Pregnancy Folklore Revisited: The Case of Heartburn and Hair

Kathleen A. Costigan, RN, MPH, Heather L. Sipsma, BA, and Janet A. DiPietro, PhD

ABSTRACT: Background: *Folklore can originate by detection of actual associations between seemingly unrelated events and perpetuated through oral tradition. The objective of this study was to determine whether a common pregnancy belief that women who experience a lot of heartburn give birth to newborns with a lot of hair is accurate.* **Methods:** *Sixty-four pregnant women ranked the severity of their degree of heartburn during pregnancy. Independent coders rated newborn hair volume using 2 photographs of the infant's head, taken shortly after birth.* **Results:** *Most (78%) women reported some degree of heartburn. Symptom severity was unrelated to fetal sex and maternal characteristics including parity, age, or weight. The simple linear relationship between heartburn severity and hair volume was significant* $r_s(62) = 0.40$, $p < 0.001$. *Categorical analysis by severity score and hair ranking revealed a similar association* ($\chi^2 = 23.93$, $p < 0.05$). *Most (23/28) women who reported moderate or severe heartburn gave birth to babies with average or above average amounts of hair, and conversely, most (10/12) women reporting no heartburn had babies with less than average or no hair.* **Conclusions:** *Contrary to expectations, it appears that an association between heartburn severity during pregnancy and newborn hair does exist. We propose a shared biologic mechanism involving a dual role of pregnancy hormones in both the relaxation of the lower esophageal sphincter and the modulation of fetal hair growth. (BIRTH 33:4 December 2006)*

Key words: *pregnancy folklore, heartburn, fetal hair*

Folklore and mythology surrounding aspects of human life develop to help interpret processes that seem mysterious. Pregnancy is rife with several admonitions and seemingly unlikely superstitions that have been perpetuated across centuries and remain in common parlance today (1,2). These adages and axioms are commonly associated with attempts both to understand that which cannot be explained and to influence that which is beyond control. Validation of these beliefs is often obtained by way of personal testimony and is perpetuated by oral tradition, often by the telling and retelling of these stories by older women to younger pregnant women (3). Although the origins of many of these "old wives tales" related to pregnancy are unknown, the invention of perceived links between apparently unrelated processes may indicate evidence of a true association (3,4). Thus, particularly persistent folklore can warrant careful study.

Previously, we investigated various beliefs associated with predicting fetal sex (e.g., whether a woman is carrying her fetus in front or across the hips, prevalence of morning sickness, and so on) and concluded that these were ineffective (5). In the current report, we turn our attention to one of the most commonly voiced pregnancy notions involving a link between maternal heartburn and infant hair. Specifically, the widely held belief, which is often included in discourse on pregnancy folklore (1,3,6), is that when a pregnant woman experiences a lot of heartburn, the baby will be born with

Kathleen A. Costigan is a Nurse Clinician III in the Department of Gynecology and Obstetrics, Johns Hopkins Medical Institutions, Baltimore, Maryland; and Heather L. Sipsma is a Research Associate, and Janet A. DiPietro is a Professor in the Department of Population and Family Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA.

Address correspondence to Kathleen A. Costigan, RN, MPH, Division of Maternal-Fetal Medicine, Department of Gynecology and Obstetrics, Johns Hopkins Hospital, Nelson 2-160, 600 North Wolfe Street, Baltimore, Maryland 21287, USA.

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a lot of hair. This seemingly implausible association has been the source of ridicule, and women were admonished in the 1950s to "Listen to your doctor instead of sewing circle fantasy" (Dorson [7]).

Heartburn, or gastroesophageal reflux, is a common symptom of pregnancy, which becomes more prevalent with advancing gestation. In fact, more than two thirds of women report experiencing heartburn by the third trimester (8–10). The initial presumption that reflux was a result of mechanical pressure exerted by a growing uterus on the lower esophageal sphincter is unsupported by current data (11). Heartburn complaints are common in early pregnancy and do not decrease during the last weeks of pregnancy with engagement of the fetal head (9). Instead, a more convincing case can be made for the role of increasing concentrations of estrogen and progesterone in the relaxation of the lower esophageal sphincter (12–14). This position is bolstered by results of an experimental animal model, confirming that administration of progesterone and estrogen reduces lower esophageal sphincter pressure (15).

Given the prevalence of belief in a link between heartburn and baby hair, we took a straightforward approach to examine this aspect of pregnancy folklore. We expected that the actuality of this link would be unsupported by the data.

Methods

Participants

Eligible participants were 98 pregnant women who were participants in a larger study of the effects of maternal relaxation on fetal behavior; a report of those findings is forthcoming. Women were self-referred volunteers from advertisements placed in local university and hospital publications and from word of mouth. Eligibility was restricted to nonsmoking women with uncomplicated pregnancies carrying singleton fetuses. Of these, 64 (65%) chose to participate in the current study by providing a photo of their baby after birth (see below). This sample reflects a population of relatively mature, well-educated women (mean years of education = 16.9 years, SD = 2.2, range 12–20; mean age = 31.5 yr , SD = 4.9, range 21–43). Most of the women were married (96.9%), nulliparous (54.7%), and non-Hispanic white ([90.6%], African-American [6.3%], and Asian [3.1%]). Fifty percent of the fetuses were female.

Procedure

The women were interviewed at 36 weeks' gestation about their experience with heartburn during the current pregnancy and asked to rank the severity of their symptoms on a 4-point scale ranging from 0 (none) to 3 (severe). Information concerning treatment modality and dosage was collected to evaluate validity of self-report. After delivery, women were invited to provide 2 photographs of the newborn taken within the first 14 days of life, one with full face and the other in side view, without hair adornments or coverings. Photographs were provided to 2 blind coders. Coders included a professional hair stylist and a young mother. Coders independently rated the amount of hair for each infant on a scale of 1 (little or almost no hair) to 5 (most hair imaginable); the photos did not include either participant or gender identifiers.

Data Analysis

Data analysis relied on simple descriptive techniques to describe both dependent and independent measures. Relations among hair, heartburn, and potential covariates were examined using Spearman rank-order correlation coefficients (r_s), *t* tests, and chi-square analyses.

Results

No differences were observed in maternal age, education level, or reported experience of heartburn between women who provided photographs to participate in this substudy and those who did not. Most (78%) women reported some degree of heartburn; severity information is shown in Table 1. Heartburn was unrelated to maternal age, education level, occupation status, parity, prepregnancy weight, height, general pregnancy anxiety, or race. Fetal sex was not associated with maternal experience of heartburn ($t(62) = 0.39$, not significant). Women delivering longer (r_s (62) = −0.34, $p < 0.01$), but not heavier (r_s (62) = −0.19) babies reported somewhat less heartburn. Of women reporting some heartburn, most (56.3%) treated it with over-the-counter antacids (e.g., Tums) or not at all (17.2%); only 4.7 and 3.1 percent used histamine$_2$-receptor antagonists (e.g., ranitidine) or proton pump inhibitors (e.g., lansoprazole), respectively. Significant relations were present between the reported

Table 1. Distribution of Reported Heartburn Severity (*n* = 64)

Heartburn Severity	*No. (%)*
None	14 (21.9)
Mild	22 (34.4)
Moderate	19 (29.7)
Severe	9 (14.1)

heartburn severity and the intensity of treatment modality ($\chi^2 = 31.22$, $p < 0.001$) and weekly antacid dosage ($r_s(62) = 0.59$, $p < 0.0001$).

Coders showed a high degree of correspondence in ratings of newborn hair ($r_s(62) = 0.67$, $p < 0.0001$). To increase the reliability of the ratings, averaged coder scores were used in all analyses. No difference in newborn hair volume was detected between boys and girls ($t(62) = 1.00$, not significant), but African-American infants were coded as having more hair than other groups ($t(62) = 2.22$, $p < 0.05$).

The distributions for hair volume ratings are shown in Table 2. The unadjusted linear association between severity of heartburn and infant hair volume, averaged between raters, was $r_s(62) = 0.40$, $p < 0.001$. Exclusion of the 4 African-American participants from the sample resulted in an elevation of this association ($r_s(58) = 0.44$, $p < 0.001$). It should be noted that the lowest and highest hair categories included small numbers of cases, which can inflate or obscure linear associations. The correlation computed without these 3 cases also increased slightly ($r_s(61) = 0.47$, $p < 0.001$). Both subanalyses enhanced our confidence in the original association detected.

Chi-square analysis was used to examine the distribution of participants in the heartburn (4 levels) by hair volume (5 levels) categories. Significant categorical association between heartburn intensity and hair volume was found ($\chi^2 = 23.93$, $p < 0.05$). Again, because small numbers in some cells could generate inconsistent associations, the data were reanalyzed without these values and remained significant ($\chi^2 = 19.71$, $p < 0.01$). Figure 1 shows a simplified version of these results in which hair ratings are collapsed into 2 categories with roughly equal distributions: none to less than average hair ($n = 30$) or average to excessive hair ($n = 34$). The figure reveals that the women who gave birth to babies with low amounts of hair rarely had moderate or high levels of heartburn and that a high amount of hair was rarely associated with a lack of heartburn. Conversely, 68 percent (23/34) of women giving birth to babies with a lot of hair experienced moderate or high levels of heartburn.

Table 2. Distribution of Newborn Hair Volume ($n = 64$)*

Newborn Hair	*No. (%)*
Little or no hair	2 (3.1)
Less than average	28 (43.8)
Average	25 (39.1)
More than average	8 (12.5)
Voluminous	1 (1.6)

**Discrepancies between coders generated some hair volume values that were not whole numbers (e.g., 2.5); in all such cases, values were uniformly rounded down to the nearest integer.*

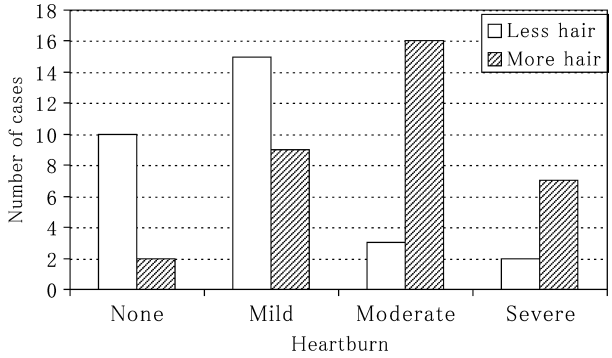

Fig. 1. Correspondence between maternal experience of heartburn severity and less (none or less than average) versus more (average to extreme) newborn hair ($\chi^2 = 18.33$, $p < 0.0001$).

Discussion and Conclusions

Much to our surprise, and somewhat to our chagrin, our application of straightforward but standard scientific methods to investigate the validity of this ubiquitous pregnancy "myth" resulted in its partial confirmation. The relationship was not perfect, but the data were fairly compelling. Most (23/28) women who reported moderate or severe heartburn gave birth to babies with a lot of hair, and conversely, most (10/12) women reporting no heartburn had babies with little hair. We were unable to identify any maternal or infant characteristics that were associated with both newborn hair and maternal heartburn, thus reducing the possibility of mediation by a third factor.

We relied on a simple method of heartburn severity measurement by self-report. Women seemed to accept the distinction of categories ranging from none to severe heartburn easily, which was statistically corroborated with both intensity of treatment modality and dosage of antacids. Several women expressed concern about taking heartburn relief medications during pregnancy, which likely suppressed the magnitude of the observed associations. Thus, although some likely subjective variation in women's appraisal of the severity of their heartburn was present, their appraisal tended to be reflected by the degree to which they treated it. However, any lack of precision inherent in our methods for categorizing either heartburn or newborn hair would have conspired against detection of an association.

It is important to note that these results are based on a small sample that included little racial or ethnic diversity. This makes it difficult to extrapolate to populations that may have different distributions in normal hair volume at birth. For example, African-American

newborns had significantly more hair at birth and there was indication that the association with heartburn was less strong for this group. Thus the current results may not generalize to groups that have less variation in newborn hair volume than present in the current sample comprised predominantly of non-Hispanic white participants.

On the surface, detection of an association between newborn hair and maternal heartburn seems improbable. However, closer examination of the development of hair during the fetal period and the mechanisms that govern pregnancy heartburn reveal a biologically plausible explanation.

Although fetal scalp hair is not routinely observed on ultrasound until midgestation (16), primordial hair follicles begin to form in the ninth week of gestation, with the bulk of follicles forming over the surface of the body and the scalp by the fourth month (17). Hair production proceeds at different rates and in several waves in the frontal, parietal, and occipital regions of the fetal head, with a surge 5–6 weeks before birth (18). The number and distribution of follicles are influenced by multiple intrinsic and endocrine factors (19) but not by fetal sex. However, racial differences that parallel those reported in our study have been noted (18). In pregnant women, increased concentrations of estrogen and other sex steroids play a dominant role in modulating hair growth (20). Hormonal activity increases the number of scalp hair follicles in the growth phase and synchronizes follicles in the resting phase, which inhibits hair shedding, resulting in more luxuriant hair as gestation progresses (21,22).

Thus, we propose that individual variation in levels of pregnancy hormones that have been implicated in the relaxation of the lower esophageal sphincter and resultant reflux are also independently associated with hair growth in the fetus. Little information exists on the origins of variability in the development of fetal hair, but we presume that sensitivity to circulating hormones parallels that of the pregnant woman. Thus, the folklore perception of a link between heartburn and hair is not a causal one but, instead, may reflect a dual consequence of rising hormonal levels. Nonetheless, these findings suggest that, indeed, sometimes the "old wives" may be right.

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