risk of unintended pregnancy compared to non-rural women (Risk Ratio [RR]:0.96;95% CI 0.95 to 0.98; P<0.00001) (Table 1).

There was an increased risk of unintended pregnancy with younger maternal age compared to our control age group of women aged 25 to 34 (Table 2). Women less than 18 years old had the largest risk (RR: 3.31, 95% CI 3.08 to 3.18, P<0.0001). The risk of unintended pregnancy decreased as maternal age increased. Women age 35+ had decreased risk of unintended pregnancy (RR: 0.76, 95% CI 0.75 to 0.79, P<0.0001).

A statistically significant association with unintended pregnancy was found in women with less education, compared to our control group of women with an Associate's degree or higher (Table 3). An education level less than a high school diploma was associated with the greatest relative risk (RR: 3.17, 95% CI 3.12 to 3.23, P<0.0001). For women with a High School Diploma or some college education, this decreased to a risk ratio of 2.19 (RR: 2.19, 95% CI 2.15-2.23, P<0.0001).

When looking at pregnancy intent based on rural maternal age, women less than 18 years of age had increased risk of unintended

Table 2: Intendedness of pregnancy based on maternal age.

Age in years	Intended (%)	Unintended (%)	RR (95% CI)	P value
< 18	748 (16.0)	3934 (84.0)	3.13 (3.08-3.18)	< 0.0001
18 to 19	4070 (32.6)	8396 (67.4)	2.5 (2.47-2.55)	< 0.0001
20 to 24	25618 (49.5)	26150 (50.5)	1.88 (1.86-1.91)	< 0.0001
25 to 34	74501 (73.2)	27314 (26.8)	1	
35+	18339 (79.4)	4763 (20.6)	0.76 (0.75-0.79)	< 0.0001

Table 3: Intendedness of pregnancy based on maternal education.

Education	Intended (%)	Unintended (%)	RR (95% CI)	P value
Less than High School diploma	11196 (41.0)	16090 (59.0)	3.17 (3.12-3.23)	< 0.0001
High school or some college	52377 (56.2)	40806 (43.8)	2.19 (2.15-2.23)	< 0.0001
Associates degree or higher	59619 (81.4)	13595 (18.6)	1	

Table 4: Intendedness of pregnancy based on maternal age and place of residence.

Age	Population	Intended (%)	Unintended (%)	RR (95% CI)	P value
<18	Rural	76 (15.8)	404 (84.2)	1.07 (1.04-1.10)	<0.0001
	Non-Rural	671 (15.9)	3524 (84.0)		
18-19	Rural	535 (33.6)	1058 (66.4)	0.98 (0.95-1.02)	0.39
	Non-Rural	3528 (32.5)	7330 (67.5)		
20-24	Rural	3818 (54.3)	3218 (45.7)	0.89 (0.87-0.92)	<0.0001
	Non-Rural	2176 (48.7)	22897 (51.3)		
25-34	Rural	9227 (75.0)	3068 (25.0)	0.92 (0.89-1.16)	<0.001
	Non-Rural	65197 (73.0)	24214 (27.0)		<.0001
35+	Rural	1903 (78.0)	537 (22.0)	1.08 (0.99-1.16)	0.07
	Non-Rural	16418 (79.5)	4223 (20.5)		

Table 5: Intendedness of pregnancy based on maternal education and place of residence.

Education	Population	Intended (%)	Unintended (%)	RR (95% CI)	P value
Less than High School Diploma	Rural	1291 (44.1)	1636 (55.9)	0.94 (0.91-0.97)	<0.0005
	Non-Rural	9885 (40.6)	14435 (59.4)		
HS diploma with or without some college	Rural	7639 (40.6)	5046 (59.4)	0.90 (0.88-0.92)	<0.0001
	Non-Rural	44679 (55.6)	35701 (44.4)		
Associate's degree or higher	Rural	6622 (80.5)	1601 (19.5)	1.05 (1.01-1.11)	0.026
	Non-Rural	52941 (81.5)	11988 (18.5)		

pregnancy in rural New York State (RR:1.07,95% CI 1.04 to 1.10, P<0.0001) (Table 4). For rural women aged 18 to 34, we did not observe an increased risk of unintended pregnancy. There was an increased risk of unintended pregnancy in rural women aged over 35, however this value was not found to be statistically significant (RR: 1.08, 95% CI 0.99 to 1.16, P=0.07).

Rural maternal education levels less than an Associates did not have increased risk of unintended pregnancy (Less than HS Diploma RR: 0.94, 95% CI 0.91 to 0.97, P<0.0005 & HS Diploma with/without some college RR: 0.90, 95% CI 0.88 to 0.93, P<0.0001) (Table 5). We did observe an increased risk of unintended pregnancy for the highest rural education level, Associates degree or higher (RR: 1.05, 95% CI 1.01 to 1.11, P=0.026).

Discussion

The most important finding of our research was the similar percentages of unintended pregnancy that rural women face as compared to non-rural women. While we did not observe that the rural population have increased risk of unintended pregnancy, we have illustrated that rural women are at a similar risk of unintended pregnancy as urban women and thus, necessitate comparable family planning resources. Women in rural areas face significant barriers to healthcare, particularly reproductive healthcare resources (such as inadequate transportation, lack of providers, lack of health insurance, lower health literacy) and therefore it is vital that primary care physicians are equipped with the knowledge and resources for adequate contraception counseling.

Our findings for maternal age are similar to many other studies illustrating unintentional pregnancy is more common for younger women. Currently the highest rate of unintended pregnancies in the US occurs to women in their twenties, with the proportion of pregnancies that are unintended generally decreasing with age [9]. We found that the largest risk of unintended pregnancy occurred for women less than eighteen years old and that younger age was considered a risk factor for women less than twenty-five years of age. For women aged over thirty-five, age was no longer found to be a risk factor as compared to women aged twenty-five to thirty-four. It is important to note that we did not assess rate in this study, but rather pregnancy intention. When looking at pregnancy intent based on rural maternal age specifically, we observed that women less than eighteen years of age had increased risk of unintended pregnancy in rural New York State, however rural women aged eighteen to thirty-four did not. This differed from the overall maternal age trend illustrating that women in their early twenties were at risk for unintended pregnancy. This may be explained by a difference in cultural norms for rural women as opposed to non-rural societal expectations. We observed an increased risk of unintended pregnancy in rural women aged over 35, however this value was not found to be statistically significant.

This may be because rural women aged greater than thirty-five have already completed their desired childbearing or may be at risk due to the notion that it is unnecessary to continue seeking family planning methods as they get older. One way that we could examine these differences found in rural pregnancy data would be to create focus groups in each geographical region to identify potential differences in norms.

As previous literature has documented, we found that less education was associated with increased unintended pregnancy. An education level less than a high school diploma was associated with the highest relative risk indicating the greatest risk of unintended pregnancy as compared to women with an Associate's degree or higher. The risk of unintended pregnancy was lower for women with a High School Diploma or some college education, but still indicated an increased risk of unintended pregnancy as compared to women with an Associate's degree or higher. When we examined rural maternal education, we did not observe that less maternal education had an increased association with unintended pregnancy. We did observe an increased risk of unintended pregnancy for the highest rural education level, Associates degree or higher (RR: 1.05, 95% CI 1.01 to 1.11, P=0.026). This does not follow the trend we observed overall for maternal education with unintended pregnancy. This may be due to a difference in rural cultural norms, access to health insurance for contraception coverage, or differing access to educational opportunities.

Conclusion

Although women in rural areas face a multitude of disparities in regard to family planning care and healthcare resources as a whole, we've shown in this study that women in rural New York State have similar percentages of unintended pregnancy as urban women. As shown in previous literature, we observed that younger women with less education have a greater association with unintended pregnancy. Few studies have focused on unintended pregnancy among women in rural populations, although rural America accounts for 22.8% of women in the US 18 years and older. The deleterious effects of unintended pregnancy have been well documented with higher rates of suicide, risk of miscarriage, low birth weight infants, and delayed onset of prenatal care, and thus our aim with this research has been to shed light on the importance of sufficient family planning care in rural regions, particularly in the context of primary care practice. A few limitations of our study: we did not include socioeconomic differences between rural-urban populations, race, cultural differences, and access to insurance coverage in our scope. A future endeavor of this study would be to create focus groups of women from different geographical regions of New York State to interview on reproductive health norms of their area, which we believe would shed fascinating light on the results of our data.

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