



Research Paper

Reproductive Health Counseling in Adolescent Women With Epilepsy: A Single-Center Study

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ABSTRACT

Background: Counseling adolescent women with epilepsy (WWE) about reproductive health (contraception, sexual activity, and menstruation) is important given the teratogenicity of many antiseizure medications and high rates of contraception failure. Only a third of adolescent WWE report discussing contraception with their epileptologists, demonstrating a significant gap in counseling.

Methods: We assessed factors associated with reproductive health counseling by pediatric neurologists via a retrospective chart review of adolescent (aged 12–18 years) WWE seen at a pediatric neurology clinic from 2018 to 2020.

Results: We analyzed 219 visits among 89 unique WWE. There were 23 documented discussions on contraception (11% of visits), 8 on sexual activity (4%), and 127 on menstruation (58%). When contraception was discussed, sexual activity and menstruation were more frequently discussed. Female providers were more likely to document a discussion of menstruation (OR = 3.2, 95% CI = [1.6, 6.4]). WWE who were older at the time of visit or who had their first seizure at an older age were more likely to have documented discussions of contraception and sexual activity. Neither details of treatment regimen nor epilepsy type was associated with documentation of counseling.

Conclusions: A minority of adolescent WWE have documented reproductive health discussions, demonstrating a need for quality improvement projects to address this gap in care.

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Introduction

Half a million women with epilepsy (WWE) in the U.S. are of childbearing age.¹ Among WWE who become pregnant, less than half of the pregnancies were planned and one in four happened after contraception failure.^{2,3} Contraception failure is high among WWE because many antiseizure medications (ASMs) have enzyme-inducing effects that reduce contraception efficacy.^{4–6} Several ASMs

decrease circulating levels of the estrogenic and progestogenic components of oral contraceptives (OCs) because these ASMs and OCs are both metabolized via the same cytochrome P450 enzyme system, CYP3A4.⁷ Contraception failure is a particularly critical concern for WWE given that many ASMs are teratogenic. There is a two- to four-fold increase in major congenital malformations in the offspring of WWE as compared to the general population.^{8,9} Furthermore, hormonal contraception can affect ASMs and increase seizure activity.^{6,10–12} As examples, estrogen leads to increased metabolism of lamotrigine and valproate. It can also act directly as a proconvulsant, as seen in catamenial epilepsy.^{6,10–12}

The complex interactions between contraceptives and ASMs highlight the importance of reproductive health counseling for adolescent WWE by a clinician trained in epilepsy care. Neurologists are more knowledgeable about the interactions between ASMs and hormonal contraceptives than endocrinologists, obstetricians/gynecologists, internal medicine physicians, family practice physicians, and pediatricians.¹³ Moreover, non-neurology physicians may be unaware when a patient changes ASMs.¹⁰ For

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these reasons, neurologists have expressed concerns that other providers might lack epilepsy-specific knowledge to appropriately provide counseling and have therefore emphasized the key role of neurologists in providing this care.¹⁴ Indeed, a mixed-methods study found adolescent WWE want their neurologists to help them understand the effect of epilepsy on their reproductive health.¹⁵

However, only a third of adolescent and adult WWE report discussing contraception with an epilepsy specialist.^{10,15} This has led to many WWE having limited knowledge of the teratogenic effects of ASMs and the potential interactions between ASMs and contraceptives.^{15,16}

Patient and provider characteristics that impact which adolescent WWE will receive contraception counseling are understudied. Understanding these factors may provide insights into how to design interventions to improve rates of counseling. We assess the factors that affect whether pediatric neurologists document conversations about contraception, sexual activity, and menstruation (reproductive health) with adolescent WWE in their care.

Methods

Study design

We conducted a retrospective chart review of all adolescent females with epilepsy seen at New York-Presbyterian/Weill Cornell Medicine Center pediatric neurology and epilepsy clinics from 2018 to 2020. This study was approved by the Weill Cornell Institutional Review Board (IRB# 1706018290).

Study population

Participants were eligible for inclusion if they were female (assigned at birth), aged 12–18 years at the time of visit, and seen by a pediatric neurologist with a visit associated with the ICD-10 code G40 (Epilepsy) between August 2018 and August 2020.

Data collection

For each participant visit that was eligible, visit notes were reviewed by a single reviewer (C.S.). The following data were extracted for each visit: patient demographics, age at visit, seizure history, epilepsy type and syndrome, etiology, comorbidities, current medication regimen, changes or additions to regimen made at the visit, and provider characteristics. We took note of whether the participant's medications were teratogenic. Teratogenic medications were defined based on Food and Drug Administration Categories. Drugs that were Category D were considered teratogenic, and drugs that were category C or Not assigned were considered not teratogenic. Teratogenic medications included valproate, carbamazepine, topiramate, phenytoin, and phenobarbital. Medications were also classified based on whether they are metabolized by the CYP3A4 enzyme system. The CYP3A4 isoenzyme inducers are phenobarbital, carbamazepine, phenytoin, felbamate, topiramate, primidone, and oxcarbazepine.¹⁷ Visit notes were reviewed for documentation of discussions on contraception, sexual activity, and menstruation. We noted when this documentation appeared in boilerplate or preformatted sections of the notes (i.e., "Review of Systems") versus free-text narrative portions of the notes. Boilerplate text may represent information generated automatically with little cognitive input from the clinician or may represent text copied from other notes and therefore is a less reliable record of the encounter.¹⁸

Statistical analysis

We performed univariate descriptive analyses of the cohort, using median statistics when appropriate. We performed both patient-level and visit-level analyses. For patient-level bivariate analysis, such as the effect of patient demographics, seizure type, and comorbidities, we used chi-square and Wilcoxon tests. The outcome for patient-level analysis was "ever counseled." For visit-level analysis, we used generalized estimating equations with a logit link, clustering by patient. This allowed us also to examine factors that change over time, such as age, number of ASMs, and if any ASM was teratogenic. The outcome for visit-level analysis was "counseling at this visit." All statistical analyses were conducted in R studio. We report 2-tailed *P* values for correlations.

Results

Sample characteristics

There were 219 visits by 89 individuals who met eligibility criteria, after excluding one woman who had been born male and transitioned to female. The majority (63%) of WWE had more than 1 visit. The median age was 15 years (interquartile range [IQR] = 13–16, absolute range = 12–18). Thirty percent were white, though there was substantial missing race data. WWE took a median of 1 ASM (IQR = 1–3, absolute range = 0–9) and were on at least one teratogenic drug for 19% of the study visits (Table).

Prevalence of reproductive health counseling

Out of 219 visits and 89 unique patients, there were 23 documented discussions on contraception (11% of visits) with 16 WWE (18%), 8 on sexual activity (4% of visits) with 6 WWE (7%), and 127 on menstruation (58% of visits) with 69 WWE (78%) (Fig A). Fifty-seven (45%) of the menstruation discussions were documented as boilerplate text. All 8 documented discussions of sexual activity were for participants documented as being not sexually active (no visits documented that a participant was sexually active).

Factors affecting reproductive health counseling

At the visit level, when contraception was discussed, sexual activity (4 of 23) and menstruation (21 of 23) were significantly more likely to be discussed. Similarly, when sexual activity was discussed, contraception (4 of 8) and menstruation (4 of 8) were significantly more likely to be discussed. There were only 4 visits (2%) during which all three reproductive health elements were discussed.

Female providers were significantly more likely to document a discussion of menstruation (odds ratio [OR] = 3.17, 95% confidence interval [CI] = [1.6, 6.4], *P* = 0.001). Provider gender was not associated with documented discussions of contraception or of sexual activity.

As age at visit increased from 12 to 18 years, WWE were significantly more likely to have documented discussions of contraception (Fig B; OR = 1.36 per year, 95% CI = [1.04, 1.79], *P* = 0.03) and sexual activity (OR = 1.7 per year, 95% CI = [1.2–2.4], *P* = 0.002). WWE who had their first seizure at an older age were more likely to have documented discussions of contraception (Fig C; documented: median age = 13 years [IQR = 6.5–16], not documented: median age = 7.5 years [IQR = 2–12]; *z* = -2.5, *P* = 0.01) and documented discussions of sexual activity (documented: median age = 16 years [IQR = 15.3–16], not documented: median age = 7 years [IQR = 2–12]; *z* = -3.80, *P* < 0.001).

TABLE.
Characteristics of People With Epilepsy (N = 89) and Their Visits (N = 219) Included in the Analysis

Patient Characteristics	
TOTAL	N = 89
Race, n (%)	
White	27 (30)
Black	12 (13)
Asian	5 (5)
Other	23 (26)
Declined	22 (25)
Ethnicity, n (%)	
Hispanic/Latino	20 (22)
Not Hispanic/Latino	40 (45)
Unknown	1 (1)
Declined	28 (31)
Primary language, n (%)	
English	71 (80)
Spanish	11 (12)
Other	4 (4)
Unknown	3 (3)
Insurance status, n (%)	
Insured	87 (98)
Uninsured	2 (2)
Epilepsy type	
Focal	32 (36)
Generalized	53 (60)
Unknown	4 (4)
Visit Characteristics	
TOTAL	N = 219
Age	15 [13–16] (12–18)
Median [IQR], (range)	
# of ASMs per subject	1 [1–3] (0–9)
Median [IQR], (range)	
Teratogenic medication, n (%)	
Yes	41 (19)
No	178 (81)
Provider gender, n (%)	
M	43 (20)
F	176 (80)
Provider level, n (%)	
Attending	176 (80)
Resident	43 (20)
# of visits per subject	2 [1–3 5]
Median [IQR], (range)	(1–8)

Abbreviations:

ASM = Antiseizure medication

F = Female

IQR = Interquartile range

M = Male

There were 41 visits with participants who were taking a teratogenic medication. Only 1 (2.5%) of these visits had a documented contraception discussion.

Details of treatment regimens were not associated with documentation of counseling, including the following variables: the number of ASMs, the addition of an ASM at the visit, addition of a teratogenic ASM, change in ASM dosage, change in teratogenic ASM dosage, actively taking a teratogenic ASM, actively taking a CYP3A4 inducing an ASM, or treatment resistance. Race, ethnicity, language spoken, epilepsy type, epilepsy etiology, comorbidities, or provider type (attending vs resident) were also not correlated with reproductive health counseling documentation.

Discussion

Summary of results

Less than one in five WWE had documentation of contraception counseling, and only one in fourteen was asked about sexual

activity at any visit between 2018 and 2020. Those with documented discussions were more likely to be older and to have their first seizure at an older age. Fifty-eight percent of WWE had documentation of menstruation for at least one visit, though this often was documented in the boilerplate Review of Systems section. Adding, changing, or currently using a teratogenic ASM was only rarely accompanied by documentation of reproductive health discussions.

Context in literature

Our rate of contraception documentation (18% of visits) is lower than that reported by a prior study conducted in 2014,¹⁶ where 34% of adolescent WWE had discussed contraception at least once with an epilepsy specialist. Our data were based on chart documentation of discussions in a two-year period, so it is possible that these conversations occurred without being documented. Nonetheless, our study is broadly in line with results of prior studies that indicate a minority of adolescent WWE receive contraception counseling. The low rate of discussions of sexual activity (4%) and moderate rate of discussions of menstruation (58%) are novel findings and merit further study at other centers.

Significance of findings

Our findings are consistent those of with prior work indicating there are substantial barriers preventing clinicians from providing reproductive health counseling to adolescent WWE. Kirkpatrick et al.¹⁴ conducted semistructured interviews with 16 pediatric neurologists and epileptologists to understand their attitudes, practices, and experiences with reproductive health for adolescent WWE. In this study, clinicians reported both systemic and interpersonal barriers to the discussion of reproductive health, including a lack of time and expertise to effectively counsel patients.¹⁵ Neurologists may assume that patients are getting appropriate counseling from their gynecologists, but this is often not the case.¹⁰ In turn, adolescent WWE may lack adequate knowledge about reproductive health and not feel empowered to engage in discussions with their neurologists, leading to a lack of counseling.

Another barrier may be liability concerns from clinicians, as some parents may be opposed to these discussions. However, given the known interactions between epilepsy, ASMs, and reproductive health, neurologists are operating within the scope of practice to engage in these discussions and have legal protections in doing so.¹⁸

Limitations

This study has several limitations. First, our methods relied on documentation as a proxy for discussions on contraception, sexual activity, and menstruation; however, it is possible that some discussions occurred without chart documentation. Second, most of the menstruation documentation occurred in the boilerplate Review of Systems section, which is a less reliable source of information about the content of a clinical encounter.¹⁹ Thus, we may have overestimated the true number of discussions of menstruation. Third, our study only looked at a two-year timeframe, so we could not assess whether participants received counseling in their lifetime. Fourth, our single-center study has uncertain generalizability to other pediatric epilepsy programs.

Conclusions

Despite these limitations, our study highlights a gap in care and emphasizes a need to improve reproductive health counseling for young WWE. In 2014, the American Academy of Neurology released

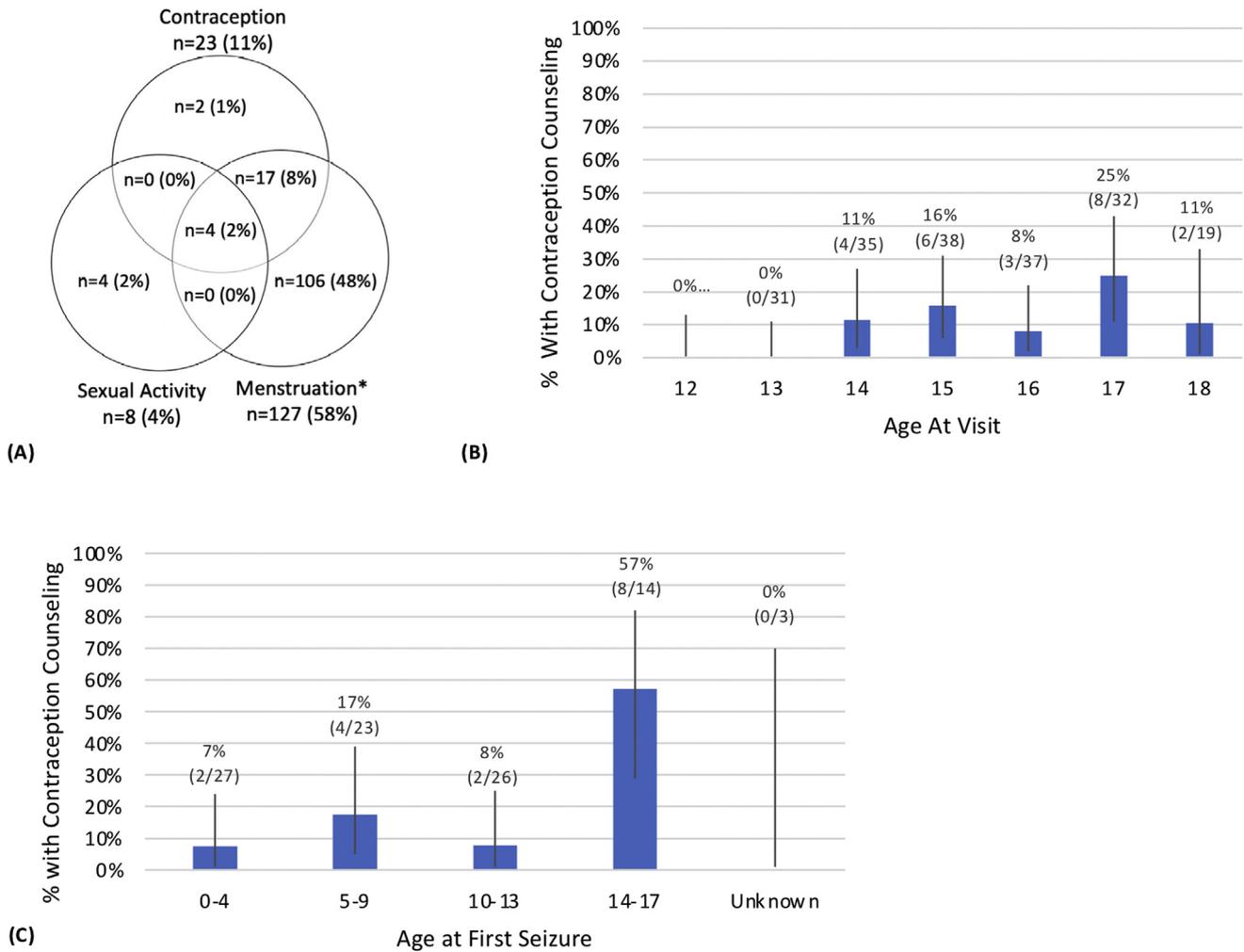


FIGURE. (A) Visit (%) documented reproductive health counseling. Percentage calculated from total visits (n = 219). *Menstruation documentation was usually found in the boilerplate Review of Systems section, whereas contraception and sexual activity documentation was always found in the free text of notes. (B) % WWE who received contraception counseling by age at visit. Error bars represent 95% CI from a binomial distribution. There was a significant increase in documentation of contraception counseling as subject's age at visit increased from 12-18 years (OR = 1.36 per year, 95% CI = [1.04, 1.79], P = 0.03). (C) % WWE who received contraception counseling by age at the first seizure. Error bars represent 95% CI from a binomial distribution. WWE who had at least one documented discussion on contraception were more likely to have their first seizure at an older age (documented: median age = 13 years [IQR = 6.5-16], not documented: median age = 7.5 years [IQR = 2-12]; z = -2.5, P = 0.01). CI, confidence interval; IQR, interquartile range; OR, odds ratio; WWE, women with epilepsy. The color version of this figure is available in the online edition.

guidelines stating that all female patients of childbearing potential (12-44 years old) diagnosed with epilepsy should receive counseling every year on how epilepsy and its treatment may affect contraception or pregnancy. One way to help meet this goal could be for epilepsy clinics to incorporate a yearly prompt in the electronic medical records system to engage in reproductive health counseling to standardize documentation processes. Other interventions might include improved educational tools for clinicians, quality improvement projects, or incentives for clinicians to engage adolescent WWE in reproductive health counseling. If epilepsy clinicians would like help counseling young women with epilepsy about reproductive health, they may consider referring their patients to neurologists with a special interest in women's reproductive health or gynecologists knowledgeable about epilepsy.

We recognize that time constraints may limit how much counseling can be incorporated into a single visit. Clinicians must weigh the value of providing information on reproductive health with other important guidance, including but not limited to risk of sudden unexpected death in epilepsy (SUDEP), driving, water safety, bone health, and ASM side effects.

Providers may choose not to document details of reproductive health discussions in the adolescent's chart given that parents may have access to the information in the medical chart.²⁰ However, we believe there should be a shift in practice to document that the discussion was had without sharing the adolescent's sexual history. This helps to improve communication across providers and provide high-quality care for adolescents with epilepsy.

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