Patterns of Postpartum Depot Medroxyprogesterone Administration Among Low-Income Mothers

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Abstract

Background: Depot medroxyprogesterone acetate (DMPA) is often administered immediately postpartum to reduce the risk of short-interval repeat or unintended pregnancies, but little is known about the actual patterns of postpartum DMPA use. This article examines the patterns of DMPA administered among low-income new mothers in an upstate New York State community.

Methods: Mothers attending urban pediatric practices (births 2009–2011) completed a mailed survey approximately 5 months after delivery. Among 83 survey items were questions about breastfeeding and timing of DMPA receipt.

Results: Unintended pregnancy was reported by 48.8% of the subjects. Their deliveries occurred across four local hospitals. Among the 31.3% of subjects who received postpartum DMPA, 62.6% received it prior to hospital discharge. Those receiving in-hospital DMPA ($n=127$) were significantly more likely than other mothers to be black, older, urban dwelling, non–high school graduates, multiparous, and planning to formula feed. Administration patterns differed by hospital.

Conclusions: This study of postpartum DMPA administration among a convenience sample of low-income mothers demonstrated rates of 26% overall, but there was between-hospital variability. Additional study may identify approaches to ensure timely administration to appropriate candidates.

Introduction

POSTPARTUM CONTRACEPTIVE DECISION MAKING should be a priority for both mothers and their providers because unintended pregnancy remains a major public health issue, especially among low-income women. Approximately 49% of US pregnancies are unintended (unwanted or mistimed); low-income women experience rates of unintended pregnancy five times those of women at the highest income level.¹ Decisions are needed about the type of contraception as well as the timing of initiation. Timely initiation of contraception helps avert unintended pregnancies and births and lengthen interpregnancy intervals, but some controversy remains about the impact of early hormonal contraception in breastfeeding women.^{2–8}

Depot medroxyprogesterone (Depo-Provera, or DMPA) was approved by the Food and Drug Administration (FDA) after conception in 1992.⁹ Historically, DMPA has been se-

lectively administered to specific subgroups, including minority women and teens.¹⁰ As described in the package insert, DMPA can be initiated only within the first 5 days postpartum if not breastfeeding and only at the sixth week postpartum for exclusively breastfeeding mothers.¹¹ No recommendation is provided for mothers who supplement breastfeeding with formula. Early administration is driven by concerns that postpartum access or utilization to care may be inconsistent, particularly for those at risk for unintended pregnancy.^{8,12} Rodriguez and Kaunitz recommend that DMPA “should be administered prior to hospital discharge and no later than the third postpartum week in well-counseled women choosing to use DMPA as their contraceptive, regardless of lactation status” (p. 6).³ This conforms to the recently published practice recommendations.¹²

The incidence of off-label administration of DMPA to breastfeeding women in the immediate postpartum period is unknown.^{2–8} Using survey data from a cohort of low-income

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women, we characterized patterns of DMPA administration in the postpartum time period and compared the socio-demographic characteristics of women receiving and those not receiving DMPA.

Materials and Methods

Setting

The setting for this study was an upstate New York county with a major metropolitan city. Approximately 8,000 births occur annually, 40% of which are to low-income mothers, defined as mothers prenatally enrolled in the Special Supplemental Nutrition Program for WIC (Women, Infants, and Children) and/or whose deliveries were paid for by Medicaid.

Six of the seven urban pediatric practices serving the majority of the county's low-income children agreed to participate in a survey of their postpartum English- and non-English-speaking mothers. The latter were primarily Hispanic women but also included refugee mothers.

Each hospital studied had its own defined policy about postpartum DMPA and what is said about its potential impact on breastfeeding. For example, some hospitals require maternal consent for DMPA given prior to discharge.

Sample

Mothers living in the county were eligible to receive the survey if they had delivered a live infant 5 months earlier. The only demographic information provided by the pediatric practices was the mother's name and age.

Data collection

Survey distribution at five practices occurred through mailings to all addresses provided minus those deemed undeliverable through a prospective assessment by the postal service. The first mailing occurred when the infant was between 5 and 6 months old. Given the limited contact information available, no followup telephone or e-mail contact was possible. As a result, follow-up was restricted to a reminder postcard and a second full survey mailing sent 2 and 3 weeks, respectively, after the original mailing. Owing to administrative restrictions, a sixth practice chose to hand out the surveys to eligible mothers to complete and return by mail. We set our target response rate at 20% for each practice.

All respondents were eligible to participate in a raffle if they returned a separate card containing their contact information. The prizes ranged from \$50 to \$250, with a 1/28 chance of winning.

Survey instrument

The survey, entitled "You and Your Baby" Survey (YYBS), gathered perinatal data from mothers from pre-pregnancy through postpartum, including infant feeding. The CDC's Pregnancy Risk Assessment Monitoring System survey, version 6, served as the source of many of the items, supplemented with several used in previous surveys by the study's primary author. Because of the interest in the timing of DMPA administration, mothers were asked, "What kind of birth control have you used since your baby was born?" A list of options was provided, including "Shot every 3 months (Depo-Provera)." In addition, mothers marking yes for this

item were asked, "If you are using the Depo-Provera shot, when did you get your first shot?" The three response options were: "In the hospital after my baby was born"; "After leaving the hospital but before the baby was 6 weeks old"; or "6 or more weeks after the birth of my baby." The last option was selected to parallel the postpartum administration time period described in the package insert for Depo-Provera. The survey included 83 questions.

Analyses

Univariate statistics were undertaken to show the distribution of maternal and infant characteristics, delivery and hospital experience, and birth outcomes and hospitalization among participating mothers. Comparisons of key demographics between survey respondents and those of the overall county births to low-income mothers assessed the representativeness of the respondents. Bivariate statistics with chi-square or *t*-test statistics analyzed differences by DMPA administration groupings (any postpartum DMPA vs. non-DMPA; DMPA in hospital vs. all others; DMPA at 6 weeks after hospitalization vs. all non-DMPA users). The first two comparisons were also analyzed using multivariable logistic regressions (backward selection), including those characteristics associated with DMPA use in the bivariate analyses ($p < 0.10$). We considered these analyses descriptive and exploratory. All *p*-values were two-sided, and we set the level of significance $p \leq 0.05$. The University of Rochester Research Subjects Review Board approved these analyses.

Results

Responding mothers gave birth between May 2009 and October 2011 (Fig. 1). A total of 703 surveys were returned

* Addresses provided by practice sites (unduplicated)

FIG. 1. Survey distribution methods and response rates.

from the 3,614 mailed surveys: a 21.0% response rate after adjusting for undeliverables. Response rates varied by practice from 18.8% to 23.7%. In the sole setting in which surveys were distributed by hand, 61 (17%) of the 358 distributed were returned. Of those returned from both processes ($n=764$), 752 (18.9% of total distributed) were deemed usable, based on completeness of data. Over time, the mailed-survey administration process changed slightly to conserve costs through elimination of the reminder postcard. The second survey then moved to 2 weeks after the initial mailing, with no impact on subsequent response rates.

Overall, nearly half of survey respondents were black, and a quarter indicated that they were Hispanic, similar to the distribution found in the City of Rochester.¹³ Nearly two-thirds were between ages 19 and 29, and the majority lived in the inner city (Table 1). This geographically distinct area of nine Zip Codes, locally known as “the Crescent,” has higher rates of poverty than the surrounding community and was the geographic target area of an ongoing community program of infant-mortality reduction (federally funded Healthy Start).¹⁴

We assessed the representativeness of our respondents by comparing their characteristics to those of the overall county population of low-income mothers (defined as Medicaid-funded delivery and/or prenatal use of WIC) who gave birth in the same time period (Table 1). These data (drawn from birth certificate records) demonstrated that the responding mothers differed somewhat from the overall county popula-

tion of low-income mothers. Specifically, YYBS respondents were less likely to be under age 18 and to have graduated from high school. They were more likely to be Hispanic and to live in the inner city. On average, respondents were 1 year older than the overall low-income population. Given that the respondents were drawn from urban-based practices, it is not surprising that the majority were inner-city residents and that a larger proportion of respondents were black or Hispanic.

For these analyses, we used 648 surveys, selecting those returned by mothers no more than 9 months postpartum and who delivered at one of the area’s four hospitals (Table 2). Over half were multiparous (59.3%), and nearly half identified the pregnancy as unintended (48.8%) (column A). Just over half (51.0%) intended to exclusively breastfeed, with another quarter (25.7%) planning to only formula feed their infants during the first few weeks postpartum.

Nearly one-third (31.3%) reported DMPA use and second largest reporting no contraception (20.4%). The next most common responses were IUD (17.1%), birth control pill (16.4%), and barrier methods (condom, diaphragm, sponge, or cervical cap) (14.0%). Fewer than 10% selected vasectomy or postpartum tubal ligation. The latter are available at all hospitals prior to discharge or within 4–6 weeks postpartum. Across the four hospitals, at least 50% (and up to 73.8%) of respondents receiving DMPA received it prior to hospital discharge. We conducted comparisons with three groups of DMPA recipients: any postpartum DMPA receipt

TABLE 1. COMPARISON OF DEMOGRAPHICS BETWEEN YOU AND YOUR BABY
SURVEY RESPONDENTS AND BIRTHS TO LOW-INCOME MOTHERS

Demographics	YYBS respondents				Low-income mothers ^a	
	n = 752				n = 9,041	
	n	%	CI lower	CI upper	n	%
Age						
≤ 18	39	5.19 ^b	3.60	6.77	855	9.46
19–29	478	63.56	60.12	67.01	6,231	68.92
≥ 30	1,923	25.66 ^c	22.54	28.79	1,955	21.62
Unknown	42	5.59	3.94	7.23	0	0.00
Education						
Less than high school	177	23.60 ^b	20.55	26.65	2,834	31.49
High school or more	573	76.40	73.35	79.45	6,166	68.51
Black						
Yes	350	46.54 ^c	42.97	50.11	3,949	43.68
No	402	53.46	49.88	57.03	5,092	56.32
Hispanic						
Yes	181	24.07 ^c	21.01	27.13	1,428	15.79
No	571	75.93	72.87	78.99	7,613	84.21
Inner-city resident						
Yes	527	70.08 ^c	66.80	73.36	5,459	60.38
No	225	29.92	26.64	33.20	3,582	39.62
Age						
Mean (CI)		26.15 (25.73–26.57)			25.11 (25.00–25.23)	
[minimum–maximum]		[14.00–46.00]			[14.00–48.00]	

^aBased on hospital birth certificate data from 5/1/2009–10/31/2011; includes only those mothers with a Medicaid-funded delivery and/or prenatal enrollment in Women, Infants, and Children program.

^bProportion was lower among responding mothers when compared to the population of low-income mothers, based on YYBS confidence interval not including % from low-income mothers.^a

^cProportion was higher among responding mothers when compared to the population of low-income mothers, based on YYBS confidence interval not including % from low income mothers.^a

CI, confidence interval; YYBS, You and Your Baby Survey.

TABLE 2. CHARACTERISTICS AND COMPARISON OF MOTHERS RECEIVING OR NOT RECEIVING DEPOT MEDROXYPROGESTERONE ACETATE POSTPARTUM

	All mothers n (%)	Mothers receiving DMPA postpartum				Column comparisons		
		Anytime ^a n (%)	Only 6 or more weeks n (%)	Never n (%)	Only in hospital n (%)	All (A) minus E n (%)	B vs. D ^b p-value	E vs. F ^b p-value
Column	A n=648	B n=203	C n=54	D n=445	E n=127	F n=521		
Maternal characteristics								
Education								
Less than high school	148 (22.9)	63 (31.2)	15 (27.8)	85 (19.1)	40 (31.7)	108 (20.8)		
High school or more	498 (77.1)	139 (68.8)	39 (72.2)	359 (80.9)	86 (68.3)	412 (79.2)	<0.01	<0.01
Race								
Black								
Yes	299 (46.1)	106 (52.2)	25 (46.3)	193 (43.4)	70 (55.1)	229 (44.0)	0.04	0.02
No	349 (53.9)	97 (47.8)	29 (53.7)	252 (56.6)	57 (44.9)	292 (56.0)	0.18	0.67
Hispanic								
Yes	154 (23.8)	55 (27.1)	16 (29.6)	99 (22.2)	32 (25.2)	122 (23.4)		
No	494 (76.2)	148 (72.9)	38 (70.4)	346 (77.8)	95 (74.8)	399 (76.6)	<0.01	0.05
Age								
Mean	26.08	24.94	24.70	26.60	25.19	26.30		
[minimum–maximum]	[14.0–46.0]	[15.0–45.0]	[15.0–45.0]	[14.0–46.0]	[16.0–42.0]	[14.0–46.0]		
Inner-city resident								
Yes	453 (69.9)	166 (81.8)	42 (77.8)	287 (64.5)	106 (83.5)	347 (66.6)	<0.01	<0.01
No	195 (30.1)	37 (18.2)	12 (22.2)	158 (35.5)	21 (16.5)	174 (33.4)		
Wanted to be pregnant								
Now or sooner	325 (51.2)	81 (40.9)	23 (42.6)	244 (55.8)	51 (41.8)	274 (53.4)	<0.01	0.02
Later or never	310 (48.8)	117 (59.1)	31 (57.4)	193 (44.2)	71 (58.2)	239 (46.6)		
Parity								
Primiparous	264 (40.7)	74 (36.5)	25 (46.3)	190 (42.7)	36 (28.3)	228 (43.8)	0.13	
Multiparous	384 (59.3)	129 (63.5)	29 (53.7)	255 (57.3)	91 (71.7)	293 (56.2)	<0.01	<0.01
Prenatal plan to feed for the first few weeks ^c								
I planned to just breastfeed my baby	326 (51.0)	82 (40.8)	30 (55.6)	244 (55.7)	43 (34.4)	283 (55.1)	<0.01	0.90
I planned to formula feed my baby	164 (25.7)	74 (36.8)	13 (24.1)	90 (20.5)	52 (41.6)	112 (21.8)		
I planned to both breastfeed and formula feed my baby	120 (18.8)	38 (18.9)	9 (16.7)	82 (18.7)	26 (20.8)	94 (18.3)		
I wasn't sure how I was going to feed my baby	29 (4.5)	7 (3.5)	2 (3.7)	22 (5.0)	4 (3.2)	25 (4.9)		
Where was this baby born ^d								
Hospital A	195 (30.1)	67 (33.0)	24 (44.4)	128 (28.8)	37 (29.1)	158 (30.3)	<0.01	<0.01
Hospital B	187 (28.9)	39 (19.2)	13 (24.1)	148 (33.3)	21 (16.5)	166 (31.9)		
Hospital C	196 (30.2)	80 (39.4)	12 (22.2)	116 (26.1)	59 (46.5)	137 (26.3)		
Hospital D	70 (10.8)	17 (8.4)	5 (9.3)	53 (11.9)	10 (7.9)	60 (11.5)		

^aIncludes mothers receiving DMPA in the hospital or any time postdischarge, including the 23 mothers who received it post-hospital discharge but before 6 weeks postpartum.^bChi-square analyses; bolded values are significant at $p < 0.05$.^cActual item wording: "Before your baby was born, how did you plan to feed your baby for the first few weeks?"^dLow-income births by hospital (2010–2011): A, 46.1%; B, 44.5%; C, 47.4%; D, 59.1%.

and two subgroups (receipt in hospital or “at or after 6 weeks.”)

Among those reporting DMPA receipt (during or after hospitalization) (Table 2, column B) compared to mothers not reporting any DMPA use (column D), the former were less likely to have graduated from high school ($p=0.01$), be younger ($p<0.01$), and plan to breastfeed in the first few weeks ($p=0.01$). DMPA recipients were more likely to be black ($p=0.04$), reside in the inner city ($p<0.01$), indicate that the birth was unintended ($p<0.01$), and planned to formula feed during the first few weeks ($p<0.01$). Differences by hospital were also significant. There were no statistically significant differences by Hispanic ethnicity or parity.

Among the 203 mothers reporting postpartum DMPA receipt, 62.6% received it prior to hospital discharge ($n=127$). As depicted in Table 2 (columns E and F), mothers receiving DMPA in the hospital differed on several key characteristics when compared with all other postpartum mothers. This latter group included all mothers, regardless of their contraceptive choice or whether they received DMPA after discharge ($n=521$). In-hospital DMPA recipients were less likely to have graduated high school ($p=0.01$) and more likely to be black ($p<0.02$), to live in the inner city ($p<0.01$), have an unintended pregnancy ($p=0.02$), and plan to formula feed ($p=0.02$). In-hospital DMPA recipients were less likely to be first-time mothers ($p=0.01$) and plan to breastfeed ($p=0.01$). Among mothers receiving DMPA in the hospital

compared to all other mothers, less than half prenatally planned to formula feed their infants ($p=0.01$). Differences by hospital were also significant. Maternal age and Hispanic ethnicity did not differ significantly.

The third analysis compared those mothers receiving DMPA at or after 6 weeks postpartum (consistent with the package insert) with those mothers who did not ever receive DMPA ($n=445$) (Table 2, columns C and D). The 22 mothers who received DMPA after hospital discharge but before 6 weeks were omitted from this comparison. Age was the only significant difference between these groups. The average age of those receiving DMPA after 6 weeks postpartum was 2 years lower.

Logistic multivariate analyses identified independent predictors of receiving DMPA postpartum (Table 3). Mothers were more likely to receive DMPA if they were inner-city residents, had an unintended birth, or planned to formula feed. Being older decreased the likelihood of receiving DMPA. Hospital was also an independent predictor. A similar pattern emerged for those receiving DMPA prior to hospital discharge; primiparous, younger mothers who lived in the inner city or planned to formula feed were more likely to receive in-hospital DMPA.

Discussion

This convenience sample of low-income mothers demonstrated that nearly one-third received DMPA as a form of

TABLE 3. BACKWARD LOGISTIC REGRESSION COMPARING CHARACTERISTICS OF MOTHERS WHO DID AND DID NOT RECEIVE DEPOT MEDROXYPROGESTERONE ACETATE

Variable [ref]	All DMPA recipients vs. all others	p-value ^b	All in-hospital DMPA recipients vs. all others	p-value ^b
	OR [CI]		OR [CI]	
Less than high school [high school or more]	1.45 [0.95–2.22]	0.09	NA	—
Black [no]	1.41 [0.96–2.06]	0.08	1.49 [0.96–2.33]	0.08
Age [continuous]	0.97 [0.93–0.99]	0.04	0.94 [0.90–0.99]	0.01
Inner-city resident [no]	1.97 [1.26–3.09]	<0.01	1.85 [1.05–3.24]	0.03
Wanted to be pregnant later or never [now or sooner]	1.58 [1.10–2.28]	0.02	1.45 [0.94–2.25]	0.10
Primiparous [multiparous]	NA	—	0.41 [0.24–0.69]	<0.01
Prenatal feeding plan ^a [just breastfeed]		<0.01		<0.01
I planned to formula feed my baby	2.13 [1.39–3.27]		2.40 [1.46–3.96]	
I planned to both breastfeed and formula feed	1.01 [0.62–1.67]		1.33 [0.74–2.39]	
I wasn't sure how I was going to feed my baby	0.94 [0.37–2.36]		1.14 [0.36–3.59]	
Birth hospital [hospital A]		<0.01		<0.01
Hospital B	0.53 [0.33–0.87]		0.61 [0.33–1.13]	
Hospital C	1.31 [0.84–2.04]		1.88 [1.12–3.16]	
Hospital D	0.43 [0.22–0.85]		0.49 [0.22–1.12]	

Hispanics are not included in either model; parity not included in “All DP recipients vs. all others” model; education dropped out of “All in-hospital DP recipients vs. all others.”

^aActual item wording: “Before your baby was born, how did you plan to feed your baby for the first few weeks?”

^bBolded values are significant at $p<0.05$.

NA, not applicable.

contraception, with more than half receiving it prior to hospital discharge. Postpartum DMPA receipt overall (31.3%) was higher than reported elsewhere. Volscho calculated a rate of 12.7% among African American women ages 18–44 based on the Behavioral Risk Factor Surveillance System (BRFSS) data from 2002–2004.¹⁵ In 2005, the *Morbidity and Mortality Weekly Report* (MMWR) (based on BRFSS data from 2002) reported a range of overall use by state between 2% and 8% among all women, with New York State at 4.8% (confidence interval [CI] ± 1.9).¹⁶ Rates among blacks were higher overall (10.6% [CI ± 7.0]) and within New York State (13.5 [CI ± 9.5]). Neither of these studies included women under 18. Rates published by Chandra (2005) showed a rate among adolescents of 13.9% and 9.4% among black women.¹⁷ Of note, these estimates represent ever-users and are not specific to postpartum use. No data on in-hospital administration are available for comparison. Although seemingly high, it may be understandable given that the demographic profiles of mothers receiving postpartum DMPA are similar to those at risk for unintended pregnancy.^{1,3} Further, these rates may be indicative of a community-wide concern regarding high teen birth rates that place the city among the highest in the country.¹⁸

Despite the survey respondents representing only low-income mothers, there were differences between those who did and did not receive DMPA (both in-hospital and post-discharge). Mothers receiving in-hospital DMPA were less likely to be first-time mothers and high school graduates but more likely to be black. DMPA administration has been associated with issues of consent and full disclosure of side effects dating back to the 1970s and 1980s.⁷

The between-hospital differences regarding in-hospital DMPA administration in this analysis were noteworthy. These different patterns likely reflect the practice patterns and preferences among providers at each facility. In the future, elimination of copays for contraception would not likely shift use to costlier forms, such as implants or IUDs, prior to discharge, as hospitals receive lump-sum payments for the overall admission, making additional cost recovery unlikely.

This study has several strengths worth highlighting. This research explores patterns of postpartum DMPA administration not previously described in the literature. In particular, this study focuses on use among a low-income population at increased risk for subsequent unintended pregnancy. Additionally, these analyses include predictive multivariable model building to identify risk factors for postpartum DMPA use.

This study also has some limitations. Although response rates were only 21% for the mailed survey, this is the return rate for the entire population. As a result, our sample represents over 20% of all mothers attending these urban-based practices that serve a relatively homogeneous population of low-income mothers. Additionally, given no prior contact with the mothers and no additional contact options, a response rate of over 20% for a cold-call survey is acceptable.¹⁹ The survey was relatively long, taking approximately 20 minutes or more to complete. The surveys were distributed through two different methods, which may have further affected our response rates. Furthermore, mothers with limited or no English- or Spanish-language capacity, while few, are likely underrepresented. All data are maternal self-report, with no opportunity for cross-checking or validation from other sources. We have no quantitative information on obstetrical practices or decision making about timing of DMPA

administration beyond anecdotal comments. As a result, we do not know the factors influencing the mothers or their providers' selection of DMPA. Finally, this was an exploratory analysis, so no corrections were made for multiple comparisons as argued by Rothman; it remains possible that the significance of some findings may be overstated.²⁰

Conclusions

This study describes in-hospital and postdischarge DMPA use among postpartum low-income women across a community. The extent of in-hospital administration was surprisingly high but conforms to the CDC's rating of evidence coupled and with concern about high rates of unintended pregnancy in our community. Additional studies of DMPA administration patterns are warranted to identify geographic or other trends, as well as the impact of different approaches to screening for and communication with mothers about the postpartum use and timing of DMPA administration.

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Author Disclosure Statement

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