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Health Care Provider Knowledge Regarding Oral Contraception Effectiveness for Women with a History of Bariatric Malabsorptive Procedures

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Abstract

Background: Clinical practice guidelines recommend women avoid pregnancy immediately after bariatric surgery, highlighting the need for effective contraception. However, women with a history of malabsorptive bariatric procedures should generally not use oral contraceptives, as these procedures may decrease contraceptive effectiveness.

Objectives: To identify provider characteristics associated with knowledge of COC effectiveness.

Setting: United States

Methods: We analyzed weighted survey data collected from national samples of public-sector health centers and office-based physicians who regularly provide family planning services (n=2,060). We asked providers about the effectiveness of combined oral contraceptives (COCs) for women with a history of malabsorptive procedures compared with healthy women (more/equally effective, less effective, do not know). We used multinomial logistic regression to calculate adjusted odds ratios and 95% confidence intervals to identify characteristics associated with COC effectiveness knowledge.

Results: Approximately 55% of providers correctly answered that COCs are less effective for women with malabsorptive procedures; 25% considered COCs more/equally effective, and 20% were uncertain. Among public-sector providers, the adjusted odds of uncertainty was significantly higher for those whose clinical focus was not reproductive health, for nurses versus advanced practice clinicians, and for those without Title X funding. For office-based physicians, adolescent medicine providers had higher odds of uncertainty versus obstetrician-gynecologists. Physicians

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practicing in settings other than private clinics (such as community health centers) had higher odds of considering COCs effective compared with those practicing in hospital or university clinics.

Conclusions: Substantial proportions of surveyed providers have inadequate COC effectiveness knowledge for women with a history of malabsorptive procedures.

Keywords

oral contraception effectiveness; bariatric surgery

Introduction

Over 36% of U.S. women between the ages of 20-39 years have obesity⁽¹⁾. Weight loss methods such as behavior modifications and medications may not be successful or sustainable methods of treatment for more severe classes of obesity and their associated complications; however, bariatric surgery has been shown to be the more effective method for weight loss and improving comorbidities^(2, 3). The incidence of bariatric surgery in the U.S. has been increasing since the 1990s with 216,000 estimated procedures in 2016; women account for over 75% of this patient population⁽⁴⁻⁷⁾.

Weight loss after bariatric surgery has been associated with improved fertility among women of reproductive age, which may increase the risk for unintended pregnancy⁽⁸⁻¹¹⁾. Alongside obesity, unintended pregnancy is a public health concern because of its association with negative maternal and infant health outcomes⁽¹²⁾. In 2011, almost half of U.S. pregnancies were unintended⁽¹³⁾. Clinical practice guidelines recommend women avoid pregnancy during the rapid weight loss phase following bariatric surgery⁽¹⁴⁾ to reduce possible maternal or fetal health risks^(10, 15-17). Additionally, the U.S. Medical Eligibility Criteria for Contraceptive Use (US MEC) considers bariatric surgery within the past two years a condition that is associated with increased risk for adverse health events as a result of pregnancy⁽¹⁸⁾. As such, the US MEC suggests that long-acting highly effective contraception might be the best choice for these patients, as barrier methods and behavior-based methods of contraception have relatively high typical-use rates of failure⁽¹⁸⁾.

Despite these recommendations, one large multicenter cohort recently reported over 40% of women in the year after bariatric surgery were having unprotected intercourse though most were not trying to conceive⁽¹⁹⁾. Another smaller study found condoms and combined oral contraceptives (COCs) were the most frequently used methods of contraception 2-12 months after bariatric surgery, with 30.6% and 16.3% of women using these methods, respectively⁽²⁰⁾. These methods, with typical use failure rates in the general population of 18% (condoms) and 9% (COCs), are not as effective as long-acting reversible contraceptives (LARCs), which include intrauterine devices (IUDs) and implants, or permanent methods of sterilization⁽²¹⁾. Furthermore, for women with a history of bariatric surgery via malabsorptive procedures, the effectiveness of COCs may be reduced due to compromised drug absorption^(22, 23) and may be further reduced by chronic postoperative complications (e.g. diarrhea or vomiting)⁽¹⁸⁾. A 2010 systematic review examining safety and effectiveness of contraception for women with a history of bariatric surgery included one small prospective study that reported 2 pregnancies among 9 oral contraceptive users (22%),

after biliopancreatic diversion and two pharmacokinetic studies reporting conflicting results among women taking COCs after jejunioileal bypass compared with normal weight or controls with obesity (24). Based on these studies and expert opinion, the US MEC classifies COCs for women with a history of bariatric malabsorptive procedures as a “Category 3”, defined as “a condition for which the theoretical or proven risks usually outweigh the advantages of using the method” (18).

The purpose of this analysis was to describe the knowledge of health care providers, including public-sector providers and office-based physicians, regarding the effectiveness of COCs for women with a history of bariatric surgery via malabsorptive procedures and to identify factors associated with inaccurate or insufficient knowledge about COC effectiveness for this patient population.

Materials and Methods

We conducted a large national survey of health care providers to assess their knowledge, attitudes, and practices regarding contraception safety and provision. We mailed questionnaires to a random sample of 4,000 public-sector health centers and 2,000 office-based physicians. Public-sector health centers were randomly sampled from a Guttmacher Institute database of all publicly funded family planning health centers nationwide (25). By design, half of sampled health centers had received federal funds from the Title X family planning program and half did not. Within these strata (Title X centers, non-Title X centers), we randomly selected centers by health center type (e.g., community health center, health department), proportionate to the relative number in the universe for that strata. At each sampled health center, we asked one provider to complete the questionnaire. Office-based physicians specializing in obstetrics and gynecology, family medicine, or adolescent medicine were randomly sampled from the American Medical Association Physician Masterfile (<https://www.ama-assn.org/life-career/ama-physician-masterfile>). The questionnaire asked about provider knowledge and attitudes regarding the safety and provision of contraception for certain groups of women. Recipients were offered the option to respond via mail or answer the questionnaire online. We attempted to reach non-responders through a reminder postcard, a second mailing, and follow-up telephone calls. Providers were eligible to participate if they provided family planning services to at least two reproductive-aged women per week.

Of 6,000 surveys distributed, 2,118 respondents were deemed eligible, 1,000 were deemed ineligible (comprised mainly of office-based physicians not providing family planning services and public-sector health centers no longer open), and 2,882 had unknown eligibility (comprised mainly of non-respondents and those with surveys returned as undeliverable). We calculated the response rate by assuming that the proportion of eligible respondents among those with known eligibility was the same as among those with unknown eligibility. The overall response rate was 51% (n=2,087). We restricted the analysis to practicing family planning providers, thereby excluding respondents who were administrative staff/managers (n=26) or who did not provide family planning services to female patients (n=1). The final analytic sample included 1,654 public sector providers and 406 office based physicians (n=2,060). We weighted data to adjust for nonresponse and the probability of selection into

the sample within each office-based physician specialty and for public-sector health center type.

This analysis examined the question: *How effective do you consider combined oral contraceptives (COCs) to be for women with a history of bariatric surgery via malabsorptive procedures (e.g. Roux-en-Y gastric bypass) compared to use by healthy women?* Response options included “More effective”, “Equally effective”, “Less effective” and “Don’t know”. Since the US MEC recommends that COCs generally should not be used (US MEC category 3) by women with a history of malabsorptive procedures due to potential decreased effectiveness, we considered “Less effective” to be the best answer, and therefore, our referent category. We combined the categories of “More effective” and “Equally effective” after comparing factors associated with each of these responses in chi-square analyses and finding similar results.

We evaluated provider and clinic characteristics to identify factors associated with considering COCs to be anything other than “less effective” among women with history of malabsorptive procedures compared with healthy women. We examined the following provider characteristics: gender, primary clinical focus, practice setting, region, occupation, time since completing formal clinical training, and formal LARC training (formal training in IUD insertion [copper or levonorgestrel] or insertion of a contraceptive implant). We included formal LARC training since providers with this training may have more family planning knowledge or experience than providers without LARC training. We also examined characteristics describing patient demographics (e.g., proportion of female patients of reproductive age who receive family planning services, who pay using Medicaid or other public assistance, who are racial/ethnic minorities, who have limited English proficiency, and who are adolescents or 35 years of age or older). We examined if there were differences in effectiveness knowledge by these characteristics within strata of office-based physicians, and for public-sector providers using Rao-Scott chi-square test.

We used multinomial logistic regression to calculate adjusted odds ratios (aORs) and 95% confidence intervals (CIs) to identify characteristics associated with considering COCs effective (responded “More effective” or “Equally effective”) or with uncertainty (responded “Do not know”), compared with “Less effective” for office-based physicians and public sector providers separately. To identify factors to include in final adjusted models, we selected those significantly ($p < 0.05$) associated with perceptions of COC effectiveness during bivariate analysis. Characteristics selected a priori for inclusion in final models were provider gender, region, practice setting and proportion of female patients of reproductive age greater than 35 years of age.

We performed all analyses using SAS 9.3 survey procedures to account for the complex sample design. The project was reviewed by CDC and was deemed as public health practice, and therefore did not require IRB approval.

Results

The majority of providers were female for both public-sector providers (89.7%) and office-based physicians (56.8%). Other characteristics of public-sector providers and office-based physicians are shown in Table 1. Obstetrics and gynecology (OB/GYN) was the prominent specialty (60.6%) for office-based physicians, and reproductive health (including OB/GYN and family planning) was the most common primary clinical focus for public-sector providers (55.0%). The majority of office-based physicians practiced in a private setting (66.4%).

For all providers combined, approximately 55% of providers correctly answered that COCs are less effective for women with malabsorptive procedures; 25% considered COCs more/equally effective, and 20% responded with uncertainty. Most public-sector providers (60.4%; Table 2) and office-based physicians (55.3%; Table 3) responded that COCs were less effective for women with a history of bariatric malabsorptive procedures compared to healthy women. Respectively among public-sector providers and office-based physicians, 17.1% 25.4% considered COCs more or equally effective for women with a history of bariatric malabsorptive procedures compared to healthy women. Meanwhile, 22.5% of publicly funded providers and 19.3% of office-based providers responded with uncertainty.

Bivariate analyses among public-sector providers found the following covariates significantly associated with inadequate knowledge of COC effectiveness for women with a history of bariatric malabsorptive procedures compared with healthy women: provider gender, primary clinical focus, occupation, health center Title X funding and percentage of female patients of reproductive age who are provided family planning services (Table 2). These remained significant after adjustment. Male providers had higher odds of considering COCs more or equally effective (aOR: 1.78, 95% CI 1.11-2.83) and lower odds of uncertainty (aOR: 0.61, 95% CI 0.38-0.98) compared with female providers. Providers with a primary clinical focus in family medicine, adolescent medicine, or primary care all had higher odds of responding with uncertainty of COC effectiveness for women with history of bariatric malabsorptive procedures compared with those with a reproductive health focus (aOR: 1.80, 95% CI 1.28-2.53; aOR: 3.14, 95% CI 2.06-4.78; aOR: 2.02, 95% CI 1.41-2.90, respectively). Nurses had higher odds of uncertainty compared with advanced practice clinicians (aOR: 1.65, 95% CI 1.19-2.27). Providers working in clinics without Title X funding also had higher odds of uncertainty or considering COCs more or equally effective compared with those in clinics with Title X funding (aOR: 1.42, 95% CI 1.08-1.88; aOR: 1.44, 95% CI 1.08-1.90, respectively).

Among office-based physicians, bivariate analyses demonstrated that physician specialty and percentage of female patients of reproductive age that pay using Medicaid or other government assistance were significantly associated with knowledge of COC effectiveness for this population (Table 3). After adjusting for covariates, these two variables as well as practice setting were significantly associated with either insufficient or inaccurate knowledge. Adolescent medicine physicians had higher odds of responding with uncertainty regarding COC effectiveness for women with history of bariatric malabsorptive procedures compared with OB/GYN physicians (aOR: 3.84, 95% CI: 1.54-9.55). Providers in practice

settings classified as “other” (such as community health centers, health departments, school or sexually transmitted infection (STI) clinics or military facilities) had higher odds of considering COCs effective for women with bariatric malabsorptive procedures, compared with providers in hospital, HMO or university clinic types (aOR: 3.79, 95% CI 1.14-12.58). Providers with 0-24% or 50+% of female patients of reproductive age that pay using Medicaid had higher odds of considering COCs effective compared with those having 25-49% patients that pay using Medicaid (aOR: 2.95, 95% CI 1.23-7.06; aOR: 2.90, 95% CI 1.01-8.37)

Discussion

In this analysis, substantial proportions of providers were unaware of concerns that COCs are less effective for women with a history of bariatric malabsorptive procedures compared to healthy women. Specifically, 17% of public-sector providers and 25% of office-based physicians responded that COCs are more or equally effective for women with a history of bariatric malabsorptive procedures compared to healthy women, and about 20% of both groups responded with uncertainty.

An important finding is that among public-sector providers, those with a non-reproductive health primary clinical focus (i.e., family medicine, adolescent medicine, or primary care) had increased odds of responding with uncertainty about COC effectiveness. For office-based physicians, adolescent medicine was the only specialty that had increased odds of responding with uncertainty compared with OB/GYNs. It is possible that adolescent medicine providers may not have as much exposure to women with history of bariatric malabsorptive procedures, as the average age of this procedure is 43 years⁽²⁶⁾. However, the rate of bariatric malabsorptive procedures among adolescents is increasing⁽²⁷⁾, therefore adolescent medicine providers would benefit from increased education about contraception for this patient population.

It is essential that primary care and reproductive health providers are aware of clinical practice guidelines around reproductive health issues for women with history of bariatric surgery, such as recommendations to delay pregnancy and medical eligibility for contraception^(14, 18). One study states that 64% of women with bariatric surgery were referred to primary care and OB/GYN physicians for contraceptive counseling⁽²⁸⁾. In another study of American Society of Metabolic and Bariatric Surgery members, fewer than half of respondents provide family planning services or referrals⁽²⁹⁾. Another survey of 563 women of fertile age who had undergone bariatric surgery found that a majority of the women reported that they received no or insufficient contraceptive counseling⁽³⁰⁾. Our findings indicate that providers of family planning services lack adequate knowledge regarding the effectiveness of one of the most common contraceptive methods, oral contraceptive pills. The sum of current evidence reflects the need for improved collaboration between bariatric specialists and referred providers and, most importantly, improved provider education to ensure patients have access to the full range of contraceptive options.

A strength of this analysis is that the survey included a large, nationally representative sample of a variety of providers from different settings and occupations. However, the

survey response rate was lower than desired (51%) and we were unable to assess if non-respondents differed from respondents in their knowledge towards COC effectiveness for women with history of bariatric malabsorptive procedures. An additional limitation is that study results are based on a question that inquired about provider knowledge, which may not reflect actual provider practices or behaviors. Furthermore, many providers may not encounter patients from this specific population on a regular basis.

Conclusion

Women with a history of bariatric surgery need patient centered contraceptive counseling that includes risk and benefits for various methods. Many providers are not aware that COCs may be less effective for women with malabsorptive procedures. Continued education and improved dissemination of MEC guideline materials are needed to provide quality family planning services to women in this population. Collaboration between bariatric specialists and family planning providers is essential to ensure women receive timely contraceptive counseling and have access to effective methods in the perioperative period.

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Highlights

Half of providers know that oral contraceptives are less effective after malabsorptive procedures.

One quarter of providers considered oral contraceptive as effective for these women.

Approximately 20% of providers were uncertain regarding effectiveness.

Table 1:

Characteristics of United States Healthcare Provider Respondents

Characteristic	Total (n=2060)	Public-sector Providers (n=1654)	Office-Based Physicians (n=406)
	n	n (%) ¹	n (%) ¹
Gender			
Male	316	143 (10.29)	173 (43.23)
Female	1732	1500 (89.71)	232 (56.77)
Primary clinical focus (public-sector providers only)			
Family medicine	-	337 (25.0)	-
Reproductive health	-	969 (55.0)	-
Adolescent medicine	-	114 (6.4)	-
Primary care	-	225 (13.6)	-
Occupation			
Physician	740	338 (24.8)	-
Advanced Practice Clinician	1010	1010 (60.9)	-
Nurse	278	278 (14.3)	-
Title X Funding			
Yes	1054	1054 (52.5)	-
No	1006	600 (47.5)	-
Physician specialty			
Family medicine	-	-	62 (39.0)
Obstetrics/Gynecology	-	-	265 (60.6)
Adolescent medicine	-	-	79 (0.3)
Practice Setting			
Hospital/HMO/University	-	-	100 (15.5)
Private	-	-	245 (66.4)
Other	-	-	61 (18.1)
Region of the US			
Northeast	303	224 (14.3)	79 (15.8)
Midwest	391	305 (18.7)	86 (24.2)
South	800	663 (37.3)	137 (33.6)
West	566	462 (29.67)	104 (26.4)
Time since completion of formal clinical training			
Less than 5 years	356	306 (20.0)	50 (15.4)
5-14 years	642	527 (33.1)	115 (28.6)
15-24 years	604	499 (29.7)	105 (25.8)
25 or more years	434	301 (17.2)	133 (30.1)
Formally trained in a LARC insertion			
Yes	1445	1099 (66.8)	346 (87.7)
No	615	555 (33.2)	60 (12.3)
Female patients of reproductive age who are provided family planning services			

Characteristic	Total (n=2060)	Public-sector Providers (n=1654)	Office-Based Physicians (n=406)
1-24%	226	167 (12.3)	59 (19.8)
25-49%	371	264 (18.1)	107 (27.0)
50-74%	477	358 (22.1)	119 (29.1)
75% +	954	836 (47.5)	118 (25.1)
Female patients of reproductive age that pay using Medicaid or other government assistance			
0-24%	627	404 (23.2)	223 (60.5)
25-49%	519	430 (27.2)	89 (22.9)
50%+	860	770 (49.6)	90 (16.6)
Female patients of reproductive age that are 35 years of age or older			
0-24%	983	822 (49.3)	161 (27.8)
25-49%	881	693 (45.0)	188 (58.7)
50%+	131	80 (5.7)	51 (13.4)
Effectiveness of COC for women with a history of malabsorptive procedures compared to healthy women			
Less effective	1202	988 (60.4)	214 (55.3)
Don't know	429	347 (22.5)	82 (19.3)
More effective or equally effective	370	265 (17.1)	105 (25.4)

Abbreviations: HMO=Health Maintenance Organization; COC=combined oral contraceptives; LARC=long-acting reversible contraception

¹Unweighted numerators and weighted percentages. Percentages may not sum to 100 due to rounding.

Table 2:

Knowledge of public-sector providers (n=1654) regarding the effectiveness of COC for women with a history of bariatric malabsorptive procedures compared to healthy women

	Public-sector providers							
	Less effective	More/equally effective	Do not know	Do not know vs less effective		More/equal vs less effective		
	% ¹	% ¹	% ¹	aOR ²	95% CI	aOR ²	95% CI	
Primary clinical focus *								
Reproductive health	67.0	17.1	15.9	ref	ref	ref	ref	
Family medicine	52.6	19.3	28.1	1.80	1.28, 2.53	1.11	0.76, 1.62	
Adolescent medicine	49.0	12.2	38.9	3.14	2.06, 4.78	0.79	0.44, 1.43	
Primary care	52.5	14.9	32.6	2.02	1.41, 2.90	0.92	0.59, 1.44	
Occupation *								
Physician	55.7	18.1	26.2	1.09	0.78, 1.53	0.77	0.52, 1.14	
Advanced Practice Clinician	623.0	17.5	19.6	ref	ref	ref	ref	
Nurse	53.5	15.5	31.0	1.65	1.19, 2.27	1.12	0.76, 1.65	
Title X Funding *								
Yes	65.3	15.5	19.3	ref	ref	ref	ref	
No	55.0	18.8	26.2	1.42	1.08, 1.88	1.44	1.08, 1.90	
Gender *								
Male	55.3	26.3	18.4	0.61	0.38, 0.98	1.78	1.11, 2.83	
Female	61.0	16.0	23.0	ref	ref	ref	ref	
Percentage of female patients of reproductive age who are provided family planning services *								
1-24%	45.9	17.4	36.7	2.02	1.33, 3.08	1.27	0.77, 2.10	
25-49%	55.5	19.0	25.5	1.16	0.81, 1.64	1.16	0.78, 1.72	
50-74%	58.5	18.4	23.1	1.09	0.80, 1.48	1.17	0.84, 1.63	
75%+	66.5	15.8	17.7	ref	ref	ref	ref	
Percentage of female patients of reproductive age that are 35 years of age or older								
0-24%	60.9	17.1	22.0	ref	ref	ref	ref	
25-49%	60.7	16.9	22.5	0.99	0.78, 1.25	0.91	0.70, 1.19	
50%+	50.0	21.8	28.2	1.22	0.72, 2.09	1.41	0.80, 2.50	

Abbreviations: COC= combined oral contraceptives; HMO= Health Maintenance Organization; aOR=adjusted odds ratio; CI=Confidence Interval

* Bivariate analysis: p <0.05 using Chi square test for proportions

¹Weighted percent

²Odds ratio adjusted for region of the U.S., and characteristics shown in table

Table 3:

Knowledge of office-based physicians (n=406) regarding the effectiveness of COC for women with a history of bariatric malabsorptive procedures compared to healthy women

	Office-Based Physicians							
	Less effective	More/equally effective	Do not know	Do not know vs less effective		More/equal vs less effective		
	% ¹	% ¹	% ¹	aOR ²	95% CI	aOR ²	95% CI	
Physician specialty*								
OB/GYN	57.3	29.0	13.7	ref	ref	ref	ref	
Family medicine	52.5	19.7	27.9	1.84	0.87, 3.94	0.63	0.27, 1.45	
Adolescent medicine	41.0	21.8	37.2	3.84	1.54, 9.55	1.47	0.64, 3.36	
Practice setting								
Hospital/HMO/University	67.4	14.1	18.5	ref	ref	ref	ref	
Private	56.0	28.0	16.1	1.34	0.48, 3.69	2.21	0.94, 5.22	
Other	43.2	25.1	31.7	2.12	0.63, 7.12	3.79	1.14, 12.58	
Gender								
Male	52.6	27.7	19.7	1.09	0.53, 2.27	1.27	0.70, 2.29	
Female	58.0	22.8	19.2	ref	ref	ref	ref	
Percentage of female patients of reproductive age that pay using Medicaid or other government assistance*								
0-24%	55.4	29.9	14.8	0.70	0.29, 1.71	2.95	1.23, 7.06	
25-49%	63.1	12.1	24.9	ref	ref	ref	ref	
50%+	45.4	26.1	28.6	1.83	0.63, 5.29	2.90	1.01, 8.37	
Percentage of female patients of reproductive age that are 35 years of age or older								
0-24%	56.4	24.0	19.6	ref	ref	ref	ref	
25-49%	55.4	23.6	21.0	1.37	0.55, 3.44	0.89	0.45, 1.78	
50%+	51.3	36.6	12.1	0.97	0.29, 3.22	1.35	0.50, 3.69	

Abbreviations: COC= combined oral contraceptives; OB/GYN= Obstetrics and Gynecology; HMO= Health Maintenance Organization; OB/GYN= Obstetrics and Gynecology; aOR=adjusted odds ratio; CI=Confidence Interval

* = Bivariate analysis p <0.05 using Chi square test for proportions

¹ Weighted percent

² Odds ratio adjusted for region of the U.S., and characteristics shown in table