

Childhood Hair Product Use and Earlier Age at Menarche in a Racially Diverse Study Population: A Pilot Study

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PURPOSE: Previous studies suggest that hair products containing endocrine disrupting chemicals could alter puberty. We evaluated the association between childhood hair product use and age at menarche in a racially diverse study population.

METHODS: We recruited 300 African-American, African-Caribbean, Hispanic, and white women from the New York City metropolitan area who were between 18–77 years of age. Data were collected retrospectively on hair oil, lotion, leave-in conditioner, perm, and other types of hair products used before age 13. Recalled age at menarche ranged from 8 to 19 years. We used multivariable binomial regression to evaluate the association between hair product use and age at menarche (<12 vs. ≥12), adjusting for potential confounders.

RESULTS: African-Americans were more likely to use hair products and reached menarche earlier than other racial/ethnic groups. Women reporting childhood hair oil use had a risk ratio of 1.4 (95% confidence interval [CI]: 1.1–1.9) for earlier menarche, adjusting for race/ethnicity and year of birth. Hair perm users had an increased risk for earlier menarche (adjusted risk ratio = 1.4, 95% CI: 1.1–1.8). Other types of hair products assessed in this study were not associated with earlier menarche.

CONCLUSIONS: Childhood hair oil and perm use were associated with earlier menarche. If replicated, these results suggest that hair product use may be important to measure in evaluating earlier age at menarche. *Ann Epidemiol* 2011;21:461–465. © 2011 Elsevier Inc. All rights reserved.

KEY WORDS: Menarche, African-American, Hispanic, Urban Population, Cosmetics, Endocrine Disruptors.

INTRODUCTION

Hair products, some of which contain placenta, estrogen, and endocrine disrupting chemicals (EDCs), such as mono-ethyl phthalate or methylparaben, are more commonly used by women and minorities (1–3). These products are often applied to hair and scalp and left on for a long duration of time (2–5). Although there is no evidence that exposure to chemicals in hair products impacts disease risk, a case series suggested that use of these hormonally-active products accelerated pubertal development in children as young as 14 months old (4). If these products can alter the onset of puberty, by being absorbed through the skin, they may also be able to accelerate the onset of menarche possibly through

increased estrogenic activity of exogenous estrogens or certain EDCs. This acceleration could lead to an earlier age at menarche, a risk factor for breast cancer (6, 7). Furthermore, frequency and length of time of the exposure to these products should be considered, as this may also impact age at menarche. Given these findings, we examined the association between childhood hair product use and age at menarche. We hypothesized that the use of hair products would be associated with earlier age at menarche, especially among women who used the products for an extended period of time during childhood.

METHODS

Design

The Greater New York Hair Products Study was a cross-sectional pilot study designed to evaluate the patterns of current hair product use among four racial/ethnic groups of women. As part of the study interview, we asked women to recall their childhood use of hair products.

Study Subjects

A convenience sample of women was recruited from nail and hair salons, churches, workplaces, restaurants/cafes,

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Selected Abbreviations and Acronyms

EDC = endocrine disrupting chemicals
RR = risk ratio
CI = confidence interval
Ref. = reference group

and laundromats in 2004–2005. Locations were selected from the New York City telephone book and personal contacts. Women were eligible if they self-identified as African-American (United States-born descendants of United States slaves), African-Caribbean (black and born in the Caribbean or descendants of people born in the Caribbean), Hispanic, or White. Participants had to speak English and be older than age 18. A total of 326 women participated in this study. Twenty-six women were excluded due to missing data. The total sample size that we analyzed was 300.

Data Collection

During the in-person interviews lasting 15–20 minutes, each participant was provided a hair products label book, which served as a memory aid based on previously conducted focus groups. The questionnaire, label book, and study protocol were approved by Columbia University’s Institutional Review Board.

Childhood hair products. Study participants were asked about their use of several types of hair products before age 13, specifically: “Did you use hair oils, hair lotions, leave-in conditioners, root stimulators, perms/relaxers, prescriptions, and any other types of hair products?” (see Fig. 1 for definitions). Responses were recorded as *ever* or *never* use. If participants reported *ever* use of a certain product type, they were asked about the brand name and duration of use of each product. We did not include root stimulators in the analysis, given that these products were not on the

market during our study participants’ childhood. Too few study participants used prescription products and were not included in this analysis. Data on the specific EDC content of the recalled hair products was not available.

Age at menarche. Participants responded to the question: “How old were you when you started your period?” Age at menarche was recorded in 0.5-year intervals. Age at menarche was divided at the median for this study population: less than 12 years versus greater than or equal to 12 years. In a secondary analysis, we also evaluated age at menarche as less than 11 years and greater than or equal to 12 years. Most literature suggests that the reliability of recall for age at menarche is moderate to high (8–13).

Statistical Methods

We constructed multivariable binomial regression models to calculate the risk ratio (RR) and 95% confidence intervals (CI) (14). We evaluated the association between *ever* use of specific types of hair products during childhood and age at menarche. Each model contained only one type of hair product. To determine the independent association between hair product use and age at menarche, we evaluated decade of birth, race/ethnicity, recruitment site and location, and place of birth as potential confounders. Anthropometric and other childhood factors were not collected in this study. We included those variables that made a 10% change in the beta value for our hair product of interest. Our final model included race/ethnicity and decade of birth.

We evaluated extended use of hair products and age at menarche, where extended use was defined as initiating use at least 2 years before the onset of menarche. We constructed multivariable models stratified by mean and extended duration of use for each product type. As an additional analysis, we also used a stricter cut point for age at menarche (<11 years). All analyses were run using SAS v. 9.1 (SAS, Cary, NC).

Hair oil: A solid or gel-like, petroleum-based product with an oily consistency used for the hair or scalp. The substance can be used at room temperature or heated.

Hair lotion: A liquid product with an oily consistency used for the hair or scalp. These products can also have a creamy-like consistency.

Hair leave-in conditioner: A water-based moisturizer made for long-term application to the hair or scalp. These products are not rinsed out immediately and are placed on the hair or scalp usually until the next time a person shampoos their hair.

Hair perm: A chemical applied to the hair, allowed to sit, and then rinsed out to alter the natural curliness or straightness of the hair for an extended period of time.

Other hair products: Any type of vitamin, essential oil, vegetable oil, produce, or grocery item used on the hair or scalp, such as vitamin E oil, egg, or olive oil.

FIGURE 1. Hair products definition.

RESULTS

Table 1 describes the characteristics of the study population. Study participants ranged in age between 18 and 77 years. Age at menarche ranged from 8 to 19 years.

Compared to women with information on race/ethnicity and childhood hair product use, women with missing data were more likely to be younger, recruited at a workplace, and born outside the United States. Childhood hair product use significantly varied by race/ethnicity for each type of hair product ($p < 0.05$). African-American and African-Caribbean women reported more hair product use during childhood compared to Hispanic and white women. For example, the majority of African-American and African-Caribbean women reported childhood hair oil use, 94%

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