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Adolescent and young adult long-acting reversible contraception post-insertion visit attendance before and after COVID-19

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Abstract

Objectives: Widespread use of telemedicine for contraceptive care, including long-acting reversible contraception (LARC), was adopted in the United States in response to the COVID-19 pandemic. Given the rapid implementation of these services, little is known about the use of telemedicine for adolescent and young adult (AYA) contraceptive care. This study examined the routine use of telemedicine for LARC post-insertion care by comparing visit attendance between AYAs receiving LARC before and after the COVID-19 pandemic onset.

Methods: This analysis included LARC insertions 3/1/19–11/30/19 (pre-pandemic onset cohort) and 4/1/20–12/31/20 (post-pandemic onset cohort) from three Adolescent Medicine subspecialty clinics in the United States. De-identified data were collected via review of the electronic health record. Descriptive statistics, χ^2 tests, and t-tests described and compared groups. Adjusted logistic regression models examined factors associated with attending a post-insertion visit and attending this visit via telemedicine.

Results: This analysis included 525 LARC insertions (279 pre- and 246 post-pandemic onset). The proportion of AYAs attending a post-insertion visit increased after the COVID-19 pandemic onset (pre 30 % vs. post 46 %; p≤0.001). Adjusted models revealed that the post-pandemic onset cohort was nearly twice as likely to attend a post-insertion visit as the pre-pandemic onset cohort (OR=1.90; 95 % CI=1.68–2.15). Of those attending this visit in the post-pandemic onset cohort (n=112), 42 % utilized telemedicine.

Conclusions: AYAs were more likely to attend post-insertion visits after the COVID-19 pandemic onset than before. Telemedicine may have influenced this change in visit attendance.

Keywords: long-acting reversible contraception; adolescent; young adult; telemedicine

Introduction

Long-acting reversible contraception (LARC), including intrauterine devices (IUDs) and the contraceptive implant, are methods available to adolescents and young adults (AYAs) for pregnancy prevention and menstrual management. Supporting AYAs who choose LARC is crucial. While follow-up care may play a role in providing this support, evidence-based guidelines for LARC surveillance in this population are lacking. The Centers for Disease Control and Prevention (CDC) do not recommend routine post-insertion visits for all patients with LARC, but instead recommend follow-up if the patient experiences side effects or other problems, if the patient wants to change their contraceptive method, and when it is time to remove or replace the device [1]. However, the CDC guidelines also state that adolescents are a special population that may benefit from more frequent LARC follow-up care [1]. Despite these recommendations, there is no consensus on how to approach follow-up for AYAs with regards to frequency or modality of visits.

Furthermore, research investigating AYA follow-up patterns after LARC insertion is limited and results are mixed. Two single-site studies estimated that less than half of

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AYAs attend a post-insertion follow-up visit (29.3 % between four- and eight-weeks post-insertion and 45 % within two weeks of insertion) [2, 3]. However, Ravi et al., found that adolescents were more likely than adults to present for IUD-related concerns (59 % of adolescents vs. 43 % of adults; p<0.001) and had more visits (median of two visits for adolescents vs. one for adults) over six months following IUD insertion at federally qualified health centers [4]. Notably, adolescents and adults in this cohort reported similar concerns at follow-up visits (bleeding changes, pelvic or abdominal pain, desire for string check, and request for removal) and similar device continuation [4].

The COVID-19 pandemic and the emergence of telemedicine added another layer of complexity to AYA LARC follow-up care. Disruptions to in-person care at the onset of the pandemic resulted in the quick adoption of telemedicine to maintain access to AYA contraceptive services during the pandemic, including LARC care [5]. A recent multisite study from our research group describing LARC telemedicine services reported that 40.1 % of AYAs presenting to LARC care in the year following the COVID-19 pandemic onset attended at least one visit via telemedicine [6]. Given that telemedicine is an innovative modality, more investigation is needed to determine its role in LARC follow-up care.

Our study aims to build on our prior work investigating AYA LARC telemedicine care and examines AYA post-insertion LARC visit attendance (within 12 weeks of LARC insertion) before and after the COVID-19 pandemic onset. We hypothesized that post-insertion visit attendance would increase following the onset of the COVID-19 pandemic when clinics were offering visits via multiple modalities (in person and via telemedicine).

Materials and methods

We utilized previously collected quality improvement data from three Adolescent Medicine subspecialty clinics. Site-specific IRB approvals were obtained, and participant consent was waived. Clinical data were collected, de-identified, and managed in an online, HIPAA-compliant database. Detailed methods regarding database creation and telemedicine implementation at each site have been previously described [6, 7].

We compare LARC post-insertion visit attendance for AYAs receiving IUDs and implants before and after the COVID-19 pandemic onset. Devices inserted 3/1/19–11/30/19 and 4/1/20–12/31/20 were defined as the “pre-pandemic” and “post-pandemic” onset cohorts, respectively. Patients were excluded if age <13 or >26 years at insertion (n=4); if insertion occurred at a non-participating location (n=10); or if the insertion was performed with procedural sedation (n=21) given unique characteristics of this population which could have influenced follow-up care.

The primary study outcome measure was the attendance of a post-insertion visit, defined as a visit at a participating site within 12 weeks of insertion during which the LARC device was addressed. It is routine practice in all sites to recommend a post-insertion visit to all patients receiving LARC in the clinic. However, recommending this visit is ultimately up to the discretion of the clinical provider, and patients are not required to schedule a post-insertion visit following LARC placement. Post-insertion visits included routine follow-up and problem-focused visits (e.g., evaluating bleeding). However, the existing database does not differentiate between routine and problem-focused visits. Additionally, the existing database does not include whether a patient was scheduled for a post-insertion visit but did not attend the visit. For patients in the post-pandemic onset cohort, follow-up visits were categorized as either in-person or via telemedicine (inclusive of all reimbursed encounters conducted via video platform or telephone). All patients in the pre-pandemic onset cohort had in-person visits.

Differences between pre- and post-pandemic onset cohorts were assessed using t-tests for continuous variables and χ^2 tests for categorical variables. Adjusted logistic regression models were used to examine factors associated with attending a post-insertion visit and attending the post-insertion visit via telemedicine, controlling for age category, LARC type, reason for LARC, race and ethnicity. Models accounted for clustering by site using generalized estimating equations. Analyses were conducted using SAS software (version 9.4; Cary, NC) and p<0.05 was considered statistically significant.

Results

A total of 525 LARC insertions (279 pre- and 246 post-pandemic onset) were included in this analysis (Table 1). Site C experienced an increase in overall LARC insertions following the onset of the COVID-19 pandemic, while Sites A and B had a decrease in insertions. IUD insertions were more common in the post-pandemic than in the pre-pandemic onset cohort (pre 48 % vs. post 61 %; p=0.003). The most common reason for LARC insertion was contraception only (46.3 %). The pre- and post-pandemic onset cohorts did not differ with respect to age at insertion (continuous, p=0.28 and categorical, p=0.77), race and ethnicity as documented in the medical record (p=0.06), or reason for LARC utilization (p=0.94).

Eighty-three (30 %) patients in the pre-pandemic onset cohort attended a post-insertion visit compared to 112 (46 %) in the post-pandemic onset cohort (p<0.001). Adjusted models, presented in Figure 1A, revealed that AYAs with LARC insertions following the pandemic onset were nearly twice as likely to attend a post-insertion visit via any modality than those with insertions prior to the pandemic onset (OR=1.90; 95 % CI=1.68–2.15; p<0.001). Notably, in adjusted analyses, younger adolescents (ages 13 to 15) were less likely (OR=0.60; 95 % CI=0.41–0.89; p=0.01)

Table 1: Demographics and clinical characteristics of the pre- and post-pandemic onset cohorts (LARC insertions 3/1/19–11/30/19 and 4/1/20–12/31/20, respectively).

Variable	Total sample (n=525)	Pre-pandemic onset (n=279)	Post-pandemic onset (n=246)	p-Value[a]
Age at insertion (years), *mean (SD)*	18.9 (2.5)	19.0 (2.5)	18.8 (2.5)	0.28
Age at insertion (category), *n* (%)				0.77
13–15 years	51 (9.7)	26 (9.3)	25 (10.2)	
16–17 years	154 (29.3)	76 (27.2)	78 (31.7)	
18–19 years	166 (31.6)	91 (32.6)	75 (30.5)	
20–22 years	108 (20.6)	59 (21.2)	49 (19.9)	
23–25 years	46 (8.8)	27 (9.7)	19 (7.7)	
Race and ethnicity, *n* (%)				0.06
White	230 (43.8)	108 (38.7)	122 (49.6)	
Hispanic	115 (21.9)	76 (27.2)	39 (15.9)	
Black or African American	71 (13.5)	37 (13.3)	34 (13.8)	
Asian	6 (1.1)	3 (1.1)	3 (1.2)	
Native American or American Indian	2 (0.3)	0 (0.0)	2 (0.8)	
Another race	29 (5.5)	16 (5.7)	13 (5.3)	
Multiple races	7 (1.3)	4 (1.4)	3 (1.2)	
Unknown	65 (12.4)	35 (12.5)	30 (12.2)	
Type of LARC, *n* (%)				0.003
IUD	282 (53.7)	133 (47.7)	149 (60.6)	
Implant	243 (46.3)	146 (52.3)	97 (39.4)	
Reason for LARC, *n* (%)				0.94
Contraception only	243 (46.3)	130 (46.6)	113 (45.9)	
Menstrual management only	77 (14.7)	43 (15.4)	34 (13.8)	
Both	201 (38.3)	104 (37.3)	97 (39.4)	
Unknown	4 (0.8)	2 (0.7)	2 (0.8)	
Site				<0.001
A	439 (83.6)	248 (88.9)	191 (77.6)	
B	44 (8.4)	27 (9.7)	17 (6.9)	
C	42 (8.0)	4 (1.4)	38 (15.5)	

SD, standard deviation. [a]t-test used for continuous variables and χ^2 test used for categorical variables.

than older adolescents (ages 18–19 years) to attend a post-insertion visit. Patients in mid adolescence (ages 16–17 years) (OR 1.21; 95 % CI=1.07–1.37; p=0.002) and young adults (ages 23–25 years) (OR=1.18; 95 % CI=1.08–1.29; p<0.001) were more likely than older adolescents (ages 18–19 years) to attend this visit. Additionally, attendance of a post-insertion visit varied by race and ethnicity with Black or African American AYAs attending this visit less frequently than White AYAs (OR=0.87; 95 % CI=0.82–0.92; p<0.001). AYAs who received implants were slightly less likely to attend a post-insertion visit than those who received IUDs (OR=0.90; 95 % CI=0.83–0.98; p=0.01). AYAs who received LARC for menstrual management only were more likely than those who desired contraception only to attend a post-insertion visit (OR=1.50; 95 % CI=1.13–1.98; p=0.005).

Among those attending a post-insertion visit following the pandemic onset, 47 (42 %) attended via telemedicine and 65 (58 %) attended in person. In adjusted models, as presented in Figure 1B, Black or African American AYAs were half as likely as White patients to attend their post-insertion visit via telemedicine (OR=0.54; 95 % CI=0.50–0.59; p<0.001). Additionally, young adults (ages 23–25 years) were significantly less likely to attend a post-insertion visit via telemedicine compared to older adolescents (ages 18–19 years) (OR=0.34; 95 % CI=0.25–0.47; p<0.001). Lastly, it is worth noting that AYAs with an implant were almost twice as likely (OR=1.91) to attend the post-insertion visit via telemedicine compared to those with IUDs in the post-pandemic onset cohort; this did not reach statistical significance in our sample (95 % CI=0.44–8.38; p=0.56). Reason for LARC did not influence the modality of the post-insertion visit.

Discussion

Our study found that AYAs with LARC insertions after the COVID-19 pandemic onset were twice as likely to attend a post-insertion visit as those with insertions prior to the pandemic. Interestingly, younger adolescents were less likely than older adolescents to attend a post-insertion visit. This may indicate that younger adolescents have additional barriers to attending follow-up care. Therefore, future research should investigate the unique needs of younger adolescents to inform guidelines on post-insertion follow-up care for this population. Additionally, the observed lower frequency of post-insertion visit attendance among Black or African American AYAs as compared to White AYAs may indicate disparities in access to this care. It is imperative that all AYAs can access post-insertion care, when indicated or desired. Therefore, future research must investigate barriers to care and preferences related to LARC follow-up across the many intersecting identities of AYAs to better understand this disparity and potential solutions.

Additionally, AYAs with implants were less likely than those with IUDs to attend a post-insertion visit. It is possible that patient and/or provider preference for follow-up varies based on the type of LARC. Furthermore, patient experience of symptoms, which can vary by method, may influence post-insertion visit attendance. One study found that roughly one-

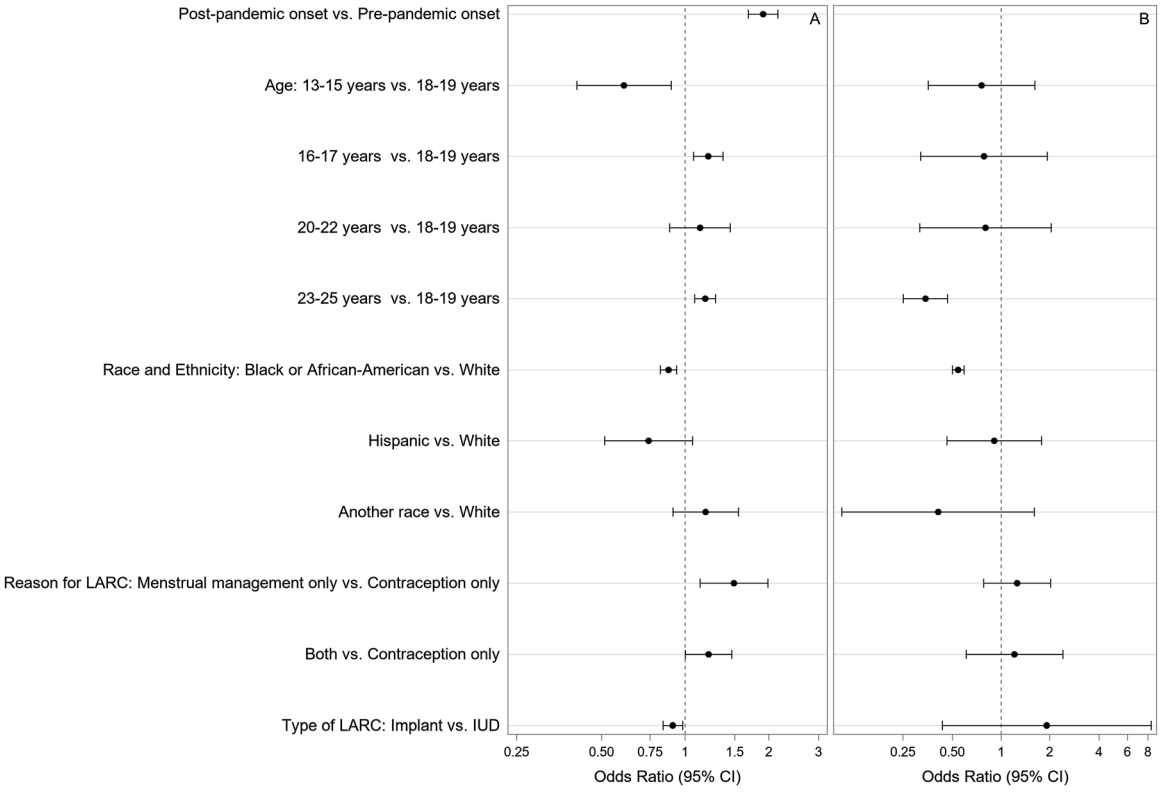

Figure 1: Results of adjusted logistic regression models examining factors associated with attending a post-insertion follow-up visit (A) and attending the post-insertion visit specifically via telemedicine (B), controlling for age category, LARC type, reason for LARC, race/ethnicity.

third of AYAs (28.6 %) attending follow-up visits within four to eight weeks of insertion reported pelvic pain or cramping, and that these symptoms were more common in AYAs with IUDs [2]. Our finding suggests that post-insertion follow-up needs may vary based on LARC type, and guidelines developed for this care should reflect this difference.

The observed increase in LARC post-insertion visit attendance in our study was concurrent with the initiation of telemedicine LARC services. This preliminary finding may suggest that telemedicine availability increased access to AYA LARC post-insertion care, as approximately 40 % of the post-pandemic onset cohort who attended this visit did so via telemedicine. Our study builds on the findings of Wood et al., who demonstrated that telemedicine was associated with a lower percentage of missed appointments in an AYA clinic [8]. While our study does not examine missed appointments, we observe an overall increase in the likelihood of attending a post-insertion visit following the COVID-19 pandemic onset and the use of telemedicine. Telemedicine could serve as a unique way to increase access to care for AYAs, as this population may be particularly facile at utilizing telemedicine given their comfort with technology and experience unique benefits from using this modality (e.g., reduced cost, time, and transportation burden) [9].

Our prior work investigating AYA LARC telemedicine care found that AYAs using telemedicine had similar demographics and clinical characteristics to those attending visits in-person [6]. However, the present study found that older patients in this population (ages 23 to 25) were less likely than adolescents ages 18–19 years to use telemedicine for their post-insertion visit. Age may influence visit modality preferences in this population. Additionally, Black or African American patients in our study were significantly less likely to use telemedicine for their post-insertion visit than White patients. Disparities in accessing telemedicine services have been raised as a concern by experts and demonstrated in other research, specifically among those with low-income, using public insurance, living in rural communities, and who identify as Black or African American and Latinx [10–13]. Therefore, future research should continue to investigate whether the availability of telemedicine increases access to care, with particular emphasis on equitable access to telemedicine and technology. The roll out and continued use of telemedicine services must address these demonstrated inequities to ensure all have access to this novel modality.

Additionally, AYAs in our sample were more likely to choose the IUD than the implant following the COVID-19

pandemic onset. The reason for this shift is unclear, but it is plausible that the pandemic landscape altered AYAs' attitudes about sexual and reproductive healthcare. It is imperative that research investigate this potential paradigm shift to understand how to best support AYAs' contraceptive needs beyond the COVID-19 pandemic. It is unlikely that the increase in IUDs influenced the increase in post-insertion visit attendance, as this difference was maintained in the adjusted analyses, which accounted for the type of LARC. While not statistically significant, AYAs with implants were nearly twice as likely as those with IUDs to attend the post-insertion visit via telemedicine. More research is needed to determine whether there are differences in post-insertion follow-up care patterns and preferences for visit modality between AYAs who use IUDs and those who use implants. Additionally, this difference could be influenced by provider preference for in-person exams following IUD placement and/or comfort using telemedicine for IUD care. Notably, telemedicine can play a role in follow-up care for both IUDs and implants, in the absence of heavy bleeding with symptoms of anemia, concern for ectopic pregnancy, non-palpable implant, or missing IUD strings, based on expert recommendation [14].

Our study has several limitations. Given our reliance on an existing database, we are unable to account for post-insertion visits that may have occurred at clinics outside of the participating sites, assess the reason for attending the visit, or capture the motivation for the visit modality. Additionally, we were unable to query patient or provider satisfaction with the post-insertion visit and/or modality of the visit. Furthermore, clinic policies, local regulations, and state regulations involving telemedicine use were not standardized across the sites. Given the data were extracted from documentation of routine clinical care in the medical record, missing data could have influenced our results (race and ethnicity unknown for 12.4 % of the sample, reason for LARC unknown for 0.8 % of the sample). Lastly, we are unable to demonstrate causality of the observed associations given the absence of randomization in our study design.

Our study adds to the limited literature examining AYA LARC follow-up patterns and is the first, to our knowledge, to compare these patterns before and after the onset of the COVID-19 pandemic following use of telemedicine. Telemedicine may have played a role in increasing access to post-insertion visits following the COVID-19 pandemic onset. The COVID-19 pandemic itself may have influenced AYA contraceptive needs, including how AYAs prefer to access healthcare. Future work should assess the clinical importance, benefit to patients, and cost-effectiveness of routine LARC post-insertion visits for AYAs, as well as the effectiveness of providing this care via telemedicine vs. in person. This continued investigation is imperative to understand how best to support AYAs choosing LARC and whether telemedicine should continue to play a role in LARC care beyond the COVID-19 pandemic.

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References

1. Curtis KM, Jatlaoui TC, Tepper NK, Zapata LB, Horton LG, Jamieson DJ, et al. U.S. selected practice recommendations for contraceptive use, 2016. MMWR Recomm Rep (Morb Mortal Wkly Rep). 2016;65:1–66.
2. Bryson AE, Cabral HJ, Coles MS. Attendance of an initial follow-up visit after long-acting reversible contraception insertion and method continuation among adolescents and young adults: a retrospective study. J Pediatr Adolesc Gynecol 2021;34:525–9.
3. Jones AE, Kaul S, Harding J, Weldon DLM, Akers AY. Follow-up care and 6-month continuation rates for long-acting reversible contraceptives in adolescents and young adults: a retrospective chart review. J Pediatr Adolesc Gynecol 2020;33:39–44.

4. Ravi A, Prine L, Waltermaurer E, Miller N, Rubin SE. Intrauterine devices at six months: does patient age matter? Results from an urban family medicine Federally Qualified Health Center (FQHC) network. J Am Board Fam Med 2014;27:822–30.
5. Wilkinson TA, Kottke MJ, Berlan ED. Providing contraception for young people during a pandemic is essential health care. JAMA Pediatr 2020; 174:823–4.
6. Bryson AE, Milliren CE, Borzutzky C, Golub SA, Pitts SAB, DiVasta AD. Telemedicine for adolescent and young adult long-acting reversible contraception follow-up care amidst a global pandemic. J Pediatr Adolesc Gynecol 2023;36:51–7.
7. Pitts S, Milliren CE, Borzutzky C, Maslyanskaya S, Berg GDA, DiVasta AD. Adolescent/young adult long-acting reversible contraception: experience from a multisite adolescent medicine collaborative. J Pediatr 2021;243:158–66.
8. Wood SM, White K, Peebles R, Pickel J, Alausa M, Mehringer J, et al. Outcomes of a rapid adolescent telehealth scale-up during the COVID-19 pandemic. J Adolesc Health 2020;67:172–8.
9. Gilkey MB, Kong WY, Huang Q, Grabert BK, Thompson P, Brewer NT. Using telehealth to deliver primary care to adolescents during and after the COVID-19 pandemic: National Survey Study of US primary care professionals. J Med Internet Res 2021;23:e31240.
10. Ortega G, Rodriguez JA, Maurer LR, Witt EE, Perez N, Reich A, et al. Telemedicine, COVID-19, and disparities: policy implications. Health Policy Technol 2020;9:368–71.
11. Park J, Erikson C, Han X, Iyer P. Are state telehealth policies associated with the use of telehealth services among underserved populations? Health Aff 2018;37:2060–8.
12. Serino-Cipoletta J, Dempsey C, Goldberg N, Marinaccio B, O'Malley K, Dolan C, et al. Telemedicine and health equity during COVID-19 in pediatric gastroenterology. J Pediatr Health Care 2022; 36:124–35.
13. Hill BJ, Lock L, Anderson B. Racial and ethnic differences in family planning telehealth use during the onset of the COVID-19 response in Arkansas, Kansas, Missouri, and Oklahoma. Contraception 2021;104: 262–4.
14. Stifani BM, Madden T, Micks E, Moayedi G, Tarleton J, Benson LS. Society of family planning clinical recommendations: contraceptive care in the context of pandemic response. Contraception 2022;113: 1–12.