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Weight gain associated with hormonal contraception use in adolescents is not different from control

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Abstract: The use of hormonal contraception is commonly associated with weight gain. The purpose of this retrospective study was to explore the association between the use of hormonal contraception and weight change in an outpatient adolescent patient population in Lexington, Kentucky. Data were gathered from the charts of 259 adolescent female patients seen in an outpatient adolescent clinic for up to 72 months. At the initial visit, all patients were evaluated for risk-taking behavior and received preventive counseling. Patients were categorized as either contraception users or non-users (control group). Contraception users were subdivided into Depot Medroxyprogesterone Acetate (DMPA) user group or non-DMPA contraception user group. The latter group included patients using oral contraceptive pills, transdermal contraceptive patch, intravaginal contraceptive ring, or other forms of hormonal contraception. Following the initial visit, all contraception users (DMPA and non-DMPA) visited the clinic every three- or six-months for follow-up. During the follow-up visits, patient weight was recorded and the patient received counseling services by a physician, a licensed psychologist, and/or a nutritionist as deemed appropriate. Data were entered in Microsoft Excel and analyzed using Statistical Analysis Software. The results showed no significant difference in weight gain between groups. We hypothesize that hormonal contraception in adolescent patients, coupled with clinical intervention in form of counseling and regular monitoring, over an extended period (longer than 24 months) is not associated with significant weight gain.

Keywords: Adolescent, contraception, clinical counseling, DMPA

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INTRODUCTION

In its most recent release, the American Academy of Pediatrics Policy on Contraception and Adolescents continues to recommend provision of hormonal contraception to adolescents by their primary care physicians (1,2). Hormonal contraception is available in various forms including combined oral contraceptive pills, injections, skin patches, subcutaneous implants, and vaginal rings (3). Oral contraceptive pills (OCPs) are the most popular method among adolescents and their protective, therapeutic, and non-contraceptive uses in gynecologic diseases are well documented (2,4-6). Depot Medroxyprogesterone Acetate (DMPA) is the major injectable contraceptive in the United States (4). DMPA injections, similar to OCPs, offer safe, effective, convenient, and reversible birth control choices (7). DMPA injection use is also favorable to use in adolescents who have low compliance rates with OCPs

(8) and are gaining appeal among adolescents, because of their effectiveness (9).

Despite the proven benefits of hormonal contraceptives, a number of controversies have emerged due to their side effects. The OCPs are commonly associated with cardiovascular complications, breakthrough bleeding, and migraine headaches (2-4,10). Injectable contraceptives, on the other hand, are commonly associated with vaginal bleeding (11,12), decreased bone mineral density, and abdominal pain (13). Both oral and injectable contraceptives have been associated with weight gain (3-5,10,11,13-16).

Numerous retrospective and prospective clinical studies conducted in the United States explored the relation between hormonal contraception and weight gain. A 24 month study by Berenson et al (11) of 16-33 year old females found that the odds of weight gain for patients using OCPs or DMPA after 24 months were

1.19 and 2.27, respectively, compared with the control group odds of 1.00. In another 12 month study, adolescent Norplant implant users gained more weight than oral contraceptive users (8.7 vs. 4.2 pounds respectively) (17). As for DMPA use, a 30-month prospective experimental study of low socioeconomic status adolescent African American patients, weight gain was the most commonly perceived side effect and the primary reason for discontinuation of treatment (18). The finding of weight gain seems to be universal; Austrian high school adolescents who started using the pill at a mean age of 16.0 ± 0.9 years noted weight gain as a side effect in addition to an increase in breast size, fatigue, and depression (19).

Contrary to the findings above, other studies showed no significant change in weight with the use of hormonal contraception. A randomized, parallel-group, multicenter study showed that use of OCPs does not substantially affect body weight for most women after 13 cycles of use (20). A study of adolescent and young women using oral contraceptive pills or intra-uterine devices (IUD) as a control group, showed no significant difference between the OCP and IUD groups in initial weight and weight after one year of use (21). A more recent study comparing OCP use to a placebo-controlled group in adolescent subjects showed that changes in body weight and the incidence of estrogen-related side effects in the OCP group after six cycles were not significantly different from placebo-controlled group (22). Due to the numerous controversies in the literature regarding weight gain due to the use of contraceptives, we aim to determine once and for all the effects of contraceptives on weight gain. To this end, we used the patient charts of patients who were on different oral contraceptive use for at least one year, as well as a 'control' group who are not using contraceptives.

METHODS

Data were gathered from the charts of 313 adolescent female patients seen in an outpatient adolescent clinic in Lexington, Kentucky. At the initial visit, all patients were evaluated for risk-taking behavior using the Perkins' Adolescent Risk Screen (PARS) form (1). PARS is a validated screen that assesses a variety of health-related variables, such as Body Mass Index (BMI), nutrition, drug use, and sexual activity, in addition to other biopsychosocial factors (23). Following this assessment, all patients received preventive counseling by a certified psychologist in the clinic.

Hormonal contraception including Depot Medroxyprogesterone Acetate (DMPA) method or non-DMPA

methods (including oral contraceptive pill, patch, ring or other forms) was prescribed to a subset of these patients following consultation with the attending physician and the patient. Follow-up visits were scheduled every three months for DMPA contraception users and every 3-6 months for non-DMPA contraception users. During follow-up visits, patient weight was recorded and other screening tests such as HPV (human papillomavirus) screening were conducted. In addition, every patient received counseling by a team composed of a psychologist, social worker, nutritionist, and a nurse practitioner. Data collected from patient charts included demographic information, weight data, HPV screen results, risk taking behavior, and pertinent medical conditions.

Data were entered and BMI was calculated in Microsoft Excel. Data were entered as "missing value" for patients who discontinued hormonal contraception or discontinued visiting the clinic. Statistical Analysis Software (1) was used to analyze the data coded in Excel. The demographic data were analyzed using descriptive statistical measures. A one-way ANOVA statistical test was performed to compare weight change and BMI change in the hormonal contraception user group vs. the control group at the initial visit and every year thereafter. The same analysis was conducted to compare the DMPA vs. non-DMPA groups. The two groups were compared at the end of years 1, 2, 3, 4, 5, and 6 using ANOVA Scheffe's method $P < .05$ was considered statistically significant.

Exclusion criteria: patients who used contraception for less than one year or switched contraception methods in less than one year were also excluded. Using these criteria, the final number of patients in the study was 259.

RESULTS

The age range of the patients included in the study was 12-21 years at the beginning of the study. The mean age was 18.1 ± 2.4 years. The median value for age was 16.5 years and the mode value was 19.5 years. Of the patients, 98% reported their status as single, 2% as married or engaged. In terms of racial distribution, 49% of the patients were Caucasian, 50% African American, and 1% Hispanic. Insurance type was used as an index of socioeconomic status. The vast majority of patients (72%) were Medicaid recipients, whereas 21% were private insurance carriers. The remaining 7% of patients had no insurance plan and were recipients of financial assistance. With respect to smoking status, most patients (66%) were non-smokers whereas 34% were smokers.

Table 1: Demographic characteristics of subjects at the beginning of the study (n=313)

Age	Mean±S.D.	Median	Mode
	15.8±2.2	16.0	16.0
Age Range	Minimum	Maximum	
	8.5	21.0	
Marital Status	Single	Married	
	97.2%	1.8%	
Race	Caucasian	African American	Other
	47.9%	47.2%	4.9%
Insurance Status	Private	None	Medicaid
	22.4%	6.3%	71.3%
Smoking Status*	Yes	No	
	30.6%	69.4%	
Substance Abuse**	Yes	No	
	25.1%	74.9%	
Contraception group	User	Non-User	
	215	98	

*Other includes Hispanic, Native American, Oriental, and biracial patients.

**The smoking status data not available for 15% of the patients.

*** Substance abuse data not available for 30% of the patients.

However, the smoking status was missing for 15% of all subjects in the study. Regarding substance abuse, 26% of patients admitted abusing alcohol, drugs, or both, whereas 74% of patients denied abusing either alcohol or drugs (see table 1).

As previously mentioned, patient weight (in pounds) was recorded at the initial and each follow-up visit. Weight changes per patient were calculated at the end of each year for patients in the contraception user and non-user (control) groups. A significant difference in the weight changes between the two groups was seen at the end of year 1 ($p = .03$). In contrast, no significant differences were observed in the following years (see graph 1).

Subsequently, the BMI calculation was used to compare patients in the contraception user and control groups as described above. No significant difference was found between the two groups at any time point, including year 1 (see graph 2). The height variable was

■ Birth control user group
□ non-user group

Graph 1: Weight change in pounds per year in contraception user and control groups.

Year	N per group	
	Users	Controls
1	214	42
2	136	22
3	76	10
4	38	4
5	16	3
6	9	2

■ Birth control user group
□ non-user group

Graph 2: Body Mass Index (BMI) change per year in both contraception user and control groups.

Year	N per group	
	Users	Controls
1	96	34
2	53	12
3	33	6
4	15	3
5	6	3
6	2	2

not documented for all patients, therefore accounting for decrease in the n value of patients in this graph.

DISCUSSION

As mentioned previously, the literature is abundant with conflicting results on the association of hormonal contraception with weight change in adolescents (11,13-

19,22). The disparity between these results could be due to a number of factors. First, the duration of most studies reported to date is relatively short. Most studies did not extend past 24 months (11), 13 cycles of use (20), one year of use (17,21,24) or six cycles of use (22). Only one study tracked patients for a duration of 30 months. This study, however, had a significant drop-out rate of subjects toward the end of the study (18).

Monitoring weight changes for a longer duration in adolescents is important because of the developmental changes that accompany the onset of puberty. The growth spurt during adolescence is associated with weight and height velocities greater than between the ages of 5 and 10 years (25). This suggests that susceptibility to hormonal contraception may be selectively accentuated in early adolescence, which is associated with the onset of menarche and the use of hormonal contraception. Rather than causing a net weight gain, hormonal contraception could accelerate pubertal development, leading to the final body weight set point that the same subject would have attained eventually if not placed on hormonal contraception. However, the short duration of studies in this field precludes such a viable conclusion.

The provision of counseling may be an effective intervention preventing weight gain. The present study is quite unique because unlike other studies, the subjects were provided with preventive counseling at the initial visit and continuous counseling at each follow-up visit. The counseling each subject received addressed a wide variety of issues such as nutrition, dealing with the side effects of contraception, ensuring compliance, and addressing psychological issues related to the well-being of the patient. In contrast, continuous counseling was not reported in other studies investigating the association between hormonal contraception and weight gain (3-5,10,11,13-16). Davies et al (26) recommended that clinicians promote delayed sexual activity and provide counseling to adolescents considering hormonal contraception. The American Association of Pediatrics also continues to recommend preventive, but not continuous counseling to this adolescent population regarding the use of contraceptives (2).

The initial weight before using hormonal contraception may be associated with the degree of weight gain in adolescents. For example, overweight in childhood or excessive body mass increment during pregnancy are risk factors of obesity in the later period of life (27). By analogy, one could hypothesize that overweight adolescents are more susceptible to weight gain induced by hormonal contraception. Risser et al

(24) found that adolescent subjects who gained > 5% of their baseline weight at 3 months were at high risk (93%) of gaining even more weight by one year.

In conclusion, earlier studies on the association of hormonal contraception and weight changes in adolescents reported significant weight gain due to contraceptives. Despite their validity, the duration of such studies, 6-24 months, remains relatively short in the context of adolescent development and thus the study is limited in its interpretive ability. Furthermore, although most studies provided preventive counseling at the initiation of hormonal contraception, none of offered a continuation in psychological counseling services. Our retrospective study is the first to address this question beyond 24 months and to show that weight gain in hormonal contraception users is not significantly different from the control group for up to 72 months. In addition, our study is unique in offering psychological counseling to patients during follow-up visits, which suggests that psychological counseling may be an effective clinical intervention preventing the weight gain traditionally associated with hormonal contraception.

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