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ORIGINAL RESEARCH

Driving Time and Single-Visit Long-Acting Reversible Contraception Provision in North Carolina

Salma Ali, MPH[1], Lindsey Yates, PhD, MPH[2], Gretchen S. Sauer, MD, MPHTM[3], Kavita Shah Arora, MD, MBE, MS[4]

[1] Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, [2] Department of Maternal and Child Health, University of North Carolina at Chapel Hill, [3] Department of Obstetrics and Gynecology, Dartmouth Hitchcock Medical Center, [4] Department of Obstetrics and Gynecology, University of North Carolina at Chapel Hill

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BACKGROUND

We examined the association between driving time and receipt of single-visit long-acting reversible contraception (LARC) in North Carolina.

METHODS

We characterized drive time with single-visit LARC placement across a statewide cohort of 4319 patients who received LARC between March 15, 2019, and March 14, 2021. Drive time was calculated on ArcGIS Pro 3.0.

RESULTS

68% of patients received a single-visit LARC. Patients who lived ≥ 30 minutes from their LARC appointment had 1.54 times the odds of single-visit LARC placement compared to patients who drove ≤ 10 minutes (95% confidence interval [CI], 1.26 – 1.90).

LIMITATIONS

Our data are limited by the electronic medical record-based design, as well as the assumption that the patient's home address is their drive time location of origin.

CONCLUSIONS

Increased driving time is associated with single-visit LARC placement. Understanding and addressing barriers to care, including geographic accessibility, is essential to enhancing access to high-quality, person-centered contraceptive care.

Introduction

Single-visit long-acting reversible contraception (LARC) placement is recommended to reduce barriers to provision.[1-3] In a 2020 single-state study, 44% of clinicians in obstetrics-gynecology reported single-visit provision of intrauterine devices (IUDs), and 57% of clinicians in obstetrics-gynecology reported single-visit provision of subdermal implants.[4] Family planning clinics may have higher rates of single-visit LARC provision. One study

demonstrated that Planned Parenthood clinics exhibited higher rates (95%) of single-visit LARC provision compared to community health centers (30%) and private practices (21%).[5]

Data demonstrate that driving distance is a significant barrier that negatively impacts access to reproductive health care services, including LARC services.[6-8] Thus, single-visit LARC may be especially important for patients with geographical limitations to care, such as increased driving time. We hypothesized that increased travel time for patients from their home to the facility of care is associated with an increased likelihood of single-visit LARC provision.

Methods

We conducted a secondary data analysis of a retrospective observational cohort study using existing electronic health record data from the University of North Carolina (UNC) Health system. This study builds on a previous analysis that assessed patient and practice characteristics associated with single-visit placement of long-acting reversible contraception (LARC) across the UNC Health system, including the main campus hospital and 82 outpatient clinics across 10 counties in North Carolina.[9] We abstracted data from charts of individuals aged 14–50 who received LARC between March 15, 2019, and March 14, 2021. We excluded records that had documented use of LARC within 6 months of the index visit and records in which the documented indications for LARC did not include contraception. Patients without address data (n = 34) or imprecise address geocoding (n = 246) were also excluded. The study was approved by the UNC Institutional Review Board.

The primary exposure was the driving time between the patients' residence at the time of their appointment and the health care facility where the patient received their LARC. We created this variable using a composite locator in ArcGIS Pro to geocode patient addresses and facility addresses. This allowed for the calculation of the driving time in minutes for each patient through an origin-destination cost matrix network analysis using a routing network database. Drive time was categorized as 'under 30 minutes' or '30 minutes or more' based on the reference of the length of a typical clinical appointment, the existing literature, and the data distribution.[6-8] The primary outcome was whether a patient received their LARC device during a single visit. Covariates included in the conceptual model were categorical age, race, ethnicity, parity, insurance type (private or public insurance), provider type (physicians or advanced practice providers), and provider specialty.

We used descriptive statistics to examine characteristics of the study population. We used multivariate logistic regression to determine the relationship between driving time and receipt of single-visit LARC, while adjusting for other relevant patient and practice covariates associated with

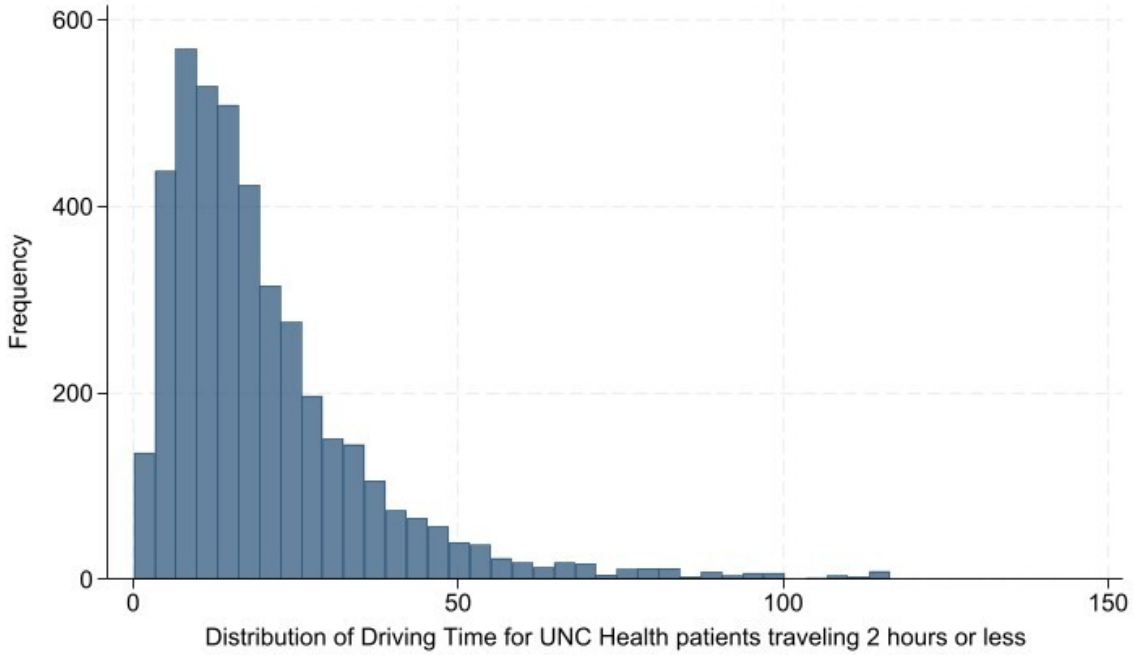

Figure 1. Distribution of Driving Time (in Minutes) for UNC Health Patients Traveling 2 Hours or Less for Contraceptive Health Care

single-visit LARC. Geocoding and calculation of driving time were performed using ArcGIS Pro 3.0, and all data analyses were conducted on Stata 17 (StataCorp LLC; College Station, TX).

Results

Of the 4319 patients who had LARC placed in an outpatient visit at UNC Health between March 14, 2019, and March 15, 2021, 68% received single-visit LARC, and the median driving time between a patient's residence and a health care facility was 16 minutes (Figure 1). Nearly two-thirds (69%) of patients received an IUD, and 31% received implants.

Patients who drove 30 or more minutes for their LARC placement had 1.54 times the odds of single-visit LARC placement compared to patients who drove less than 10 minutes (95% confidence interval [CI], 1.256 – 1.898) (Table 1). Moreover, statistically significant associations were found for age, parity, insurance type, provider type, and provider specialty.

Discussion

Among those patients who received LARC in a state-wide health system in North Carolina, driving time is associated with single-visit LARC placement. Gawron and colleagues found that increased driving distance was associated with a decreased likelihood of receiving any type of LARC.[6] Additionally, patients with public insurance had higher odds of receiving single-visit LARC compared to those with private insurance. This difference may be influenced by perceptions about which patients are more likely to have barriers accessing

Table 1. Crude and Adjusted Odds Ratios of Single-Visit LARC Placement of Women Receiving Care from UNC Health Between March 14, 2019–March 15, 2021, Using Logistic Regression (N = 4319)

Covariates	Single-Visit LARC Placement n (%)	Multi-visit LARC Placement n (%)	Crude Odds Ratio	(95% CI)	Adjusted Odds Ratio	(95% CI)
Driving time	–	–	–	–	–	–
Less than 10 minutes	778 (26.31)	404 (29.66)	–	–	–	–
10–20 minutes	988 (33.41)	497 (36.49)	1.03	(0.88, 1.21)	1.03	(0.87, 1.22)
20–30 minutes	517 (17.48)	256 (18.80)	1.05	(0.86, 1.27)	0.99	(0.81, 1.21)
30+ minutes	674 (22.79)	205 (15.05)	1.71*	(1.40, 2.08)	1.54*	(1.26, 1.90)
Age	–	–	–	–	–	–
14–19 years	532 (17.99)	356 (26.14)	0.84	(0.70, 1.01)	0.97	(0.79, 1.19)
20–24 years	629 (21.27)	354 (25.99)	–	–	–	–
25–29 years	628 (21.24)	241 (17.69)	1.47*	(1.20, 1.79)	1.34*	(1.09, 1.66)
30–34 years	553 (18.70)	201 (14.76)	1.55*	(1.68, 1.90)	1.31*	(1.05, 1.64)
35–39 years	369 (12.48)	122 (8.96)	1.70*	(1.33, 2.17)	1.46*	(1.12, 1.90)
40+ years	246 (8.32)	88 (6.46)	1.57*	(1.19, 2.07)	1.66*	(1.22, 2.25)
Race	–	–	–	–	–	–
American Indian/ Alaska Native	9 (0.30)	1 (0.07)	4.55	(0.58, 35.98)	3.05	(0.37, 24.97)
Asian	74 (2.50)	25 (1.84)	1.50	(0.94, 2.37)	1.40	(0.87, 2.26)
Black or African American	547 (18.50)	246 (18.06)	1.12	(0.95, 1.33)	1.07	(0.89, 1.28)
Native Hawaiian or Other Pacific Islander	4 (0.14)	1 (0.07)	2.02	(0.23, 18.12)	1.39	(0.15, 13.03)
White	1772 (59.93)	896 (65.79)	–	–	–	–
Other Race	399 (13.49)	126 (9.25)	1.60*	(1.29, 1.99)	1.48*	(1.10, 1.99)
Unknown/ Missing	152 (5.14)	67 (4.92)	1.15	(0.85, 1.55)	0.81	(0.55, 1.20)
Ethnicity	–	–	–	–	–	–
Hispanic/ Latino	374 (12.65)	132 (9.69)	1.38*	(1.12, 1.71)	1.07	(0.80, 1.43)
Not Hispanic/ Latino	2397 (81.06)	1171 (85.98)	–	–	–	–
Unknown/ Missing	186 (6.29)	59 (4.33)	1.54*	(1.14, 2.08)	1.90*	(1.28, 2.82)
Parity	–	–	–	–	–	–
0 previous births	1231 (41.63)	769 (56.46)	–	–	–	–
1–2 previous births	1340 (45.32)	465 (34.14)	1.80*	(1.57, 2.07)	1.37*	(1.16, 1.62)
3 or more previous births	386 (13.05)	128 (9.40)	1.88*	(1.51, 2.35)	1.25	(0.970, 1.62)
Type of insurance	–	–	–	–	–	–
Private insurance	1890 (63.92)	967 (71.0)	–	–	–	–
Public insurance	1067 (36.08)	395 (29.0)	1.38*	(1.20, 1.59)	1.41*	(1.22, 1.63)
Type of LARC	–	–	–	–	–	–
IUD	2060 (69.67)	903 (66.30)	–	–	–	–
Implant	897 (30.33)	459 (33.70)	0.86*	(0.75, 0.98)	1.02	(0.88, 1.19)
Type of provider	–	–	–	–	–	–
Physician	1705 (57.66)	650 (47.72)	–	–	–	–
Advanced practice practitioner	1252 (42.34)	712 (52.28)	0.67*	(0.59, 0.76)	0.60*	(0.52, 0.69)
Specialty of provider	–	–	–	–	–	–

Covariates	Single-Visit LARC Placement n (%)	Multi-visit LARC Placement n (%)	Crude Odds Ratio	(95% CI)	Adjusted Odds Ratio	(95% CI)
OB/GYN	2293 (77.54)	906 (66.52)	–	–	–	–
Family medicine	587 (19.85)	345 (25.33)	0.67*	(0.58, 0.78)	0.70*	(0.59, 0.83)
Internal medicine	22 (0.74)	78 (5.73)	0.11*	(0.07, 0.18)	0.09*	(0.05, 0.14)
Pediatrics	43 (1.45)	32 (2.35)	0.53*	(0.33, 0.84)	0.60*	(0.37, 0.99)
Other	12 (0.41)	1 (0.07)	4.74	(0.62, 36.52)	4.36	(0.55, 34.45)

Note. *Results are significant at the 0.05 level.

LARC or insurance-related barriers to single-visit LARC provision, including billing concerns and private insurance coverage verification.[4,5] Those who were older or more parous were more likely to undergo single-visit LARC. While we cannot infer causality from our methodology, this may be attributable to the fact that clinically, LARC insertion procedures are often considered less complex or time intensive. It may also reflect increased advocacy on the part of patients who have previously used contraception, including LARC. Advanced practice providers and non-OBGYN providers are less likely to provide single-visit LARC placement. This may indicate other potentially modifiable barriers to LARC placement, such as lack of training for some providers and limited device stock.

Strengths of our study include a diverse patient population seeking care across an entire state. Understanding driving time is important given increasing limitations in access to care. Limitations include the assumption that a patient's home is the location of origin, disregarding the possibility of travel from other locations, such as a workplace or school. Further, clinical practice changes due to the emergency response to the COVID-19 pandemic may have impacted single-visit LARC provision.

Conclusion

Increased driving time is associated with single-visit LARC placement, underscoring the influence of geographic accessibility on contraceptive care. Addressing geographic barriers is essential to advancing reproductive health equity and ensuring access to person-centered care. Further research can continue to focus on understanding the influence of geographic accessibility on access to contraception as a crucial component to providing equitable health care.

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Disclosure of interests

The authors report no conflicts of interest.

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