Depot Medroxyprogesterone Acetate Use
in Inner-city, Minority Adolescents

Continuation Rates and Characteristics of Long-term Users

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Objective: To identify continuation rates of depot medroxyprogesterone acetate (Depo-Provera) and characteristics of long-term users in a population of inner-city, minority adolescents with high pregnancy rates.

Design: Retrospective medical record review.

Setting: An inner-city adolescent clinic and an adolescent pregnancy program.

Methods: A review of the medical records of 250 females aged 13 to 20 years (mean ± SD, 16.8 ± 1.1 years), 62.9% Hispanic and 34.2% African American, receiving a first depot medroxyprogesterone acetate injection for contraception between August 1993 and June 1996 was conducted using a standardized form. The mean ± SD age at menarche of the subjects was 11.6 ± 1.4 years, and the mean ± SD age at first intercourse was 14.1 ± 1.3 years; the mean number of lifetime sex partners was 2.4. Of the subjects, 73.6% had used condoms, 32.0% used oral contraceptives, and none used implants. Of the 201 subjects for whom there were data in the medical records regarding prior fertility, 172 (85.6%) had been pregnant, and 145 (72.1%) had a child. Life table analysis was used to measure depot medroxyprogesterone acetate continuation rates and to compare subgroups of adolescents.

Results: Depot medroxyprogesterone acetate continuation rates were found to be 70.3% at 6 months, 48.3% at 9 months, 31.5% at 12 months, and 12.8% at 24 months. The most common reason for depot medroxyprogesterone acetate discontinuation was missed appointments (41.7%). Subjects were followed up for a mean ± SD of 1.3 ± 0.7 years after discontinuation of depot medroxyprogesterone acetate use; 46.7% became pregnant. Among those 156 adolescents who discontinued depot medroxyprogesterone acetate use, 40.0% restarted the method at some later time. Continuation of depot medroxyprogesterone acetate use was more likely if age at first intercourse was younger than 13 years (P = .04). Continuation rates were not related to age, ethnicity, age at menarche, number of sex partners, use of other contraceptives, prior pregnancy, or having a child.

Conclusions: In this study, just less than one third of the adolescents continued depot medroxyprogesterone acetate use for 1 year or longer. This suggests that depot medroxyprogesterone acetate does not function as a long-term method for most inner-city adolescents. The only characteristic that was associated with successful continuation of depot medroxyprogesterone acetate use was young age at first intercourse, implying that experience may be the main determinant of continuation.


Editor’s Note: This study provides more evidence that depot medroxyprogesterone acetate (Depo-Provera) is another nonanswer to adolescent pregnancy prevention. I guess preservation of the species had a great deal to do with nature allowing adolescent girls to have babies, but it seems to be working in the opposite direction now.

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Teenage pregnancy remains a major social problem in the United States despite a recent decline in pregnancy rates in the late 1990s. Most pregnancies in adolescents are unintended, and approximately half end in abortion. Compared with other industrialized countries, the pregnancy rate of teenagers in the United States is twice as high as in England, Wales, and Canada, and more than 9 times as high as in the Netherlands and Japan. The consequences of adolescent childbearing are multiple, including poor obstetric outcomes, low birth weight, economic hardship, and psychosocial disadvantage in the children of teenaged mothers.

Preventing adolescent pregnancy is not an easy task, in part because of high contraceptive failure rates. This contraceptive failure most often results from discontinuation or improper use of the method rather than from inherent method failure. The best possible solution is to en-
SUBJECTS AND METHODS

PROCEDURE

A medical record review was conducted of all females aged 13 to 20 years who had received a first depot medroxyprogesterone acetate injection for contraception at an inner-city adolescent clinic and an adolescent pregnancy program from August 1993 to June 1996. A standardized data collection form was developed to ensure that all reviewers obtained the same data. The clinic provides general adolescent health care, and the pregnancy program provides both prenatal and postnatal care for adolescents. Standard protocol during the study included extensive counseling by a nurse practitioner or physician about risks, benefits, and side effects before the first injection of depot medroxyprogesterone acetate. In addition, a calendar indicating the follow-up appointment date for the next injection was given to each patient at the time of discharge from the clinic, but no reminder cards or telephone calls were used to improve appointment keeping. Parental consent was not needed to receive depot medroxyprogesterone acetate for contraception. As a component of standard clinic procedure, a log book was kept to identify adolescents who were using depot medroxyprogesterone acetate and to keep track of the dates of follow-up injections. Of the 231 patients identified from the clinic log book as having received at least 1 depot medroxyprogesterone acetate injection, 231 medical records were available for review. The remaining 19 medical records were unavailable during the time of the study. Medical records were reviewed by 1 of 2 reviewers (S.W.L. and J.R.) using the standardized form. Of the 231 patients, 29 were excluded: 3 had insufficient information recorded in the medical record, and 26 received the initial depot medroxyprogesterone acetate injection at the maternity ward or at outside clinics. This left 202 first-time depot medroxyprogesterone acetate users included in the final study sample. The study was carried out with approval from the Montefiore Medical Center and North Central Bronx Hospital, Bronx, NY, Institutional Review Boards.

SUBJECTS

The mean age of the subjects was 16.8 years at the time of the first depot medroxyprogesterone acetate injection (Table 1). They were primarily single and of Hispanic and African American ethnicity. The mean age at menarche was 11.6 years, and the mean age at first intercourse was 14.1 years. A large majority had been pregnant at least once and many had children. Other sexual and contraceptive data are shown in Table 1.

STATISTICAL ANALYSIS

Life table analysis was used to measure depot medroxyprogesterone acetate continuation rates and to compare subgroups of adolescents. In this analysis, the duration of depot medroxyprogesterone acetate use was calculated by monthly interval. Continuation rates were calculated from start and stop dates. The start date was defined as the date of first injection; stop date, the date 14 weeks after the last injection. Subjects who returned to the clinic later than 14 weeks after the last injection, and still desired depot medroxyprogesterone acetate contraception, were considered as restarters and were not included in the analysis of uninterrupted depot medroxyprogesterone acetate continuation rates. Fourteen weeks was chosen as the cutoff point because the manufacturer recommends ruling out pregnancy before giving a subsequent injection after 14 weeks. The subjects who failed to return to the clinic at all were considered unavailable for follow-up and were included in the life-table analysis as continuing the method (censored cases) up to 14 weeks from the last injection. Overall continuation rates are reported as cumulative probability of continuing depot medroxyprogesterone acetate use at 6, 9, 12, and 24 months. The Wilcoxon-Gehan test was used to compare subgroups of subjects. Data were entered and analyzed using computer software (SPSS 7.5 for Windows; SPSS Inc, Chicago, Ill).

Many had children. Other sexual and contraceptive data. The mean age at menarche was 11.6 years, and the mean age at first intercourse was 14.1 years. A large majority had been pregnant at least once and many had children. Other sexual and contraceptive data are shown in Table 1.

Courage adolescents to remain abstinent, but to date this strategy has not been successful. Seventy-four percent of adolescent girls initiate sexual activity by age 19 years, most of them outside of marriage.10 Thus, encouraging consistent and correct contraceptive use is a necessary strategy to help lower the adolescent pregnancy rates. Most of the contraceptives available are not ideal for adolescents, either because they are coitus dependent or because they require daily medication (eg, condoms and the oral contraceptive pill [OCP]). The availability of newer, long-acting methods of hormonal contraception may improve adolescents’ compliance, and thus these methods may have a lower typical use failure rate than barrier methods or OCPs. The levonorgestrel implant system (Norplant) is one long-acting contraceptive method with high efficacy. Once implanted, it is effective for up to 5 years. However, this method is not appealing to young women for various reasons, whereas an injectable method with wide appeal in this age group.11

Depot medroxyprogesterone acetate (Depo-Provera) is a progestin-only contraceptive that requires injection every 12 weeks. It prevents pregnancy through inhibiting the secretion of gonadotropins, thus inhibiting ovulation.12 It is highly effective, with failure rates ranging between 0% and 0.7% during the first year of use.12 It seems ideal for use by adolescents because it is not coitus dependent, does not require daily compliance for efficacy, and can be administered safely either immediately postpartum or postabortion. However, it does require compliance with quarterly injections.

Few studies have measured depot medroxyprogesterone acetate continuation rates in adolescents. Poleczek and LiBlanc13 conducted a medical record review of 159 inner-city subjects younger than 19 years using depot medroxyprogesterone acetate. The 1-year continuation rate was 27%. O’Dell et al,14 in a similar medical record review of 161 postpartum adolescents, found a 1-year continuation rate of 34%. Smith et al15 conducted a medical record review of 50 adolescents in Ohio, aged 9 to 21 years, using depot medroxyprogesterone acetate for either a preexisting medical indication or contraception. These investigators found much higher continuation rates, 72% at 1 year and more than 50% after 2 years. Cromer et al16 conducted a prospective, nonran-
domized study comparing adolescents, aged 11 to 20 years, using OCPs (n = 75), depot medroxyprogesterone acetate (n = 66), and levonorgestrel contraceptive implants (n = 58) during a 6-month interval. The 6-month continuation rate was 78% in patients using depot medroxyprogesterone acetate and 46% in patients using OCPs. However, subjects in this study required parental consent to participate, and parents of the subjects were also involved in the study.

The objective of the present study is to identify continuation rates for depot medroxyprogesterone acetate use in a population of inner-city, minority adolescents. We studied adolescents who were using the drug solely for contraception and who did not require parental consent. An additional goal of the study was to identify characteristics of long-term depot medroxyprogesterone acetate users. We hypothesized, based on studies using this and other hormonal contraceptives, that certain subject characteristics, such as older age at first intercourse, prior use of hormonal contraception, and having a child, might be associated with increased continuation of depot medroxyprogesterone acetate use.

RESULTS

CONTINUATION OF DEPOT MEDROXYPROGESTERONE ACETATE USE

Figure 1 shows the life-table analysis curve of the uninterrupted depot medroxyprogesterone acetate continuation rates of 202 adolescent subjects. Subjects were followed up for a mean ± SD of 1.5 ± 0.9 years from the date of the first depot medroxyprogesterone acetate injection.

As shown in the figure, continuation of depot medroxyprogesterone acetate was 70.3% at 6 months, 48.3% at 9 months, and 31.5% at 12 months. Thus, just less than one third of the subjects were still using the method after 1 year. By 2 years, only 12.8% of the subjects had continued using the method without interruption. Because 14 weeks after the last injection is an arbitrary cutoff point for discontinuation (albeit based on manufacturer’s recommendations), we recalculated continuation rates using 16 weeks as a cutoff point. Continuation rates were similar when 14 weeks or 16 weeks was used as the cutoff: 6-month continuation, 70.3% vs 70.8%; 9-month, 48.3% vs 49.9%; 12-month, 31.5% vs 35.0%; and 24-month, 12.8% vs 13.1%, respectively.

REASONS FOR DISCONTINUATION OF DEPOT MEDROXYPROGESTERONE ACETATE USE

Reasons for depot medroxyprogesterone acetate discontinuation are indicated in Table 2. The most common reason for discontinuation was a missed appointment. Side effects accounted for a similar percentage of discontinuations. Of the 2 pregnancies that occurred while subjects were using the method, 1 was likely a true method failure. In the case of the other pregnancy, it is more likely that the adolescent had received depot medroxyprogesterone acetate in early pregnancy and had a false-negative urine pregnancy test result.

After discontinuation of depot medroxyprogesterone acetate, the subjects who returned to the clinic (n = 156) were followed up for a mean ± SD of 1.3 ± 0.7 years. Of these subjects, we had information on subsequent pregnancy and restarting depot medroxyprogesterone acetate use.

Table 1. Characteristics of First-Time Adolescent Depot Medroxyprogesterone Acetate Users

<table>
<thead>
<tr>
<th>Characteristic Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), y (n = 202)</td>
<td>16.8 (1.1)</td>
</tr>
<tr>
<td>Age at menarche, mean (SD), y (n = 176)</td>
<td>11.6 (1.4)</td>
</tr>
<tr>
<td>Age at coitus, mean (SD), y (n = 134)</td>
<td>14.1 (1.3)</td>
</tr>
<tr>
<td>No. of lifetime sex partners, mean (SD) (n = 128)</td>
<td>2.4 (1.9)</td>
</tr>
<tr>
<td>Marital status (n = 179)</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>168 (93.9)</td>
</tr>
<tr>
<td>Married</td>
<td>11 (6.1)</td>
</tr>
<tr>
<td>Ethnicity (n = 202)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>127 (62.9)</td>
</tr>
<tr>
<td>African American</td>
<td>69 (34.2)</td>
</tr>
<tr>
<td>White</td>
<td>3 (1.5)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (1.5)</td>
</tr>
<tr>
<td>Prior contraceptive use (n = 197)</td>
<td></td>
</tr>
<tr>
<td>Condoms</td>
<td>145 (73.6)</td>
</tr>
<tr>
<td>Levonorgestrel implants</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Oral contraceptive pills</td>
<td>63 (32.0)</td>
</tr>
<tr>
<td>Prior obstetrical experience (n = 201)</td>
<td></td>
</tr>
<tr>
<td>Ever pregnant</td>
<td>172 (85.6)</td>
</tr>
<tr>
<td>Had at least 1 child</td>
<td>145 (72.1)</td>
</tr>
</tbody>
</table>

*Data are given as number (percentage) of adolescents, unless otherwise indicated. Numbers of subjects differ because of missing data in the medical records of some patients.
†Percentages do not total 100% because of rounding.
‡Adolescents could respond to more than 1 choice.
terone acetate use for 135 subjects. Sixty-three adolescents (46.7%) became pregnant during that time, and 54 (40.0%) restarted the method at a mean of 22 weeks from the last injection.

CHARACTERISTICS OF LONG-TERM DEPOT MEDROXYPROGESTERONE ACETATE USERS

Depot medroxyprogesterone acetate continuation rates were compared within the following subsets of the sample: age at first injection (<13 vs ≥13 years), ethnicity (African American vs Hispanic), age at menarche (<13 vs ≥13 years), age at first intercourse (<13 vs ≥13 years), number of sexual partners (<2 vs ≥2), prior use of other contraceptives (condom or OCP use vs no use), prior pregnancy, and having a child.

Figure 2 shows the comparison between age at first intercourse (<13 vs ≥13 years) and continuation of depot medroxyprogesterone acetate use. Continuation was more likely in girls with an age at first intercourse younger than 13 years (P = .04).

Subject characteristics not associated with depot medroxyprogesterone acetate continuation rates were age at first injection, ethnicity, age at menarche, number of sexual partners, prior use of other contraceptives, prior pregnancy, and having a child.

COMMENT

This study of more than 200 adolescents found a 1-year continuation rate of depot medroxyprogesterone acetate contraceptive injection of just less than one third (31.5%). This rate is similar to the rates reported by Polanieczky and LiBlanc in their study of inner-city teenagers (27%) and by O’Dell et al in their study of postpartum adolescents (34%), but not as high as was found in earlier studies on small populations.15,16

When compared with OCPs, the 6-month continuation rate of depot medroxyprogesterone acetate found in this study (70.3%) is higher than that found for OCPs in a study of inner-city adolescents in Baltimore, Md (50%), and of adolescents in Columbus, Ohio (46%). However, the 1-year continuation rate of depot medroxyprogesterone acetate we found in this study is similar to that found in other studies for OCPs (32%-34%) and much lower than has been demonstrated for levonorgestrel contraceptive implants (83%-91%) in similar populations of adolescents. This suggests that while the efficacy of depot medroxyprogesterone acetate in typical use by inner-city adolescents will be better than that of OCPs for the first 6 months of use, that advantage is lost by 1 year.

The most common reason for discontinuing depot medroxyprogesterone acetate contraception in our study was a missed appointment. We used a cutoff of 14 weeks after the last depot medroxyprogesterone acetate shot to define discontinuation by missed appointment, but even if we extended the cutoff time to 16 weeks, it did not substantially change our discontinuation rates. At the time of the study, we did not have a reminder system to contact patients for follow-up appointments. Our continuation rates may have been higher had we had such a system in place. However, confidentiality issues present a barrier to calling the home to remind adolescents to come in for their shot, and even mailed reminders may lead to breaches of confidentiality. Perhaps these adolescents simply lacked the organization and ability to remember appointments. Another possibility is that some adolescent girls were ambivalent about contraception, and they may
have desired a pregnancy and thus did not keep the appointment. This may have been a factor, as we found that 46.7% of adolescent girls who discontinued depot medroxyprogesterone acetate use subsequently became pregnant. However, since none of the adolescents reported that they discontinued the method to become pregnant, and 40.0% of adolescents who stopped depot medroxyprogesterone acetate use restarted at some later time, it is unlikely that this was the cause.

In this study, side effects accounted for less than half of the reasons for discontinuing depot medroxyprogesterone acetate use. As reported in other studies, irregular bleeding was the most common side effect leading to discontinuation, followed by weight gain. Other side effects accounted for less than a quarter of the reasons for discontinuing depot medroxyprogesterone acetate use. This suggests that improved education about side effects and close monitoring and rapid treatment or reassurance may improve continuation rates.

An additional aim of this study was to explore subject characteristics that could be included in a model predicting long-term continuation of depot medroxyprogesterone acetate contraception. However, of all the predictor variables hypothesized to affect depot medroxyprogesterone acetate contraception, only age at first intercourse was significantly associated. In this group of inner-city, minority adolescents with high pregnancy rates, young age at first intercourse was associated with better continuation rates, which is contrary to our hypothesis. This may reflect a longer experience with sexual activity and contraception. Adolescents tend to delay use of the most effective methods of contraception for a substantial period after their first act of intercourse, and those who have been sexually active longer may be more committed to effective contraception and thus have better continuation rates.

There are some limitations to this study. Most study subjects were from minority ethnic groups, had been pregnant, or had a child. Therefore, our findings may not generalize to the broad adolescent population. However, this sample represents a high-risk group for early parenthood, and our findings are similar to other studies of inner-city adolescents. Also, the study was a retrospective medical record review, and some of the medical records had incomplete data, thus decreasing our power to detect significant differences.

In summary, in this inner-city group of adolescents, continuation rates of depot medroxyprogesterone acetate contraception decline rapidly during the first year of use. Just less than one-third of the adolescents continued depot medroxyprogesterone acetate use for 1 year or longer, suggesting that this contraceptive method does not function as a long-term method for most adolescents. Discontinuation results as much from missed appointments as from side effects of the drug, and many teenagers restart the method after discontinuation. In this study, the only characteristic that was associated with successful continuation of depot medroxyprogesterone acetate use was young age at first intercourse, implying that experience may be the main determinant of continuation.

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REFERENCES