

Tea and Premenstrual Syndrome in the People's Republic of China

ANNETTE MACKEY ROSSIGNOL, ScD, JIANYI ZHANG, MD, YONGZHOU CHEN, MD, AND ZHENG XIANG, MD

Abstract: We evaluated the hypothesis that tea consumption causes premenstrual syndrome by studying 188 nursing students and tea factory workers in the People's Republic of China via questionnaires distributed in classes (nursing students) or during routine physical examinations (tea factory workers). Analysis of the data revealed that tea consumption is strongly related to the prevalence of premenstrual syndrome and that the effects are dose-dependent. (*Am J Public Health* 1989; 79:67-69.)

Introduction

The causes of premenstrual syndrome are unknown.¹⁻³ Putative causes include a hormonal imbalance—particularly a deficit of progesterone,⁴ dietary deficiencies,⁵⁻⁸ a diet rich in highly refined sugar products and/or high fat foods, alcohol use, tobacco use, lack of exercise, oral contraceptive use,⁹ and consumption of caffeine-containing beverages.¹⁰

This study was undertaken to assess the relation between consumption of one type of caffeine-containing beverage (tea) and the prevalence of premenstrual syndrome. To prevent confounding by other (putative) causes of premenstrual syndrome, the study was conducted in a population in which the prevalence of these other causes, including consumption of other caffeine-containing beverages, was expected to be low or zero.

Methods

Study Populations

The study was conducted at three sites in the People's Republic of China: 1) a medical university in Shanghai that trains public health nurses; 2) a nursing school in rural, southern China; and 3) a tea factory in rural, southern China. We expected that the consumption of tea would be less frequent among the nursing students than among the tea factory workers.

The study subjects consisted of all female third and fourth year public health nursing students at the medical university in Shanghai, all female students in one class at the nursing school in rural southern China, and all female workers in the tea factory. The average age of the nursing students was 22.3 years (range, 15 to 33 years), and 24.8 years (range, 17 to 35 years) for the tea factory workers. Participation was 100 per cent for each population.

Data Collection and Analysis

A questionnaire was handed out in class to nursing students at each of the two schools. The questionnaire, although translated into Chinese, was identical in pertinent ways to the questionnaire developed by Rossignol,¹⁰ and

solicited information about the presence and severity of premenstrual and menstrual symptoms, demographic characteristics, health-related characteristics (for example, alcohol and tobacco use), use of over-the-counter drugs containing caffeine, and consumption of caffeine-containing beverages. The questionnaires were completed in class and returned.

Data from the tea factory workers were collected during a routine physical examination of each worker. The examinations were performed by female physicians who, during the course of the examination, asked the worker the questions about the presence of menstrual and premenstrual symptoms and about health-related habits including caffeine use. Upon completion of the examination, the physician completed a questionnaire for each worker. The questionnaire was identical to those completed by the nursing students except that the questions related to specific symptoms of premenstrual syndrome were omitted.

We estimated the premenstrual syndrome prevalence odds ratio for two levels of average daily consumption of tea: one-half to four drinks, and four-and-one-half to eight drinks. Area of residence (nursing students, tea factory workers) was controlled by stratifying the data into the two categories of residence and obtaining an estimate for a uniform prevalence odds ratio by the method of maximum likelihood. Heterogeneity of the prevalence odds ratio according to residence was evaluated by the likelihood ratio test proposed by Miettinen, as described by Rothman and Boice.¹¹ Confidence limits for the prevalence odds ratio were based on Miettinen's test-based procedure,^{12,13} using the programs of Rothman and Boice.¹¹

The level of severity for premenstrual syndrome was determined by each participant in response to a question asking her to assess the overall severity of her symptoms.

Results

Thirty-nine per cent of the nursing students and 77 per cent of the factory workers reported experiencing premenstrual syndrome. Overall, 74 per cent of these women rated their symptoms as mild, 24 per cent as moderate, and 3 per cent as severe. These proportions were similar in each study group. Among the nursing students, the most common symptoms were breast swelling and tenderness, tiredness, and anxiety, affecting 51, 49, and 34 per cent of women with symptoms, respectively.

Tea was the only reported source of caffeine in both study populations.

Table 1 shows the prevalence of premenstrual syndrome and of putative causes and preventives of premenstrual syndrome by study group. The prevalence of each of the putative causes/preventives, except for tea consumption, was either zero or over 90 per cent for each population. For this reason, any observed association between tea consumption and premenstrual syndrome can not be attributable to confounding by any of these factors. Table 2 shows the prevalence odds ratios of premenstrual syndrome according to average daily tea consumption by residence, and controlling for residence in a high or low tea-consuming region (study group). The prevalence odds ratio for 4.5 to 8 drinks

Address reprint requests to Annette MacKay Rossignol, ScD, Associate Professor, Department of Health, Oregon State University, Corvallis, OR 97331-6406. Dr. Zhang is Director, Laboratory of Radiation Health, Shanghai Institute of Radiation Medicine; Dr. Chen is Director, Anqi County Anti-epidemic Station, Fujian Province; Dr. Xiang is with Shanghai Medical University. This paper, submitted to the *Journal* February 22, 1988, was revised and accepted for publication June 29, 1988.

TABLE 1—Putative Causes/Preventives of Premenstrual Syndrome for the Study Subjects According to Residence in a High or Low Tea-consuming Region

	Population		
	Low Tea-consuming Region—Nursing Students (124 subjects)	High Tea-consuming Region—Tea Factory Workers (64 Subjects)	Both Populations (188 Subjects)
	%	%	%
Prevalence of Premenstrual Syndrome	39	77	52
Cause/Preventive			
Any Tea Consumption	10	92	38
Caffeine Intake from Cola or Coffee or Over-the-counter drugs	0	0	0
Alcohol Use	0	0	0
Cigarette Use	0	0	0
Daily Exercise (Bike Riding)	over 90	over 90	over 90
Oral Contraceptive Use	0	0	0
Vitamin Supplement Use	0	0	0
Diet	Vegetables, Rice, Pork, No Beef, Few Refined Sugar Products	Vegetables, Rice, Pork, No Beef, Few Refined Sugar Products	Vegetables, Rice, Pork, No Beef, Few Refined Sugar Products

TABLE 2—Prevalence Odds Ratios of Premenstrual Syndrome According to Average Daily Tea Consumption by Residence

Residence (= Study Group)	Average Daily Tea Consumption (Number of Drinks)	Prevalence Odds Ratio of Premenstrual Syndrome (90% Confidence Interval)
Low Tea Consuming (= Nursing Students)	0	1.0
	0.5 to 4	1.4 (0.5, 4.0)
	4.5 to 8	∞ (-)
	0.5 to 8	1.7 (0.6, 4.5)
High Tea Consuming (= Tea Factory Workers)	0	1.0
	0.5 to 4	4.5 (0.9, 21.7)
	4.5 to 8	8.6 (1.7, 42.9)
	0.5 to 8	5.9 (1.4, 25.3)
Both Residences	0	1.0**
	0.5 to 4	2.0 (0.8, 4.7)
	4.5 to 8	9.7 (2.1, 44.5)
	0.5 to 8	2.4 (1.0, 5.6)

**Prevalence odds ratios were estimated controlling for residence in a high or low tea-consuming region (= study group). The $p_{(2)}$ values associated with the likelihood ratio tests evaluating heterogeneity of the prevalence odds ratios by residence were 0.29, 0.58, and 0.19 for 0.5 to 4, 4.5 to 8 and 0.5 to 8 drinks of tea per day, respectively. The crude prevalence odds ratios were 3.4 for 0.5 to 4 drinks of tea per day, and 10.0 for 4.5 to 8 drinks of tea per day.

of tea per day were considerably higher than the prevalence odds ratio for 0.5 to 4 drinks per day, consistent with a dose-response relation between tea consumption and premenstrual syndrome.

Discussion

We found a strong association between tea consumption and the prevalence of premenstrual syndrome, particularly for women who consume 4.5 to 8 drinks of tea per day. The effects were similar to the effects reported in a previous study¹⁰ that evaluated the relation between consumption of all caffeine-containing beverages (cola plus coffee plus tea) and the prevalence of premenstrual syndrome. In this previous study, 49 per cent of the caffeine-containing beverages were drinks of cola, 32 per cent were coffee, and only 19 per cent were tea.

In the present study, consumption of tea, especially for the low consumer, typically occurred non-uniformly throughout the week, with pots of tea shared with friends once or twice per week rather than daily. Tea exposure, therefore, varied considerably from day to day, with no exposure on many days and substantially higher exposure (3 to 4 cups of tea) on other days even among low consumers. It is unknown how this pattern of tea consumption may have affected the study findings.

Several factors might account for the observed relation between tea consumption and premenstrual syndrome, including a causal role for total daily fluid consumption (which might be related to average daily tea consumption) or differences in the reproductive histories of the study participants according to the level of tea consumption. None of the commonly suspected, modifiable causes/preventives of pre-

menstrual syndrome, except tea consumption (Table 1), however, is a possible explanation for the study results because none of these other factors varied in frequency according to tea consumption or the presence of premenstrual syndrome. A possible mechanism involving cyclic nucleotides for a causal relation between tea and premenstrual syndrome is provided by Minton.^{14,15}

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Differences in the Timeliness of Diagnosis, Breast and Cervical Cancer, San Francisco 1974-85

L. DUNCAN SAUNDERS, MB, BCH, PhD

Abstract: Cancer registry data for San Francisco (1974-85) were used to identify women at greater risk of late diagnoses for breast and cervical cancers by age and ethnicity. For breast cancer, Black women were at greater risk for late diagnoses. For cervical cancer, women of all ethnic groups ages 50-69 years and Japanese and Filipino women were at greater risk for late diagnoses. (*Am J Public Health* 1989; 79:69-70.)

Introduction

Survival rates for women with early diagnosis of breast and cervical cancer are considerably better than for those with late diagnosis.¹ There is also substantial evidence that mortality from breast cancer for women over age 50 years can be reduced with a combination of regular breast examination and mammography.²⁻⁴ For women ages 20-70 years there is good evidence, although no randomized controlled trials have been done, that cervical cancer mortality can be reduced by regular cervical pap smears.⁵⁻⁷

Despite this, the utilization of screening tests is low. A 1983 national survey found that only 45 per cent and 14 per cent of women ages 50-70 years had had annual physical examinations and mammograms, respectively. Among women ages 20-39, 79 per cent had had pap smears every three years, compared to only 57 per cent of women ages 40-70 years.⁸

Address reprint requests to Dr. L. Duncan Saunders, Chief, Non-infectious Disease Epidemiology, Bureau of Communicable Disease Control, San Francisco Department of Public Health, 101 Grove Street, San Francisco, CA 94102. This paper, submitted to the *Journal* May 10, 1988, was revised and accepted for publication September 21, 1988.

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Methods

The study uses data collected on San Francisco women diagnosed with breast cancer (ICD-0 1976 Code 174) or cervical cancer (ICD-0 1976 Code 180) between 1974 and 1985 by the San Francisco-Oakland SMSA cancer registry, which identifies approximately 98 per cent of incident cases of cancer occurring in five San Francisco Bay Area counties.⁹ The purpose of this analysis was to examine differences in the timeliness of diagnosis of female breast and cervical cancer in different age and ethnic groups.

Based on the ability of screening programs to detect high percentages of breast cancers without nodal involvement,⁴ breast cancers were classified as early (in situ and localized stages) or late (regional or remote stages). As regular pap smears can detect a high percentage of cervical cancers before these became invasive,⁵ cervical cancers were classified as early (in situ) or late (localized, regional or remote).

Distribution of the timeliness of diagnosis (early and late) by age group (<30, 30-39, 40-49, 50-59, 60-69 years) for these cancer types were calculated for White non-Hispanic, White Hispanic (primarily Mexican American), Black, Chinese, Japanese and Filipino women for the years 1974-85. The upper age limit of 70 years was chosen to follow the National Cancer Institute recommendations of screening for these cancers under the age of 70 years.¹⁰

Chi square tests for trend were used to examine the association between late diagnosis of breast and cervical cancer with age. To examine ethnic differences in late diagnoses for these cancers odds ratios (with 95% confidence intervals) were calculated for each of the other ethnic groups using White non-Hispanic women as the reference group.

Results

Breast Cancer

We found that 1,568 (43.5 per cent) of the 3,608 breast