

The Function of Ethnicity, Income Level, and Menstrual Taboos in Postmenarcheal Adolescents' Understanding of Menarche and Menstruation

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Abstract The purpose of this study was to examine differences in knowledge about menstruation, feelings of preparation for menarche, and menstrual attitudes of early adolescent girls from different ethnic groups and income levels. An interaction between ethnicity and income level was also investigated. Participants were 165 postmenarcheal adolescent girls' (ages 11–15) from Pittsburgh, Pennsylvania, USA, who were categorized into four groups: higher income European Americans, lower income European Americans, higher income African Americans, and lower income African Americans. It was predicted that African Americans, lower income participants, and lower income African Americans would score lower on a menstrual knowledge test, report feeling less prepared for menarche, and report more negative menstrual attitudes (i.e., fewer positive feelings about menstruation, more negative feelings about menstruation, and less openness toward menstruation) than European Americans, higher income participants, and any other income level and ethnicity grouping. Not all hypotheses were fully supported. Participants' lacked accurate menstrual knowledge and felt unprepared for menarche, but menstrual attitudes were ambivalent. Ethnicity and income level alone did not play a substantial role in girls' understanding of menarche and menstruation; however, they did interact. Overall, higher income European Americans fared better than the other participants. Theories and research regarding girls' understanding of menarche and menstruation must take sociocultural factors into account.

Keywords Adolescents · Menstruation · Menarche · Ethnicity · Race · Income level · Socioeconomic status · Menstrual taboos

Introduction

Menstruation is, at one time or another, experienced by most girls and women across the world. It is a universal phenomenon that has been stigmatized across most cultures and religions (Delaney et al. 1988; De Troyer et al. 2003; Shuttle and Redgrove 2005). In U.S. culture, this stigma encompasses three specific menstrual taboos (concealment, activity, and communication) which have been shown to be internalized at a young age and influence menstrual behaviors and attitudes in negative ways (Britton 1996; Hewitt 2000; Houppert 1999; Kissling 1996; Roberts et al. 2002; Williams 1983). The concealment taboo refers to the belief that menstruation is something that should be hidden and kept secret (Laws 1990). The activity taboo essentially limits a menstruating woman's physical behavior (Britton 1996; Houppert 1999). The communication taboo prohibits open discussion of menstruation (Kissling 1996; Williams 1983) which inhibits girls from having an accurate base of menstrual knowledge and preparation for menarche. This, in turn, could lead some girls to the development and propagation of falsehoods about menstruation and their own bodies and possibly make them more vulnerable to maladjustment (Laws 1990; Rierdan et al. 1986).

A girl's culture, ethnicity, and social class may also affect how she and those around her manifest these taboos; however, most U.S. studies have explored the experiences of European American, middle-class girls and women only. Understanding the experiences of different ethnic groups and social classes is critical if we are to appropriately address the specific needs of these individuals and help

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them develop and maintain a healthy outlook on menstruation and themselves. Given that, the aim of this study was to determine if ethnicity and socioeconomic status are associated with reactions to menarche and menstruation. Specifically investigated were the responses to questions about menstrual knowledge, feelings of preparation for menarche, and menstrual attitudes (i.e., positive feelings about menstruation, negative feelings about menstruation, and openness toward menstruation) of early adolescent girls from different ethnic groups and income levels and living in a mid-Atlantic state of the U.S. The studies reviewed in this paper were conducted with U.S. samples unless otherwise noted.

Menarche and the Menstrual Education Process

While there is little current research on adolescents' menstrual knowledge, preparation for menarche, and menstrual attitudes, earlier research has explored menstrual education with particular focus on the sources of information and the underlying messages of the information communicated. U.S. studies (Koff and Rierdan 1995; Rierdan et al. 1983; Stoltzman 1986; Weideger 1976) and cross-cultural studies (e.g., Chrisler and Zittel 1998) have reported that menstruation information comes from multiple sources including mothers, siblings, peers, teachers, and various forms of media. However, most researchers agree that the primary source of information is the mother.

The function of the mother in menstrual education is particularly important because girls may learn sex-role identity and related behaviors primarily through interaction and observation in the mother-daughter relationship (Menke 1983). Therefore, a belief held by the daughter that her mother had negative reactions to menstruation may cause the daughter to anticipate or experience those same negative reactions. On the other hand, in families in which the mother holds a positive and open attitude towards menstruation, the daughter seems better able to identify with her mother as a positive model for mature womanhood (Danza 1983).

Several authors have argued that because of the vital role the mother plays in preparing her daughter for menstruation, mothers should be emotionally supportive and knowledgeable about menstruation (e.g., Gillooly 1998; Rierdan et al. 1983). However, many mothers find themselves unprepared for the task of educating their daughters about menstruation (Brumberg 1997; Costos et al. 2002; Houppert 1999). In order to describe the substance of communication between daughters and their mothers, Costos et al. (2002) interviewed 138 women of various ages about their experiences with menarche and the menstrual education they received. Specifically, participants were asked how they learned about menstruation, what were their memories of their first period, what their experiences with their period were like while

growing up, and if they had any recollections about their mothers' menstrual cycles. More than half of the participants reported that their mothers would not openly discuss menstruation and were secretive and uncommunicative on the subject. Those with mothers who were open to talking about menstruation described the messages they received as being laced with negativity and focused on the operational functions related to menstruation rather than their daughters' emotional and psychological needs. This research suggests that, when it comes to menstrual education, mothers obey the menstrual taboos by limiting open communication and urging secrecy among their daughters, thus leaving them unprepared for menarche.

Girls have also come to depend on the sanitary products industry for instruction on menstruation. Nevertheless, a number of researchers have concluded that, with content that emphasizes secrecy and focuses on menstrual management and hygiene, the quality of the educational materials provided by sanitary product manufacturers is lacking (Brumberg 1997; Erchull et al. 2002; Havens and Swenson 1988; Houppert 1999; Whisnant et al. 1975). Earlier studies have found that educational pamphlets developed by the sanitary products manufactures perpetuate menstrual shame and taboos by presenting menstruation as a "hygiene crisis" (Havens and Swenson 1988; Whisnant et al. 1975). Such a representation indicates that menstrual blood and the person shedding it are dirty and in need of immediate sanitation. Just by referring to menstrual products as "sanitary" products only reinforces the idea that menstruating women are unsanitary.

More recently, a comparative analysis of older menstruation education booklets to more modern ones showed that the main focus was menstrual management and hygiene regardless of the year in which the materials were published (Erchull et al. 2002). It is of note, however, that the more contemporary booklets were less likely to approach discussion of menstruation from a "hygiene crisis" framework. This displays some progress in diminishing the view of menstruation as a pollutant. However, all 28 educational materials analyzed placed an emphasis on secrecy, thus indicating that even in the present day, girls are expected and taught to hide their menstruation and not discuss it openly.

Menarche, Ethnicity, and Socioeconomic Status

Culture and ethnicity are known to have strong influences on the events experienced throughout one's life. Menarche is no exception. Although there has been a great deal of research on girls' attitudes and behaviors toward, preparation for, and understanding of menarche and menstruation over the past thirty years, the vast majority of that research occurred in the U.S. More recently, however, an exploration

of these factors has begun in countries across the world (e.g., Marvan et al. 2006, 2001; Skandhan et al. 1988; Tang et al. 2003). These cross-cultural studies show that while some feelings about menstruation are similar across cultures, the experience of menstruation is, nevertheless, influenced by cultural factors (Lee 2001). As a result, findings based on U.S. studies may not be an accurate representation of the menstrual experience of women from other cultures.

The influence of culture also has implications for the generalizability of U.S. studies conducted with mostly white women to women of color. Although the amount of research on psychological and emotional effects of menstruation in other cultures has risen, the same cannot be said for this type of research among the various ethnic minority groups in the U.S. Most U.S. research in this discipline has failed to explore the emotional and psychological impact of menarche among different ethnic groups within its own country. Therefore, exploring only white girls' and women's responses to menarche and menstruation ignores the experiences of all other U.S. girls and women.

An earlier study of 67 postmenarcheal African American middle and high school age girls examined their experience of menarche and compared findings to similar studies of European American participants (Scott et al. 1989). Like the European American girls in other research, the less prepared the African American adolescents felt, the more negative their feelings toward their experience of menarche. However, the percentage of African Americans who reported feeling unprepared for menarche was twice that of European Americans from other studies. Furthermore, the African American sample expressed a more negative response to menarche than the previous European American samples. Thus, this study hints that African American girls may be at greater risk for maladjustment to menstruation than European American girls and highlights the need for greater examination of ethnic differences in reactions to menarche and menstruation.

One recent study that did explore the menstrual experiences of women of color interviewed 17 low-income, African American women of various ages about menstrual communications (Cooper and Koch 2007). While all the women in the study expressed a desire for better communication, they also described themselves and those around them as avoidant about discussing menstrual events throughout their lives. The authors argue that this lack of openness toward communication about menstruation leads to confusion, negative menstrual attitudes, and inaccurate knowledge about menstruation, menopause, and menstrual-related health. While the participants in this study were adults, it is not unreasonable to expect that the experiences of African American girls may be comparable, particularly when it is considered that the participants reported a lack of menstrual communication not just in adulthood, but throughout their lives.

As with culture and ethnicity, the impact of social class on adjustment to menarche has received little attention despite the extensive research on socioeconomic status and its effects on development and general well-being (e.g., Adler et al. 1993; Bradley and Corwyn 2002; Feinstein 1993; Keating and Hertzman 1999). Most researchers have neglected to explore the role socioeconomic status may play in girls' adjustment to menarche and menstruation. As previously discussed, Cooper and Koch (2007) interviewed low-income African American women and found the presence of the menstrual communication taboo (i.e., a lack of openness or unwillingness to discuss menstruation) that lead to a negative menstrual outlook and ignorance on the subject. A study of Mexican adolescents found that the upper class girls had mothers who communicated more accepting messages about menstruation than did mothers from lower class families (Benjet and Hernandez-Guzman 2002). Given that, it is not surprising that girls in the study from upper class families had more positive menstrual attitudes and less anxiety about menstruation than girls from lower class families.

Taking into account the impact that both culture and social location have on development, this study examines both ethnicity and income level with regard to menstrual knowledge, preparation, and attitudes (i.e., positive feelings about menstruation, negative feelings about menstruation, and openness toward menstruation). Because they represent two protective factors, it is expected that higher income European American girls would fair best, while lower income African American girls, who represent two risk factors, would have the least understanding of menarche and menstruation. Because it is unknown whether culture or social location has the greater impact and because lower income European American girls and higher income African American girls each represent both a risk factor and protective factor, it is expected that their menstrual knowledge, preparation, attitudes will fall between those of the other two groups.

Current Study

The purpose of this study was to investigate the menstrual knowledge, feelings of preparation for menarche, and the menstrual attitudes (i.e., positive feelings about menstruation, negative feelings about menstruation, and openness toward menstruation) of early adolescent girls from different ethnic and socioeconomic backgrounds to determine if ethnicity and socioeconomic status are associated with reactions to menarche and menstruation. The following hypotheses were tested:

1. African American participants will score lower on a menstrual knowledge test, report feeling less prepared for menarche, and report more negative menstrual

- attitudes (i.e., fewer positive feelings about menstruation, more negative feelings about menstruation, and less openness toward menstruation) than European American participants.
2. Participants from lower income households will score lower on a menstrual knowledge test, report feeling less prepared for menarche, and report more negative menstrual attitudes (i.e., fewer positive feelings about menstruation, more negative feelings about menstruation, and less openness toward menstruation) than participants from higher income households.
 3. African American participants from lower income households will score lower on a menstrual knowledge test, report feeling less prepared for menarche, and report disproportionately more negative menstrual attitudes (i.e., fewer positive feelings about menstruation, more negative feelings about menstruation, and less openness toward menstruation) than any other ethnicity and income level group combination.

Demographic variables and scaled instruments were each analyzed via a 2×2 (ethnicity by income level) multivariate analysis of variance (MANOVA) with an interaction term in order to examine differences in responses according to ethnic group and income level. Open-ended responses to the menstrual knowledge question were analyzed for content.

Method

Participants

The sample for the current study consisted of 169 postmenarcheal adolescent girls (86 African American, 83 European American) from one middle school, one high school, and two church youth groups in the Pittsburgh area. Participants were categorized into four groups: 37 were classified as European American from higher income homes, 46 were classified as European Americans from lower income homes, 33 were classified as African Americans from higher income homes, and 53 were classified as African Americans from lower income homes. In order to yield appropriate power (80 % for a medium effect size with a two-tailed p -value of .05), a minimum of 32 participants was needed in each group.

Ethnicity was determined via self-report. Income level was determined by a self-report qualification for free or reduced price lunches. Participants who reported receiving free or reduced price lunches were categorized as “lower income”. Participants who reported that they do not receive free or reduced price lunches were categorized as “higher income”. To qualify for a free or reduced price lunch, federal guidelines stipulate that a family’s income must be

less than 365 dollars per week for each individual living within the household (Federal Register 2007). There was an almost even distribution of higher income participants from the schools and churches (53.6 % school participants, 46.4 % church participants); however, this was not the case for the participants from lower income homes (89 % school participants, 11 % church participants).

Participants ages were between 11 and 15 ($M=13.67$, $SD=1.02$). The ages at which participants reached menarche were between 9.25 and 15.06 ($M=12.47$, $SD=1.01$) while the length of time participants had been postmenarcheal ranged from 1 month to 4 years and 2 months ($M=1$ year and 2 months, $SD=11$ months). Means by ethnicity and income category are reported in Table 1. Current ages were calculated based on their reported date of birth and the date the questionnaire was completed. Age at menarche was calculated based on participants’ reported date of birth and their reported length of time menstruating.

Procedure

Potential participants were given a packet to take home which included (a) two copies of the consent form; (b) one copy of the questionnaire; (c) two self-addressed, stamped envelopes; and (d) a cover letter with directions and mailing instructions. Parents were instructed to read the consent forms with their daughter and, if they both agree to the youth’s participation, sign one copy of the consent form, return it in one of the provided envelopes, and keep one copy for their own records. Girls who had parental permission to participate were instructed to complete the survey and return it in the second provided envelope. It was explained that the purpose of separate envelopes was to protect their privacy. The envelopes were coded so that questionnaire responses could be matched to signed consent forms, thus ensuring that only responses from individuals with parental permission were included in the analyses.

A total of 265 survey packets were distributed to potential participants. Of those, 175 useable surveys were returned (i.e., respondents were postmenarcheal and indicated ethnicity and whether or not they qualified for a free or reduced price lunch), resulting in a 66 % response rate. Six respondents were excluded from the sample because the ethnicity indicated was not African American or European American (four were bi- or multi-ethnic and two were Asian American), resulting in a total of 169 participants (126 girls from the middle and high school and 43 girls from the church youth groups).

Measures

Participants completed a four-page questionnaire which consisted of four sections that solicited (a) demographic

Table 1 Menstrual knowledge coding definitions and examples

Score	Coding definition	Example
2—Fully correct	Response is based on scientific fact with accurate biological information, demonstrates an accurate understanding of how the female body works, and has no additional inaccurate information	When a girl is healthy she starts to have periods to get her body ready to have a baby. When she doesn't get pregnant each month, the egg that wasn't fertilized has to come out. So does the uterus tissue. That's the blood.
1—Partially correct	Response is mostly based on scientific fact and has a mix of accurate biological information and inaccurate information or response has limited accurate biological information, but demonstrates some understanding of how the female body works	Because they are not pregnant.
0—Fully incorrect	Response is not based on scientific fact, has no biological information, or the response has completely inaccurate biological information and does not demonstrate any understanding of how the female body works	Because Eve broke the rules.

information; (b) knowledge about menstruation; (c) preparation for menarche and menstruation; and (d) menstrual attitudes. The entire questionnaire took approximately 15 min to complete.

Demographic Questionnaire

The demographic questionnaire included six items which asked about participants' background, including their date of birth, ethnicity, zip code, menstrual status, length of time menstruating, and qualification status for free or reduced price lunches.

Measure of Menstrual Knowledge

To assess menstrual knowledge an open-ended question asked participants to explain, in their own words, why girls menstruate. Responses were assigned a point value based on whether they were correct or not (fully correct response = 2, partially correct response = 1, fully incorrect response = 0) with a higher score indicating greater knowledge about menstruation.

A response was deemed fully correct if it was based on scientific fact with accurate biological information, demonstrated an accurate understanding of how the female body works at menstruation, and did not have any additional incorrect information. If a response was not based on scientific fact nor provided any biological information, then it was considered incorrect. If a response did include biological information, but that information was completely false and, thus, indicated no accurate understanding of how the female body works at menstruation, then it was also considered incorrect. If the response was mostly based on scientific fact and had a mix of accurate biological information and inaccurate information it was deemed partially correct. If the response had limited accurate biological information, but demonstrated some understanding of how the

female body works at menstruation, it was also deemed partially correct. Examples of responses for each scoring group are presented in Table 1.

Forty responses (10 from each of the four ethnic and income level groupings) were randomly selected and scored separately by two raters. The raters initially disagreed on three items, yielding a percent agreement of 92.5 %. The responses upon which there was disagreement were discussed and reconciled.

Measure of Preparation for Menarche

Seven items, developed by the researcher, were used to assess participants' level of preparation for menarche. The items are as follows. "I was given helpful information about periods before I got one." "I felt ready when I got my first period." "I knew what to do when I got my first period." "I understood what was happening to my body when I got my first period." "I had enough stuff (like pads or tampons) when I got my first period." "I knew how to use pads or tampons when I got my first period." "I knew what to expect before I got my first period."

Using a 5-point Likert scale, participants rated their level of agreement with each statement. The total possible score for this scale ranges from 7 to 35, with a higher score indicating greater feelings of preparedness. The preparation for menarche measure had acceptable internal consistency reliability with an alpha coefficient of .72 for this sample.

Adolescent Menstrual Attitudes Questionnaire

The Adolescent Menstrual Attitude Questionnaire (AMAQ) (Morse et al. 1993) is a scale that assesses menstrual attitudes of both pre- and postmenarcheal adolescents. Unlike other measures of menstrual attitudes, the AMAQ was designed specifically for adolescents and uses terminology that is appropriate for that age group. To ensure good

content validity the AMAQ was developed using content analysis from qualitative data of previous studies with adolescent girls. Each item was rated by seven experts in either adolescence or school nursing and only those items that were highly rated by all experts were retained. There are two versions of the AMAQ, one for premenarcheal girls and one for girls who have experienced menarche. Each version consists of 58 items and is made up of six subscales. The number of pre- and postmenarcheal items, respectively, are: Positive Feelings (12 and 11), Negative Feelings (17 and 18), Openness Toward Menstruation (6 and 5), Living with Menstruation (10 and 8), Menstrual Symptoms (5 and 9), and Acceptance of Menarche (8 and 7).

For this study, a total of 24 items were utilized from the following three subscales of the postmenarcheal form: Positive Feelings (eight items, e.g., “I feel very grown up when I have my period.”), Negative Feelings (11 items, e.g., “I feel ugly and gross when I have my period.”), and Openness Toward Menstruation (five items, e.g., “I often talk about periods with my friends.”). The 24 items were selected because they specifically related to (a) menstrual taboos, especially the concealment and communication taboos, (b) feelings of happiness about and maturity when menstruating, and (c) feelings of rejection, embarrassment, and fear about menstruation. Several items from the original AMAQ postmenarcheal Positive Feelings and Negative Feelings subscales were omitted because they either did not specifically relate to the menstrual taboos examined in this study or because they were highly repetitive and, therefore, deemed unnecessary. An example of an omitted Positive Feelings item is “I feel pleased when I’m having my period.” An example of an omitted Negative Feelings item is “Girls dislike touching themselves to change pads or tampons.”

Using a 5-point Likert scale, participants rated their level of agreement with each statement. Possible score ranges for each subscale are as follows: 8 to 40 for Positive Feelings with higher scores indicating more positive menstrual attitudes, 11 to 55 for Negative Feelings with higher scores indicating more negative menstrual attitudes, and 5 to 25 for Openness Toward Menstruation with higher scores indicating a more open attitudes toward menstruation. The AMAQ items used in this study had good internal consistency reliability with an alpha coefficient of .83 for Positive Feelings, .79 for Negative Feelings, and .88 for Openness Toward Menstruation for this sample.

Results

Descriptive Analysis

In order to examine possible differences among ethnicity and income levels with respect to the demographic variables a 2×2 (ethnicity by income level) MANOVA was conducted.

Means by ethnicity and income category are presented in Table 2. The multivariate test was not significant for an interaction between ethnicity and income level, Pillai's Trace = .040, $F(1, 168) = 2.240$, $p = .086$. It was, however, significant for ethnicity, Pillai's Trace = .392, $F(1, 168) = 35.096$, $p = .000$, and income level, Pillai's Trace = .097, $F(1, 168) = 35.096$, $p = .000$. Univariate F tests for participants' current age indicated a significant main effect for income level only, $F(1, 168) = 17.008$, $p = .000$, and suggested that lower income participants were older ($M = 13.92$, $SD = 1.11$) than higher income participants ($M = 13.31$, $SD = .76$). However, the mean difference between the groups was less than one year of age.

The univariate F tests for age at menarche showed a significant main effect for ethnicity, $F(1, 168) = 78.982$, $p = .000$, which indicated that African American participants reached menarche at a significantly earlier age ($M = 11.91$, $SD = 1.10$) than European American participants ($M = 13.06$, $SD = .71$). The main effect for income level was also statistically significant, $F(1, 168) = 6.315$, $p = .013$, and showed that higher income participants had their first period at an earlier age ($M = 12.33$, $SD = .83$) than lower income participants ($M = 12.58$, $SD = 1.12$). The differences between the means was small and not of practical significance.

Univariate F tests for length of time menstruating also showed a significant main effect for ethnicity, $F(1, 168) = 51.503$, $p = .000$, and indicated that African American participants on average ($M = 19.06$, $SD = 11.95$) had been menstruating longer than European American participants ($M = 8.14$, $SD = 6.34$). The main effect for income level was also statistically significant, $F(1, 168) = 5.554$, $p = .020$, and suggested that lower income participants were menstruating longer ($M = 15.43$, $SD = 11.79$) than higher income participants ($M = 11.24$, $SD = 9.42$).

Analyses for Dependent Measures

In order to examine possible differences among ethnicity and income levels with respect to the dependent measures a 2×2 (ethnicity by income level) MANOVA was conducted.

Table 2 Means for demographic variables by ethnicity and income level

Group	<i>n</i>	Current age <i>M (SD)</i>	Age at menarche <i>M (SD)</i>	Months menstruating <i>M (SD)</i>
L.I.A.A.	53	13.66 (1.20)	11.92 (1.01)	20.43 (12.68)
H.I.A.A.	33	13.36 (.92)	11.89 (.83)	16.85 (10.48)
L.I.E.A.	46	14.21 (.93)	13.39 (.67)	9.67 (7.32)
H.I.E.A.	37	13.27 (.60)	12.73 (.62)	6.24 (4.23)

L.I.A.A. lower income African Americans; *H.I.A.A.* higher income African Americans; *L.I.E.A.* lower income European Americans; *H.I.E.A.* higher income European Americans

Means by ethnicity and income category are presented in Table 3 for all dependent measures.

The multivariate test was significant for the interaction between ethnicity and income level, Pillai's Trace=.107, $F(1, 165)=3.299$, $p=.008$, as well as the main effects of ethnicity, Pillai's Trace=.169, $F(1, 165)=5.554$, $p=.000$, and income level, Pillai's Trace=.296, $F(1, 165)=11.528$, $p=.000$. Univariate F test results are discussed below for each dependant variable.

Menstrual Knowledge

With regard to menstrual knowledge, it was hypothesized that both African American participants and participants from lower income households would score lower on a menstrual knowledge test than European American participants and participants from higher income households. It was also predicted that African Americans from lower income households would score lower than any other ethnic and income level group combination. Results showed that the interaction of ethnicity and income level was statistically significant, $F(1, 164)=5.19$, $p=.024$, as were the main effects for ethnicity, $F(1, 164)=6.89$, $p=.010$ and income level, $F(1, 164)=25.02$, $p=.000$. Figure 1 illustrates this interaction. Post hoc Bonferroni tests revealed that, on average, the higher income European American participants were more knowledgeable about menstruation than the other three ethnic and income level groupings at the .05 level of significance. All other comparisons were not significant. However, even the higher income European American group's mean of 1.29 was closer to the "partially correct" scale value, indicating that irrespective of participants' ethnicity and income level, the adolescents in this study did not have a full understanding of why they menstruate.

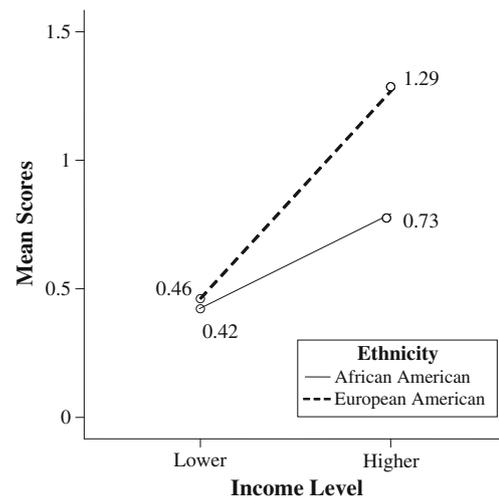


Fig. 1 Interaction of ethnicity and income level on menstrual knowledge scores

Responses to the question of why girls get periods varied greatly, from religiously-based ideas of punishment (e.g., "Girls get periods and cramps because God was mad that Eve made Adam eat the forbidden apple. So we have to pay for their sins."), to more scientific and technical answers (e.g., "When a girl is healthy she starts to have periods to get her body ready to have a baby. When she's not pregnant the egg that wasn't fertilized has to come out. So does the extra body tissue that makes you look bloated. That's the stuff in the blood that comes out."). Regardless of the theme of the answers provided or the level of correctness, the majority of responses (64 %) were negative in tone and included phrases such as "bad," "dirty," and "infected" to describe menstrual blood and tissue. It is interesting to note that 62 (42.8 %) of the adolescents either admitted that they did not know or did not respond at all to this question. Also of note,

Table 3 Means for dependent measures by ethnicity and income level

Group	<i>n</i>	Knowledge ^a <i>M (SD)</i>	Preparation ^b <i>M (SD)</i>	Positive ^c <i>M (SD)</i>	Negative ^d <i>M (SD)</i>	Openness ^e <i>M (SD)</i>
L.I.A.A.	53	.42 (.50)	16.84 (7.00)	22.09 (8.74)	25.30 (13.33)	18.15 (4.47)
H.I.A.A.	33	.73 (.83)	20.23 (7.27)	26.30 (8.97)	30.18 (12.58)	20.33 (5.66)
L.I.E.A.	46	.46 (.76)	18.41 (7.56)	24.26 (9.76)	30.07 (45.42)	18.67 (5.17)
H.I.E.A.	37	1.29 (.62) ^f	27.29 (4.57)*	29.84 (9.66)	33.65 (13.51)	21.87 (5.01)

L.I.A.A. lower income African Americans; H.I.A.A. higher income African Americans; L.I.E.A. lower income European Americans; H.I.E.A. higher income European Americans; Knowledge = menstrual knowledge; Preparation = level of preparation for menarche; Positive = positive feelings about menstruation; Negative = negative feelings about menstruation; Openness = openness toward menstruation

^a Menstrual knowledge scores can range from 0–2.

^b Preparation for menarche scores can range from 7–35.

^c Positive feelings about menstruation scores can range from 8–40.

^d Negative feelings about menstruation can range from 11–55.

^e Openness toward menstruation scores can range from 5–25.

* $p<.05$. H.I.E.A. were significantly more knowledgeable about menstruation and more prepared for menarche than each of the other three groups

is that lower income African American participants were at least twice more likely than any other ethnic and income level group to simply state that they did not know why girls menstruate.

Preparation for Menarche

With regard to preparation for menarche, it was hypothesized that both African American participants and participants from lower income households would report feeling less prepared for menarche than European American participants and participants from higher income households. It was also predicted that African Americans from lower income households would feel less prepared than any other ethnic and income level group combination. Findings were similar to that for menstrual knowledge. The interaction of ethnicity and income level was statistically significant, $F(1, 164)=5.82, p=.017$, as were the two main effects, $F(1, 164)=14.35, p=.000$ for ethnicity and $F(1, 164)=29.02, p=.000$ for income level. Figure 2 illustrates this interaction. Post hoc Bonferroni tests showed that, on average, the higher income European American participants reported feeling more prepared for menarche than the other three groups at the .05 level of significance. All other ethnic and income level group comparisons were not significant.

Menstrual Attitudes

With regard to menstrual attitudes, it was hypothesized that both African American participants and participants from lower income households would report more negative menstrual attitudes (i.e., fewer positive feelings about menstruation, more negative feelings about menstruation, and less openness toward menstruation) than European American participants and participants from higher income households. It

was also predicted that African Americans from lower income households would have more negative menstrual attitudes (i.e., fewer positive feelings about menstruation, more negative feelings about menstruation, and less openness toward menstruation) than any other ethnic and income level group combination.

The interaction for ethnicity and income level was not statistically significant for any of the menstrual attitudes measures, $F(1, 164)=.46, p=.830$ for Positive Feelings, $F(1, 164)=.16, p=.692$ for Negative Feelings, and $F(1, 164)=.15, p=.696$ for Openness Toward Menstruation. The main effect for ethnicity was also not significant, $F(1, 164)=3.78, p=.054$ for Positive Feelings, $F(1, 164)=2.98, p=.086$ for Negative Feelings, and $F(1, 164)=3.87, p=.051$ for Openness Toward Menstruation. With regard to the main effect for income level, there was no difference between groups for Negative Feelings, $F(1, 164)=3.56, p=.052$, however, there was a significant difference between groups for Positive Feelings, $F(1, 164)=9.25, p=.003$, and Openness Toward Menstruation, $F(1, 164)=8.45, p=.004$. Irrespective of ethnicity, higher income participants reported more positive feelings about menstruation and greater openness toward menstruation than lower income participants. While there was a great deal of variability within groups, it should be noted that the means for Positive Feelings were closest to the “neutral” verbal label for lower income participants and between “neutral” and “agree” for higher income participants. For Openness Toward Menarche, both group means were closest to the “agree” verbal label.

Discussion

The main goal of this study was to determine if ethnicity and income level are associated with early adolescents’ reactions to menarche and menstruation in present U.S. culture. Not all hypotheses were fully supported by the current results. The hypothesis which claimed that lower income African American participants would score lower than any other ethnic and income level grouping on measures of menstrual knowledge, preparation for menarche, and menstrual attitudes was not supported. While lower income African American participants were indeed the lowest scoring group on knowledge and preparation further analysis showed that the differences between groups were only statistically significant between higher income European American participants and each of the other ethnic and income level groupings. On average, lower income African Americans, lower income European Americans, and higher income African Americans had scores that indicated a very poor understanding of menstruation and a lack of readiness for menarche. Alternatively, higher income European Americans had mean scores that represented a partial understanding of menstruation and at least some level of preparation for menarche. Nonetheless, irrespective of

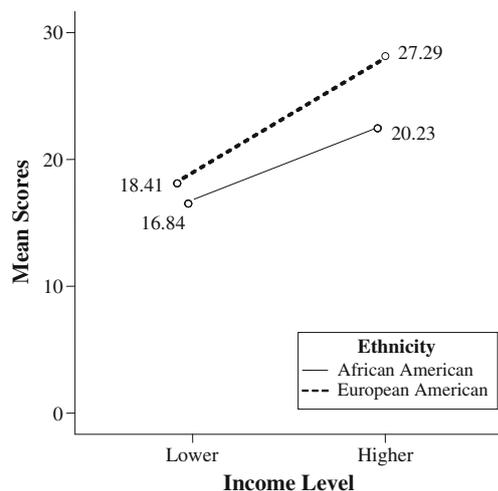


Fig. 2 Interaction of ethnicity and income level on preparation for menarche scores

participants' ethnicity and income level, the girls in this study did not have a comprehensive understanding of why they menstruate nor did they feel prepared for menarche.

These findings suggest that current efforts in place to educate girls about menstruation are deficient, particularly when one considers that these results are similar to those of studies conducted several decades ago (e.g., McKeever 1984; Whisnant et al. 1975). It appears that adequate menstrual information is still not getting across to adolescent girls. Reasons for this are unclear. This may be a function of internalized menstrual taboos, particularly the communication taboo wherein discussion of menstruation is prohibited. This may also be evidence of a cycle wherein girls who are not appropriately educated end up passing misinformation to peers, younger siblings, and in the future, their own daughters. As previous research has identified (e.g., Laws 1990; Rierdan et al. 1986), ignorance in the realm of menstruation and lack of preparation for the event perpetuates myths and misbeliefs. Not understanding menstruation puts girls in a position where their continued ignorance makes them more susceptible to developing feelings of shame about their reproductive functions, negative menstrual attitudes, and low self-esteem. Additionally, girls who are unknowledgeable about menstruation are also more likely to engage in sexual behaviors at an earlier age which can result in exposure to sexually transmitted diseases and unwanted pregnancies.

Given that the girls in this study lacked menstrual knowledge and preparation it would be expected that their feelings about menstruation would be largely negative. However, this was not the case. While lower income African American participants did score the lowest on all three menstrual attitude measures, the differences among the four groups on positive feelings about menstruation, negative feelings about menstruation, and openness toward menstruation were not statistically significant. Furthermore, participants' overall scores for each of the menstrual attitude measures were neutral or ambivalent. An explanation for these ambivalent attitudes may rest in the current cultural environment. Unlike participants from earlier studies, this generation is growing up with the ever present notion of menstrual suppression that is advertised in magazines and television commercials. The idea that they will be able to control and minimize their periods and any associated symptomatology may help negate any negative menstrual attitudes.

Nonetheless, a finding of ambivalent attitudes is curious when one considers that (a) results from the measures of menstrual knowledge and feelings of preparation showed a significant interaction among ethnicity and income level and (b) it has been documented both domestically and internationally that menstrual knowledge and feelings of preparation for menarche are positively correlated with menstrual

attitudes (Brooks-Gunn and Ruble 1982; Brumberg 1997; Houppert 1999; Koff and Rierdan 1995; Tang et al. 2003). There are two reasons why the results in the present study were not aligned with those of previous studies. First, there are few studies that have examined these factors with girls of this current generation who have more access to technology and information via that technology (e.g., the internet). While some of this information may be flawed, there was no evidence to indicate that participants did not feel confident with the information that they do have, however incorrect that information may be. As a result, there is no reason for a lack of accurate menstrual knowledge to have any noteworthy influence on their feelings toward menstruation. Secondly, because menstruation is ever present in movies, television programs, commercials, magazine ads, and internet ads, current adolescents may not feel that the act of menstruating is a big deal (Lee 2009). This may lead to low expectations about preparation. As with the lack of menstrual knowledge, there is then no cause to presume that lack of preparation would substantially impact the perception and outlook these participants have about menstruation.

The hypothesis which postulated that African American participants would score lower than European American participants on measures of menstrual knowledge, preparation for menarche, and menstrual attitudes was partially corroborated. Although African American participants did, on average, have lower scores on all three menstrual attitude measures than European American participants, there was no significant difference between the two groups. However, African American participants were significantly less knowledgeable about menstruation and less prepared for menarche than European American participants. Regardless, the nature of the interaction effect, wherein significant differences were found only when higher income European Americans participants were involved, rendered these findings inconsequential.

The hypothesis which proposed that participants from a lower income level would score lower than participants from a higher income level on measures of menstrual knowledge, preparation for menarche, and menstrual attitudes was fully confirmed with the exception of participants' negative feelings about menstruation. As in the results of the previous hypothesis, the discoveries regarding knowledge and preparation were deemed not meaningful in light of the interaction effects. Furthermore, while the difference between the income levels was significant in the menstrual attitudes measures of positive feelings about menstruation and openness toward menstruation, both means were closest to the "neutral" scoring range. Therefore, caution should be taken when interpreting this finding. Although higher income participants reported more positive feelings about menstruation and were more open toward menstruation than lower income participants, the actual

average scores on the measures and their ambivalent meaning indicate that the difference among the income groups may not be of major importance.

While, overall, participants' lacked accurate menstrual knowledge, felt either unprepared or, at best, only somewhat prepared for menarche, and held ambivalent menstrual attitudes, the findings of this study emphasize that higher income European Americans were notably different from the other ethnic and income level groupings. As many other authors have concluded (e.g., Adler et al. 1993; Bradley and Corwyn 2002; Feinstein 1993; Keating and Hertzman 1999), being European American and coming from a higher income level is a protective factor against maladjustment in development and provides better prospects for education, social opportunities, access to quality health care services, and general well-being. Therefore, it is not surprising that higher income European Americans in the present study fared better than the other ethnic and income level groupings in their reactions to menarche and menstruation. Nonetheless, while higher income European American participants had greater knowledge and preparation than their counterparts, they still did not have a full understanding of menstruation nor did they feel fully prepared for menarche.

There are many benefits to having an accurate understanding and positive outlook on menstruation. For example, when a girl reaches menarche she is likely to experience psychological and emotional turmoil. Establishing a strong knowledge base and a healthy psychological and emotional outlook on menstruation before reaching menarche could help girls develop better feelings about menstruation and alleviate any confusion, fear, and shame while promoting higher levels of self-esteem and overall well-being. Furthermore, as was demonstrated with adult women, having accurate reproductive knowledge and positive menstrual attitudes may be more likely to abstain from sex or at least use contraceptives correctly when they engage in sexual behaviors and reduce their exposure to sexually transmitted diseases and unwanted pregnancies (Morrison et al. 2010).

It is evident that theories regarding girls' understanding of menarche and menstruation need to take various social and cultural factors into account. The ways in which professionals approach the topic of menstruation when dealing with adolescents and their parents should also consider these factors. The results from this study could prove useful for health care providers and educators in improving the ways in which information about menstruation is addressed and disseminated. These results would also be useful in the development of education programs targeted to specific ethnic or income level groups to empower adolescent girls about menstruation and their health.

There are several limitations inherent in the current study that must be considered in the interpretation of results. Two major limitations relate to the appropriate generalizability of

the results. Firstly, income level was solely determined by adolescents' self-report of whether or not they qualify for a free or reduced price lunch. While this measure has been used in previous studies to indicate socioeconomic status, using only this benchmark fails to make distinctions between all the levels of poverty, education, occupational status, and wealth that fall on the continuum of socioeconomic status. Future studies should utilize multiple methods of identifying income level. Doing so would allow for comparisons among those living in extreme poverty, middle-class adolescents, the wealthy, and all other class divisions within. Additionally, the study focused only on African American and European American adolescents. All other ethnicities or combination of ethnicities (i.e., bi-ethnic and multi-ethnic) were excluded from the sample, thus failing to account for those individuals' experiences and viewpoints. Because so many ethnic groups are present in America, it is vital that these populations be considered in future research. It may be of particular interest to focus on individuals who come from bi- and multi-ethnic groups. How they respond to menarche and menstruation may reflect the ethnic group with which they most identify. Broadening the scope of income level and ethnic groups included in studies of adolescents' reactions to menarche and menstruation will also allow for more generalizability of future findings.

Another obvious limitation is that this study utilized only postmenarcheal participants; therefore, some of the responses provided are of a retrospective nature and are, consequently, suspect to potential problems inherent in recall. This study also relied on self-report measures. While this enhances participants' anonymity and privacy, it also fails to allow for clarification of items which some participants may have found confusing. Furthermore, this study was not an experimental design. As a result, only associations and not causal inferences regarding the finding can be made. Additionally, the fact that the vast majority of lower income participants were from the schools while very few were from the churches should also be taken into consideration when interpreting the results. A possible explanation for this disparity is that the school district from where participants were recruited is located in a somewhat less affluent area, whereas the churches are in areas that are more financially comfortable. This occurred because only one of the five school districts and two of the four churches that were approached (all of which represented various levels of affluence and poverty) agreed to allow this research to be presented to their students/youth group members.

Finally, the adolescent girls in this study represent a convenience sample, thus it must be considered that the result are affected by volunteer bias. Because this study dealt with minors who required parental permission to participate, the volunteer bias may be further magnified. A girl had to express a desire to participate and she had to have a

parent that was supportive of that desire and willing to complete a consent form. So the biases of both the participants and her parent have to be considered. However, it should be noted that this is a difficult population to reach, especially given the sensitive nature of the questions asked within the study. Therefore, the findings should not be disregarded simply because of the limitations inherent in this research.

There are several directions in which future research should proceed. In addition to broader sampling of ethnic and economic diversity, it is imperative to determine why girls from certain ethnicities and income levels are less knowledgeable about menstruation and feel less prepared for menarche. Why do accurate menstrual knowledge and menarcheal preparation seem to be missing for this generation of tweens and teens, especially in lower income groups and higher income African Americans? In what ways are menstrual taboos incorporated into their thinking and are certain ethnic and socioeconomic groups more susceptible to these taboos? Identifying factors and vulnerabilities that make some girls more predisposed to feeling a need for silence, secrecy, and physical and behavioral restrictions may lead to ways of preventing those behaviors in the future and effectively addressing the feeling of shame inherent in present day menstrual taboos.

Future studies should also consider using premenarcheal participants from diverse ethnic and socioeconomic backgrounds. This would allow for comparisons between girls awaiting their first periods and those who have already experienced it and the specific issues associated with each group. What's more, identifying problems with which premenarcheal girls from various ethnic groups and social classes struggle provides opportunities to address them before menarche occurs.

From a measurement standpoint, having participants complete both self-report measures and face-to-face interviews could be valuable. While self-report measures completed in private may result in more honest answers there is great potential for participants to skip or ignore certain questions or items. Face-to-face interviews provide the opportunity to ask probing and follow-up questions based on participants' responses, thus providing more detailed answers. Combining those answers with the self-report responses would offer a richer understanding of how adolescents from differing ethnic and socioeconomic backgrounds experience menarche and menstruation.

How a girl understands her menarche and menstruation can have an impact on how she navigates her adolescence and deals with her emerging sexuality. Social and cultural factors also play an important role in girls' understanding of menstruation. Being aware of how those factors specifically influence menstrual knowledge, preparation, and attitudes can help determine how to best help girls cope with the

turmoil of adolescence and contribute in a positive way to their general well-being. Therefore, it is paramount that culture and social location receive further attention and examination in both domestic and international research.

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