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Menstrual Cycle Influences on Alcohol Consumption among Blacks

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Alcohol consumption patterns among 39 Black men, normally cycling women, and women taking oral contraceptives were examined over a 30-day self-monitoring period to determine the influence of the menstrual cycle on drinking behavior. Previous animal and human data suggest premenstrual increases and mid-cycle decreases in alcohol consumption, but contradictory reports of an absence of menstrual cycle effects have emerged more recently. Decreased drinking among women taking oral contraceptives also has been reported. No studies examining Black subject samples could be isolated, and indications of racial differences in metabolic rates suggest that generalizations about Black women from studies using predominantly White subjects may be unjustified. No overall significant differences were found in alcohol consumption patterns or amounts of alcohol consumed for the three groups across the menstrual cycle. The effects of the sex hormones and the possibility of interactions between menstrual cycle symptomatology and drinking patterns are discussed along with implications and recommendations for future research in this area.

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Increasing awareness of the problems associated with excessive alcohol consumption has coincided with years of multidisciplinary research into the factors that precipitate, maintain, and/or exacerbate drinking behavior. The grim statistics on automobile fatalities alone provide testimony to the magnitude of the alcohol problem in the country today (Seixas, 1981). Interestingly, women have been excluded largely from research on alcohol consumption and Black women essentially ignored entirely (Corrigan, 1974). Exclusion of these groups probably results from reports of increased variability in female physiological and behavioral responses to alcohol ingestion (Jones & Jones, 1976a; 1977), with more homogeneous subject samples thus used to minimize sources of error variance. Significant racial differences in alcohol metabolic rates have been reported (Ewing, Rouse, & Pellizzari, 1974; Fenna, Mix, & Schaefer, 1971; Reed, Kalant, Gibbins, Kapur, & Rankin, 1976; Wolff, 1972), thus rendering generalizations about Black metabolic and/or consumption patterns derived from White samples tenuous.

Research efforts directed at menstrual cycle influences generally attempt to answer one of two related questions: (a) Do women achieve higher levels of intoxication, given identical alcohol doses, at different points within their menstrual cycles? (b) Are women's consumption patterns altered by menstrual cycle changes? Logically, estrogen and progesterone level changes are important potential mechanisms for treatment effects that may exist, and women taking oral contraceptives often are included in research designs as a comparison group to be used to determine the importance of underlying hormonal changes that occur during the menstrual cycle. These sex hormone fluctuations are illustrated in Figure 1. Progesterone peaks at day 22, and estrogens peak at both ovulation (around day 14) and at day 22 (approximately 8 days after ovulation). Sex hormone levels are sharply attenuated at the premenstrum, precipitating menstrual flow (day 1). Women taking oral contraceptives have elevated sex hormone levels throughout the cycle with the exception of menstrual flow that is triggered by a temporary cessation of pill usage.

Recognition of potential menstrual cycle influences on alcohol metabolism can be traced to animal studies demonstrating that castration exacerbated the behavioral effects of acute alcohol intoxication (Kask, 1929; Klotz, 1977; Stortebecker, 1939) and subsequent human data suggesting that women achieve higher peak blood alcohol concentrations when they drink premenstrually (Jones & Jones, 1976a; 1976b; 1977).

Of primary interest to the authors of this article are reports of increased alcohol consumption at the premenstrual and menstrual points of the cycle. Rats given free access to alcohol have been found to drink less around estrus (Aschkensay-Lelu, 1960a; 1960b) as well as after oral contraceptive administration (Erikson, 1969) and exogenous estrogen injections (Aschkenasy-Lelu, 1958, 1960a; 1960b; Mardones, 1960; Wallgren & Barry, 1970). Voluntary intake in hamsters (Emerson, Brown, Nash, & Moore, 1952) and human females (Little, Schultz, & Mandrell, 1976; Rosett, 1981) has been reported to be diminished during pregnancy, and Jones and Jones (1976a; 1976b) found that women taking oral contraceptives consumed less alcohol than did their normal cycling counterparts. Such studies taken collectively
A complimentary trend is indicated by reports of premenstrual consumption increases in alcoholic women (Belfer, Shader, Carroll, & Harmatz, 1971; Podalsky, 1973), but more recently, Sutker, Libet, Allain, & Randall (1982) failed to find within-cycle consumption differences among normal cycling and women taking oral contraceptives. Nevertheless, this latter research group did note that normal cycling women did report commonly that they drank premenstrually in an effort to relieve ("self-medicate") negative mood states and physical symptoms associated with the premenstrum. Symptoms of the premenstrual tension syndrome include headaches, backaches, bloatedness, cramps, emotional lability, and many others estimated to effect 40 to 60% of normal cycling women (Angier & Witzleben, 1982).

The reliability and validity of measures of alcohol consumption routinely have been questioned (Summers, 1970), but recent findings suggest that self-reports of alcohol intake among problem drinkers may be far more accurate than generally believed (Maisto, Sobell, Mitch, & Sobell, 1982; Maisto, Sobell, & Sobell, 1982). Voluntary, nonalcoholic subject samples can be used to reduce active deceptive efforts, and researchers often utilize within-group research designs that compare subjects to themselves at various points within their own cycles. Thus, the problem of inaccurate reporting is minimized by such a methodological approach, assuming that subjects are inaccurate consistently in their reporting. The Khavari Alcohol Test (KAT: Khavari & Farber, 1978) has become a popular measure of mean daily alcohol intake, and the authors of the KAT have presented an impressive series of studies that document its general reliability and validity. Therefore, the problem of measurement presents important, though surmountable, methodological limitations to alcohol consumption research.
The effect of the menstrual cycle on alcohol consumption remains unclear. Some evidence suggests tendencies of some women to increase their consumption premenstrually and drink less at midcycle. If such research, along with the earlier conclusions of Jones and Jones (1976b) about alcohol metabolism in women are correct, some women may be consuming more alcohol at the very point within their menstrual cycles when they are least able to metabolize it effectively. The present pilot study examines alcohol consumption in normal cycling and oral contraceptive Black females during the course of their menstrual cycles.

Method

Subjects

Subjects were recruited from three introductory psychology classes at Southern University in New Orleans. A total of 69 students comprised the initial subject pool, but elimination criteria resulted in samples of 13 normal cycling women, 13 women taking oral contraceptives, and 13 men, a total of 39 participants. Subjects were eliminated from the study if they drank excessively or were totally abstinent as measured by the KAT. The national drinking average has been reported to be approximately 0.94 ounces per day (Noble, 1978) and reported mean consumption in the experimental samples was 0.91 ± 1.23, 0.79 ± 0.78, and 1.08 ± 1.39 ounces per day for the normal cycling, oral contraceptive, and male groups, respectively. It should be noted that these values represented how much subjects said they drank (via the KAT) prior to the initiation of study participation. Mean subject ages were 25.5 ± 6.2, 21.0 ± 2.2, and 22.2 ± 3.8 years for the normal cycling, oral contraceptive, and male groups, respectively. The mean menstrual cycle length and flow was approximately 28.1 ± 0.63 and 4.0 ± 0.85 days, respectively. All subjects were Black.

Procedure

Subjects were given extra classroom credit for participation and were not informed of the nature of the independent variables under investigation. All female subjects were administered a consent form, the KAT, the Moos Menstrual Distress Questionnaire (MDQ), and a Health History Questionnaire to determine regularity of menstrual cycles. The MDQ is a reliable (r’s > .85), extensively used measure of menstrual symptomatology. (Moos, 1968; Moos, Kopell, Melges, Yalom, Lunde, Clayton, & Hamberg, 1969). There are eight subscales that measure pain, concentration, behavioral change, autonomic reactions, water retention, negative affect, arousal, and control at the menstrual (days 1–4), premenstrual (days 24–28), and intermenstrual (days 5–22) points within the cycle. Males were given only the consent form and the KAT. All subjects were given alcohol self-monitoring sheets and instructed on necessary recording procedures. Subjects were asked to self-monitor their daily alcohol consumption throughout the course of the semester. Classroom discussions served to maximize compliance and improve recording accuracy.
Independent Variables

Day of the menstrual cycle and group assignment served as the two independent variables examined in the study. The day of the menstrual cycle was divided into five levels. The five A factor cells were comprised of recordings from days 1–5, 7–11, 12–16, 19–23, and 24–28. The second factor was the group assignment, which was comprised of three levels. The B1 level was normal cycling women, the B2 level was oral contraceptive women, and the B3 level was males. Each subject in the male sample was given a random number from 1 to 28 that was used to correspond with the day of the cycle represented in the female samples. Males do not have a menstrual cycle, of course, but this procedure served to compensate for seasonal variations in consumption that may be observed during holiday seasons. If all males began recording their consumption on “day 1,” statistical differences in drinking may have been observed as an artifact to a holiday. If Mardi Gras fell 10 days after the initiation of recording, many subjects may show an elevation on “day 10,” which would suggest cyclical variation in their consumption pattern that actually did not exist.

Dependent measure.

Daily ethanol consumption in ounces served as the dependent measure. This score was calculated using the Khavari guidelines for computing ethanol content from various alcoholic beverages.

Results

Subjects’ mean consumption (as measured by self-monitoring) during the one-month study period was 0.25 ± 0.20, 0.26 ± 0.29, and 0.48 ± 0.41 ounces per day for the normal cycling, oral contraceptive, and male groups, respectively. These values were substantially lower than predicted by the KAT scores, with correlations between KAT scores and actual drinking found to be $r = +0.35$ ($p > .05$) and $r = +0.37$ ($p > .05$) for the normal cycling and oral contraceptive women, respectively. KAT and actual consumption amounts were correlated significantly, however, for the male subjects ($r = +0.61, p < .05$).

Table 1 shows the cell means and standard deviations for alcohol consumption among subjects throughout the menstrual cycle. Figure 2 presents these same results graphically. Significant differences between the three groups in average amount consumed ($F 2, 36 = 2.14, p > .05$) and the interaction ($F 8, 144 = 0.89, p = .05$) were not found, but the within-group comparisons did approach statistical significance ($F 4, 144 = 2.23, p < .10$). Figure 2 shows a tendency for some women to increase alcohol consumption after menstruation was completed (during days 7 through 11). Approximately 61% of the women in both groups increased their mean consumptions at A2 over that of the A1 point of the cycle, whereas only 15% decreased drinking during this same period. The remainder of the women showed no difference in consumption amounts from the A1 to the A2 point within the cycle.
Table 1

*Cell Means and Standard Deviations*

<table>
<thead>
<tr>
<th>GROUP</th>
<th>TIME OF CYCLE</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
<td>A5</td>
</tr>
<tr>
<td>B1: Normal Cycling Women</td>
<td>.14 ± .20</td>
<td>.40 ± .52</td>
<td>.17 ± .27</td>
<td>.17 ± .29</td>
<td>.26 ± .38</td>
</tr>
<tr>
<td>B2: Oral Contraceptive Women</td>
<td>.25 ± .33</td>
<td>.41 ± .34</td>
<td>.30 ± .49</td>
<td>.24 ± .40</td>
<td>.18 ± .40</td>
</tr>
<tr>
<td>B3: Men</td>
<td>.45 ± .39</td>
<td>.60 ± .64</td>
<td>.25 ± .31</td>
<td>.41 ± .50</td>
<td>.70 ± 1.1</td>
</tr>
</tbody>
</table>

Thus, the normal cycling and oral contraceptive groups were similar in both consumption amounts and within-cycle drinking tendencies.

![Figure 2. Gender differences in mean daily alcohol consumption](http://example.com/image.png)

**Legend**
- (B1) normal cycling women
- (B2) oral contraceptive women
- (B3) men

Days of the Menstrual Cycle

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1-5)</td>
<td>(7-11)</td>
<td>(12-16)</td>
<td>(19-23)</td>
<td>(24-28)</td>
</tr>
</tbody>
</table>

Figure 2. Gender differences in mean daily alcohol consumption
Additional analyses were conducted to determine if factors were present that would allow prediction of the tendency to increase consumption after menstrual flow was completed. Correlations between KAT scores and difference scores between consumption at the A1 and A2 points of the cycle failed to reach statistical significance for both normal cycling ($r = +0.32, p > .05$) and oral contraceptive ($r = -0.16, p > .05$) women. Thus, the heavier drinkers, as measured by the KAT, were no more likely than the lighter drinkers to increase their drinking after menstruation was complete. Problems with the KAT validity for the female drinkers does weaken this conclusion. Age was found unrelated to the consumption changes as well, with correlations of $r = +0.28 (p > .05)$ and $r = -0.08 (p > .05)$ found for the normal cycling and oral contraceptive groups, respectively.

Of more interest were correlations between increased post menstruation drinking and menstrual distress symptom changes. Some tenuous evidence emerged suggesting that for some subjects A1—A2 drinking differentials were associated with significant symptom relief (as measured by the MDQ) after menstruation was completed. The small sample sizes examined, however, prompt understatement of the significance of these data. Virtually all correlations between symptom relief and consumption changes were in the predicted direction (greater symptom relief -> increased drinking), but no strong tendencies of this nature or drinking pattern differences between the two female groups were isolated.

**Discussion**

The present findings refute earlier animal and human data that suggest premenstrual consumption increases among women and instead support the reported absence by Sutter et al. (1982) of within-cycle differences for normal cycling and oral contraceptive groups. Similarly, Jones and Jones (1976b) finding of group differences in the mean daily ethanol consumed during the menstrual cycle were not found. Some tenuous evidence was generated supporting the suggestions of Sutker et al. that alcohol consumption may be associated with premenstrual symptomatology, but at a different point within the cycle. The present data suggest that some women may increase their drinking post menstruation with this tendency enhanced by perceptions of menstrual cycle symptom relief. Thus, it would be predicted that women failing to perceive that menstruation was a significant stressor would show no predictable menstrual cycle pattern in alcohol consumption. The absence of differences between normal cycling women and those taking oral contraceptives suggests that such effects may be related only indirectly to underlying hormonal changes observed during the cycle.

The notion that premenstrual drinking may serve as a “self-medicating” tactic can be reexamined perhaps in light of the present findings. Approximately 60% of women in the present study increased their consumption after rather than before symptom relief had occurred. It is logical to speculate that for some women completion of menstruation may precipitate more relaxed, less inhibited behavior.
This possibility could be referred to as a "relief" as opposed to a "self-medication" hypothesis.

An important related finding involved the ineffectiveness of the KAT in predicting mean daily ethanol consumption in female subjects. Interestingly, the KAT scores were predictive of consumption in male subjects. Khavari and Farber (1978) surprisingly neglected to specify the gender composition for the sample pool used in the development of this instrument. Thus usage of the KAT to predict future drinking behavior in women may be suspect.

Further examination is needed to assess the relationship between menstrual cycle symptomatology and within-cycle alcohol consumption fluctuations. Overall differences probably are not present, but interactions between symptomatology and drinking behavior are suggested by the data from this study and related findings. Large samples of subjects may be necessary to isolate significant effects. It is interesting to note that deviations in the present findings and previous studies may have resulted from racial differences in the subject samples. Future researchers may consider examining both White and Black samples within the same research design. In addition, samples could be examined from the general public rather than the college students used in the present study. The representativeness of the subjects examined in this study could be questioned if generalizations to the general public are attempted. Finally, reliance on single psychometric instruments such as the KAT or the MDQ perhaps should be avoided. Additional measures of drinking behavior and menstrual cycle symptomatology may be used to compensate for inadequacies in these popular instruments.

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MENSTRUAL FACTORS


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