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Weight and body fat changes in postpartum depot-medroxyprogesterone acetate users

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Abstract

Background: Although postpartum depot-medroxyprogesterone acetate (DMPA) recipients often cite weight gain as the reason for discontinuing DMPA, little is known about body composition changes in postpartum DMPA recipients.
Study design: Women who used DMPA during the postpartum year were measured on several anthropometric dimensions of body composition and compared with women who elected surgical sterilization with bilateral partial salpingectomy (BPS).
Results: After 1 year, DMPA recipients did not differ from the BPS group in weight or percent body fat changes. Almost half the women using DMPA returned to pregravid weight; nearly half gained weight. Higher pre-pregnancy body mass index was associated with weight gain among DMPA recipients.
Conclusions: DMPA recipients who were overweight or obese before pregnancy may have greater risk for weight gain in the first year postpartum. However, when counseling women, the risk for DMPA-related weight gain should be balanced against the potential for increased weight from subsequent pregnancies.

Keywords: Depot-medroxyprogesterone acetate; BMI; Body composition; Body fat; Weight; Postpartum

1. Introduction

Depot-medroxyprogesterone acetate (DMPA) received Food and Drug Administration approval for contraceptive use by women in the United States (U.S.) in 1992. In subsequent years, clinicians observed the rapidly growing popularity of DMPA among American women seeking an effective and convenient birth control method. The widespread acceptance of DMPA among American women is attributable to its high efficacy rate of >99% in preventing pregnancy [1] and ease of use — one intramuscular injection four times a year [2]. The convenience of DMPA may have particular appeal to women in the postpartum year when mothering a baby places constraints on time, memory and organization, typically required for many other contraceptive methods. DMPA gives an additional advantage to breastfeeding mothers because it does not interfere with lactation [3] and may even enhance breast milk production [4,5]. Consequently, DMPA does not adversely affect lactation or infant growth [6]; U.S. family planning experts endorse administration of DMPA to lactating mothers [7].

Early, exploratory clinical trials [8] and later controlled studies [9–17] reported a slight, but not statistically significant, weight gain of 3–6 lb over 1 year of use in DMPA users. Nevertheless, weight gain has been cited as one of the chief reasons for termination of DMPA [18–22]. In our practice, clinicians and postpartum women raised concerns about weight-related DMPA use in the postpartum year — notably, about poor return to pre-pregnancy weight, weight gain and changes in fat distribution. We conducted this study to address these concerns.

Earlier studies of weight-related change in DMPA users focused predominantly on changes in weight, with weight gain

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predicted as an undesirable outcome of DMPA use. Most of these studies have reported DMPA-related weight gain in terms of average gain over time [9–15] or changes in body mass index (BMI) [16,17]. Not much exploration has focused on change in anthropometric indicators of obesity over time in DMPA users, but women who used DMPA in one study [23] had a tendency to increase and redistribute fat centrally over a 3-year period. However, women in these studies were not postpartum. The clinical significance of obesity-related changes in DMPA users is important, as obesity in women may be more detrimental than high BMI or weight alone. Even in normal weight women, excess body fat (>30%) and central obesity are independent risk factors for development of coronary artery disease and myocardial infarction [24,25], diabetes [23,26] and some cancers [27–29].

A few studies have focused on weight or body changes associated with DMPA use in the postpartum period. One retrospective investigation of postpartum Navajo women found greater weight in postpartum DMPA users than in nonusers [14]. In another study, women with a history of gestational diabetes who used DMPA postpartum increased body weight and truncal fat deposition [30].

In summary, little is known about DMPA-related changes in weight and body composition in postpartum women without history of gestational diabetes. The purpose of this study was to describe the weight and body composition changes among women who used DMPA for contraception during the postpartum year and to compare them to postpartum women who elected surgical sterilization by bilateral partial salpingectomy (BPS). Potential prenatal predictors of weight gain in postpartum DMPA users also were explored. In addition to weight change, body composition was measured in order to identify whether percent and distribution of fat were adversely affected among postpartum DMPA users. This study provides useful information to clinicians related to potential risks for obesity in postpartum DMPA users.

2. Materials and methods

A convenience sample of 78 postpartum women (≥18 years of age) who elected to use DMPA or surgical sterilization by BPS was recruited from the Department of Community Medicine at a hospital in a large midwestern city in the U.S. The investigators obtained institutional review board (IRB) approval for the study protocol prior to recruiting potential participants, and the procedures followed were in accordance with the ethical standards of the IRB. Potential subjects were counseled in the third trimester of pregnancy about all available contraceptive methods. Postpartum women were eligible for the study after electing to use DMPA or after consenting to BPS. Women <18 years of age were excluded, as inclusion of adolescents in previous studies has been found to overestimate postpartum weight changes, resulting in biased estimates for adult women [31]. Women were not eligible if they were using hormone replacement such as oral contraceptives, thyroid hormone, steroid therapy or any other medication known to cause changes in weight or body composition. Women with significant underlying prenatal and postpartum medical illness, including gestational or type II diabetes [32], also were excluded. Women with BMI >35 kg/m^2 postpartum were excepted from participation, as the methods of body fat measurement used in this study have been found to be questionably reliable in obese subjects [33] and the pharmacokinetics of DMPA are uncertain in this group [34]. Subject enrollment occurred over an 18-month period. Sixty-one women consented to participate in the DMPA group and received 150 mg of Depo-Provera® (Pfizer) brand of DMPA im every 12 weeks beginning at 6 weeks postpartum. Seventeen women participated in the surgical sterilization group and received no additional contraceptive treatment.

Pre-pregnancy BMI was calculated from retrospective review of pre-pregnancy height and weight, recorded from the most recent pre-pregnancy visit to the clinic. Height, weight, fatfolds and circumferences were measured at 6 weeks postpartum (baseline) and every 3 months for 1 year, for a total of five data collection points. Weight was taken with the subject wearing undergarments (bra and underpants) and a regular hospital gown using a standard balance beam scale and recorded to the nearest 0.25 lb. Height was measured in inches with a wall mounted stadiometer. Fatfolds (bicep, tricep, subscapular, suprailiac) and circumferences (mid-arm, waist, hip, calf and upper, middle and lower thigh) were measured with Lange calipers and linen measuring tapes to the nearest 0.1 mm and 0.1 cm, respectively. Standardized techniques and sites were used for all anthropometric measurements [35–37]. Inter-rater reliability between staff members conducting anthropometric measures was 98%, established prior to initiating the study.

The RJL Bioelectrical Impedance System (BIA-Model 103; RJL Systems, Inc., Detroit, MI, USA), a tetrapolar electrode, was used to measure body composition by detecting the impedance and reactance to a weak electrical current (800 μA) [38]. Reactance and impedance were used in the manufacturer-specified equation to determine lean and fat masses. To decrease potential effects of dehydration, subjects were instructed to refrain from exercising during the previous 24 h, ingesting large amounts of food for the previous 4 h, and from consuming alcohol or excessive caffeine beverages (equivalent to 2 cups of coffee) for the previous 12 h.

All participants completed a 3-day diet log prior to each 3-month anthropometric measurement interval. Two investigators blindly and independently classified each log into high (≥3500) or medium-to-low (<3500) calorie groups. Finally, at each visit, participants responded to questions about the previous 3 months including what medications they had taken, whether they had been smoking tobacco, breastfeeding and an activity log of days a week they had been exercising for at least 20 min. However, participants so