Frequency of Mastalgia Among Women Veterans

Association with Psychiatric Conditions and Unexplained Pain Syndromes

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OBJECTIVE: To determine the prevalence and frequency of mastalgia and its association with psychiatric conditions and unexplained pain syndromes.

DESIGN, SETTING, AND PARTICIPANTS: Cross-sectional mailed survey completed by 1,219 female veterans enrolled at the VA Puget Sound Health Care System in 1998.

MEASUREMENTS: Breast pain in the past year, unrelated to pregnancy, was categorized as infrequent ($\leq$ monthly) or frequent ($\geq$ weekly) mastalgia. Surveys assessed posttraumatic stress disorder (PTSD), depression, panic disorder, and alcohol misuse with validated screening tests, as well as self-reported past-year chronic pelvic pain, fibromyalgia, and irritable bowel syndrome.

RESULTS: The response rate was 63%. Fifty-five percent of the respondents reported past-year mastalgia. Of these, 15% reported frequent mastalgia. Compared to women without mastalgia, women reporting frequent mastalgia were more likely to screen positive for PTSD (odds ratio [OR] 5.2, 95% confidence interval [CI] 3.2 to 8.4), major depression (OR 4.2, 2.6 to 6.9), panic disorder (OR 7.1, 3.9 to 12.8), eating disorder (OR 2.6, 1.5 to 4.7), alcohol misuse (OR 1.8, 1.1 to 2.8), or domestic violence (OR 3.1, 1.9 to 5.0), and to report fibromyalgia (OR 3.9, 2.1 to 7.4), chronic pelvic pain (OR 5.4, 2.7 to 10.5), or irritable bowel syndrome (OR 2.8, 1.6 to 4.8). Women with infrequent mastalgia were also more likely than women without mastalgia to screen positive for PTSD, depression, or panic disorder, or report pelvic pain or irritable bowel syndrome, although associations were weaker than with frequent mastalgia.

CONCLUSIONS: Like other unexplained pain syndromes, frequent mastalgia is strongly associated with PTSD and other psychiatric conditions. Clinicians seeing patients with frequent mastalgia should inquire about anxiety, depression, alcohol misuse, and trauma history.

KEY WORDS: mastalgia; breast pain; mastodynia; women veterans; unexplained pain syndromes.

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Breast pain, also called mastalgia, is common and varies markedly in severity and clinical significance. Among women, the reported prevalence of mastalgia ranges from 41% to 79%,^{1–5} and the most common type is associated with menstruation.³ This “cyclic” type of mastalgia typically occurs monthly before the beginning of the menstrual period, is of mild severity, and is relieved within 7 days of the onset of menses.^{4,6–8} In a population-based survey, Ader et al.⁴ found that 68% of women aged 18 to 44 experienced cyclic breast symptoms, though the majority of these rated their symptoms as mild.

A smaller proportion of women experience more frequent or severe mastalgia that is often noncyclic, interferes with daily activities, and may prompt women to seek treatment. Little is known about the cause of frequent (noncyclic) mastalgia or its impact on women’s lives. The underlying physiology may be different for noncyclic versus cyclic breast pain, and noncyclic breast pain appears less likely to respond to hormonal therapies.^{6,9–12}

Studies have demonstrated an association between mastalgia, particularly treatment-resistant mastalgia, and psychological symptoms such as depression,^{13–15} anxiety,^{13–15} and somatization.^{14,15} Mastalgia has also been associated with high stress levels,⁴ but an association with alcohol misuse, which is common among female veterans and associated with psycho-social and health problems,^{16,17} has not been explored. Although studies have shown an association between mastalgia and somatization or history of emotional abuse,¹⁵ none have explored whether frequent mastalgia may be associated with other medically unexplained pain syndromes such as fibromyalgia, chronic pelvic pain, and irritable bowel syndrome, which are common among women and associated with psychiatric conditions or distress.^{18–22}

Posttraumatic stress disorder (PTSD) is common among women veterans and has been associated with somatization in women treated at a VA primary care clinic.²³ We hypothesized that, like somatization, frequent mastalgia may also be associated with psychiatric conditions among women veterans and may cluster with unexplained pain syndromes.

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The purpose of this study was to determine the prevalence and severity of both frequent and infrequent mastalgia in a relatively large clinical population of women veterans. We also evaluated the associations between the presence and frequency of mastalgia with psychiatric conditions (depression, PTSD, panic disorder, eating disorder, alcohol misuse), history of domestic violence, and 3 unexplained pain syndromes (fibromyalgia, chronic pelvic pain, and irritable bowel syndrome).

METHODS

Study Population

All data used in this study came from a mailed Women's Health Survey,^{16,17} which was sent in 1998 to all female veterans living in the Puget Sound area and receiving care at the VA Puget Sound Health Care System between October 1996 and January 1998. Women were excluded if they reported that they were too ill or disabled to participate ($n=29$). The University of Washington Human Subjects Committee approved the study.

Of the 1,935 eligible female veterans, 1,219 (63%) responded and answered the questions regarding mastalgia. Analysis of demographic characteristics using a VA administrative database¹⁷ revealed that respondents were older (mean age 47.4 vs 45.0 years, $P=.001$), more likely to be white (72% vs 66%, $P=.01$) and more likely to report ever being married (81% vs 77%, $P=.03$) than nonrespondents. No significant differences were observed with regard to period of military service or the extent of service-connected disability.

Measures

Mastalgia. At the time this study was conducted, there were no validated mastalgia questionnaires published. We therefore developed the following 3 questions to assess the frequency, severity and functional impact of past-year mastalgia:

1. How often in the last year have you had breast pain or tenderness that was not related to a pregnancy? Never, Less than monthly, Monthly, Weekly, Daily or almost daily.
2. How would you rate your usual level of breast pain? Mild, Moderate, Severe.
3. Over the past 4 weeks, how much has your breast pain or tenderness interfered with your life? Not at all, A little bit, Moderately, Quite a bit, Extremely.

We categorized women into 3 groups based on the frequency of their breast pain in the past-year: "Never," "Infrequent" (monthly or less often), and "Frequent" (weekly or more often). The other questions were used to create dichotomous measures of severity (mild vs moderate-severe breast pain) and self-reported functional impairment because of mastalgia (whether breast pain interfered with women's lives not at all or a little bit vs moderately-extremely).

Psychiatric Conditions, Domestic Violence, and Alcohol Misuse. The Women's Health Survey included several mental health screening tests. The 17-item PTSD Checklist-Civilian-Version (PCL-C) identified women screening positive for PTSD using the optimal cut point (≥ 38) validated in this population.²⁴ The Patient Health Questionnaire (PHQ), validated by Spitzer and colleagues for use in a self-administered format,²⁵

was used to screen for major depression, panic disorder, and an eating disorder. A previously published question about a history of domestic violence was also included²⁶: "At any time, has a partner ever hit, kicked, or otherwise physically hurt you?" (Yes/No).

A question about the frequency of drinking 4 or more drinks on 1 occasion, based on the Alcohol Use Disorders Identification Test (AUDIT), has been validated as a brief screening test for alcohol misuse among women veterans.^{17,27} Women consuming 4 or more drinks on at least 1 occasion in the past year were considered to screen positive for alcohol misuse.

Unexplained Pain Syndromes. We asked women to indicate whether they had ever experienced fibromyalgia, irritable bowel syndrome, or chronic pelvic pain, and if so, whether they had experienced each pain syndrome in the past year.

Menopausal Status. Respondents were categorized as menopausal if they were at least 55 years old, or if they reported hysterectomy and bilateral oophorectomy. Women were considered premenopausal if they were younger than 35 years, or were ages 35 to 54 years and reported regular periods and were not taking hormone replacement therapy (HRT). All others respondents were classified as "menopausal status unknown."

Postmenopausal women who reported that they had taken "estrogen hormone replacement (Premarin, Prempro, Estrace or other estrogen pills) for at least 6 months" in the past year were considered to have taken HRT.

Other Measures. Demographic characteristics and self-reported height and weight were assessed. Body mass index was calculated as weight (kg)/height² (meters). Participants who reported smoking cigarettes in the past year were classified as current smokers. Women were considered to have a significant family history of breast cancer if they responded "yes" to the question: "Have any of your parents, brothers, sisters, or your children had breast cancer before age 50?"

Statistical Analysis

Initial descriptive analyses compared women reporting no mastalgia, mastalgia monthly or less (infrequent), and mastalgia weekly or more (frequent). Chi-square tests were used to assess associations of mastalgia with categorical variables. Logistic regression models adjusting for age, race/ethnicity, and marital status were used to further evaluate the association between mastalgia and each characteristic hypothesized to be associated with breast pain using a separate model for each variable (Table 3).

RESULTS

Patient Characteristics

Of 1,935 eligible female veterans who received the mailed survey, 1,219 (63%) responded and answered the questions regarding mastalgia. Respondents' ages ranged from 22 to 94 years, with a mean age of 47 years. The women were predominantly white, married or previously married, and college educated (Table 1). Four hundred and two women (33%) were postmenopausal, and approximately half of these (53%) reported that they had used HRT in the past year (Table 1). Other clinical and behavioral characteristics of the study population

Table 1. Characteristics of the Study Population (n=1,219)

	N	(%)
Age (y)		
<35	272	(22)
35 to 44	371	(30)
45 to 54	286	(24)
≥ 55	290	(24)
Race/ethnicity		
White	888	(76)
Black	157	(13)
Other	127	(11)
Education		
≤ 12th grade	152	(13)
Attended some college	612	(50)
Graduated from college	437	(36)
Marital status		
Never married	196	(16)
Married or partnered	504	(41)
Divorced or separated	390	(32)
Widowed or other	129	(11)
Menopausal status		
Premenopausal	498	(41)
Postmenopausal*	402	(33)
Unknown	319	(26)
Smoking (past year)	358	(30)
Obesity (BMI > 30)	408	(34)
Breast cancer		
Personal history	29	(2)
Significant family history†	136	(11)
Alcohol misuse (current)‡	301	(25)
Psychiatric conditions (current)		
PTSD§	391	(33)
Major depression	239	(20)
Panic disorder	158	(13)
Eating disorder	129	(11)
Domestic violence (ever)	433	(39)
Unexplained pain syndromes (past year)		
Chronic pelvic pain	95	(8)
Fibromyalgia	101	(9)
Irritable bowel syndrome	185	(16)

*Among postmenopausal women, 213 (53%) reported using hormone replacement therapy in the past year.

†Defined as history of breast cancer in a first degree relative before age 50 (in this table and Table 2).

‡Alcohol Use Disorders Identification Test (AUDIT).

§Posttraumatic Stress Disorder Checklist (PCL).

|| Patient Health Questionnaire (PHQ).

PTSD, post traumatic stress disorder.

hypothesized to be associated with mastalgia are presented in Table 1.

Prevalence of Mastalgia

Fifty-five percent of women reported that they had experienced breast pain in the past year. Of these, 85% (45% of the study sample) indicated that the pain occurred monthly or less (infrequently), and 15% (9% of the study sample) reported the pain occurred weekly or more (frequently).

Severity and Functional Impairment

The usual level of breast pain was rated as moderate or severe by one third of the women with infrequent mastalgia and by two thirds of the women with frequent mastalgia (Table 2). When asked how much the breast pain had interfered with their lives in the past 4 weeks, 7% of the women with infrequent mastalgia responded “moderately to extremely” while

Table 2. Severity of Mastalgia and Associations of Variables with Mastalgia Frequency

	N (%)				P-Value
	No Mastalgia (N=547)	Infrequent* Mastalgia (N=568)	Frequent* Mastalgia (N=104)		
Age (y)					<.001
<35	96 (18)	156 (28)	20 (19)		
35 to 44	132 (24)	206 (36)	33 (32)		
45 to 54	114 (21)	142 (25)	30 (29)		
≥ 55	205 (38)	64 (11)	21 (20)		
Race/ethnicity					.003
White	418 (76)	390 (69)	80 (77)		
Black	54 (10)	96 (17)	7 (7)		
Other	54 (10)	63 (11)	10 (10)		
Education					.098
≤ 12th grade	81 (15)	59 (11)	12 (12)		
Attended some college	258 (48)	295 (53)	59 (58)		
Graduated from college	200 (37)	206 (37)	31 (30)		
Marital status					.001
Never married	83 (15)	96 (17)	17 (16)		
Married or partnered	202 (37)	258 (45)	44 (42)		
Divorced or separated	182 (33)	174 (31)	34 (33)		
Widowed or other	89 (15)	40 (7)	9 (9)		
Menopausal status					<.001
Premenopausal	168 (31)	301 (53)	29 (28)		
Postmenopausal	250 (46)	112 (20)	40 (39)		
Unknown	129 (24)	155 (27)	35 (34)		
HRT use (past year)†	120 (48)	68 (61)	25 (64)		.026
Smoking (past year)	153 (28)	163 (29)	42 (41)		.044
Obesity (BMI > 30)	165 (30)	196 (35)	47 (45)		.005
Breast cancer					
Personal history	17 (3)	7 (1)	5 (5)		.025
Significant family history	54 (10)	63 (11)	19 (18)		.041
Alcohol misuse (current)‡	112 (21)	154 (27)	35 (34)		.003
Psychiatric conditions (current)					
PTSD§	112 (21)	221 (40)	58 (59)		<.001
Major depression	64 (12)	135 (24)	40 (39)		<.001
Panic disorder	27 (5)	102 (18)	29 (28)		<.001
Eating disorder	42 (8)	67 (12)	20 (19)		<.001
Domestic violence (ever)	164 (33)	213 (41)	56 (60)		<.001
Unexplained pain syndromes (past year)					
Chronic pelvic pain	24 (5)	52 (10)	19 (20)		<.001
Fibromyalgia	32 (6)	49 (9)	20 (21)		<.001
Irritable bowel syndrome	59 (11)	100 (18)	26 (26)		<.001
Severity of mastalgia					
Moderate-to-severe	—	194 (34)	65 (63)		<.001
Interferes with life moderately-to-extremely*	—	39 (7)	37 (36)		<.001

*Infrequent, monthly or less; Frequent, weekly or more.

†Hormone replacement therapy use among post-menopausal women only.

‡Alcohol Use Disorders Identification Test (AUDIT).

§Posttraumatic Stress Disorder Checklist (PCL).

|| Patient Health Questionnaire (PHQ).

*In the past 4 weeks, how much has your breast pain or tenderness interfered with your life?

HRT, hormone replacement therapy; PTSD, post traumatic stress disorder.

36% of women with frequent breast pain responded “moderately to extremely” (Table 2).

Age and Other Demographic Factors

Women with frequent mastalgia were predominantly in the middle 2 age groups (age 35–55), and women with infrequent mastalgia were generally under age 45 (Table 2). Black women were less likely to report frequent mastalgia than white women (4% and 9%, respectively), and more likely to report infrequent mastalgia (61% and 44%, respectively). Married women were more likely to report infrequent mastalgia than other women (51% and 43%, respectively).

Association of Mastalgia with Psychiatric Conditions or Unexplained Pain Syndromes

Mastalgia was strongly associated with screening positive for psychiatric conditions, alcohol misuse, unexplained pain syndromes, and history of domestic violence (Table 2). The prevalence of each of these conditions was highest among women with frequent mastalgia, lowest among women without mastalgia, and intermediate among women with infrequent mastalgia.

Frequent Mastalgia. After adjustment for demographics (age, race/ethnicity, and marital status), PTSD, major depression, panic disorder, eating disorder, alcohol misuse, fibromyalgia, chronic pelvic pain, irritable bowel syndrome, and history of domestic violence each remained strongly associated with frequent mastalgia (Table 3). Smoking, obesity, and significant family history of breast cancer each had a weaker, but significant, association with frequent mastalgia.

Infrequent Mastalgia. After adjustment for age, race/ethnicity, and marital status, the significant association between infrequent mastalgia and PTSD, major depression, panic disorder, chronic pelvic pain, and irritable bowel syndrome persisted, although the associations were weaker than for frequent mastalgia (Table 3).

DISCUSSION

To our knowledge, this is the largest study of mastalgia in a clinical sample of women. Over half of the women in the present study reported mastalgia in the past year. The majority of these women reported symptoms monthly or less often, but a notable minority (15%) reported frequent mastalgia (weekly or more). Women with frequent mastalgia reported more severe pain, and over a third reported that their breast pain interfered moderately or extremely with their lives. Frequent mastalgia was strongly associated with screening positive for psychiatric conditions, alcohol misuse, domestic violence, and unexplained pain syndromes.

The 55% prevalence of past-year mastalgia in the present study is lower than the 68% prevalence reported in a population-based study of 874 women aged 18–44 years reported by Ader et al.⁴ despite the fact that the previous study included only cyclic breast pain. The lower prevalence in the present study likely reflects the inclusion of older women (the age range was 22–94 years with mean age 47 years) who are less likely to report mastalgia. As might be expected, frequent mastalgia impacted the daily lives of women in our study more than infrequent mastalgia did. Compared to women with in-

Table 3. Associations Between Mastalgia and Patient Characteristics, Adjusted for Age, Race/Ethnicity, and Marital Status

	Infrequent Mastalgia vs No Mastalgia		Frequent Mastalgia vs No Mastalgia	
	OR	95% CI	OR	95% CI
Smoking (past year)	0.9	(0.7 to 1.2)	1.6	(1.1 to 2.6)
Obesity (BMI > 30)	1.1	(1.0 to 1.3)	1.4	(1.1 to 1.8)
Breast cancer				
Personal history	0.8	(0.3 to 2.0)	2.1	(0.7 to 6.2)
Significant family history	1.3	(0.8 to 1.9)	2.3	(1.3 to 4.1)
Alcohol misuse (current)*	1.1	(0.8 to 1.5)	1.8	(1.1 to 2.8)
Psychiatric conditions (current)				
PTSD†	2.1	(1.6 to 2.8)	5.2	(3.2 to 8.4)
Major depression‡	2.1	(1.5 to 2.9)	4.2	(2.6 to 6.9)
Panic disorder‡	4.0	(2.5 to 6.3)	7.1	(3.9 to 12.8)
Eating disorder‡	1.6	(1.0 to 2.4)	2.6	(1.5 to 4.7)
Domestic violence (ever)	1.4	(1.0 to 1.8)	3.1	(1.9 to 5.0)
Unexplained pain syndromes (past year)				
Chronic pelvic pain	1.8	(1.1 to 3.0)	5.4	(2.7 to 10.5)
Fibromyalgia	1.6	(1.0 to 2.6)	3.9	(2.1 to 7.4)
Irritable bowel syndrome	1.9	(1.3 to 2.7)	2.8	(1.6 to 4.8)

* Alcohol Use Disorders Identification Test (AUDIT).

† Posttraumatic Stress Disorder Checklist (PCL).

‡ Patient Health Questionnaire (PHQ).

PTSD, post traumatic stress disorder; CI, confidence interval.

frequent mastalgia, women with frequent mastalgia were twice as likely to rate their pain as “moderate” or “severe” and 5 times more likely to report that their breast pain had interfered with their lives moderately to extremely in the past month (Table 2).

This study of women enrolled for care in the VA is the first to evaluate the association of psychologic symptoms and noncyclic breast pain in a general clinical sample of women. Previous studies of psychologic symptoms and noncyclic mastalgia have included women seeking care in specialty breast clinics or with treatment refractory breast pain. In 1978, Preece et al.¹³ compared a subgroup of breast clinic patients with mastalgia who did not respond to treatment ($n=14$; 4%) with those who did respond and found higher scores for anxiety and depression in the treatment-resistant group. In 1993, Jenkins et al. evaluated a group of 25 breast clinic patients with severe, treatment-resistant mastalgia. Using Composite International Diagnostic Interview criteria, 21 (84%) of these women met criteria for a psychiatric diagnosis: 17 had current anxiety, 5 had panic disorder, 16 had major depression, and 7 had somatization disorder.¹⁴ Based on their findings, Jenkins recommended psychiatric evaluation and a trial of antidepressants for women who do not respond to standard pharmacologic treatment of mastalgia. Colgrave et al.¹⁵ compared psychologic characteristics of 89 women presenting to a breast clinic for mastalgia to 31 presenting for evaluation of a breast lump. They found that, in addition to anxiety, depression, and somatization symptoms, a history of emotional abuse was associated with mastalgia. Our study suggests that psychologic symptoms are also strongly associated with frequent mastalgia in women not seeking specialty care for breast pain.

This study has several limitations. First, the study sample was composed of women who receive care through the VA. These patients may have different rates of psychologic distress than other populations,^{23,28} and the prevalence of frequent mastalgia in this population may differ in non-VA populations. Second, as the respondents were somewhat older than nonrespondents (47.4 vs 45.0 years), we may have underestimated the prevalence of mastalgia in female VA patients. Moreover, because this was a cross-sectional study, it can only evaluate associations between breast pain and other characteristics and cannot address causality. It is possible that depression or anxiety alters patients' awareness or interpretation of bodily sensations and painful stimuli, causing patients to develop pain syndromes. Whatever lifetime experiences or traumas lead to PTSD could also lead to somatization, and frequent mastalgia may be a type of somatization. Alternatively, unexplained pain syndromes could lead to depression and anxiety. It is also possible that the relationship between psychiatric conditions and pain is multidirectional. For instance, the association with alcohol misuse could reflect self-medication of pain with alcohol. Alcohol use can increase estrogen levels in premenopausal women and in postmenopausal women on HRT²⁹; these higher estrogen levels could, theoretically, increase mastalgia. This study also did not collect data on certain factors associated with breast pain such as ductal ectasia, previous breast surgery, or medications, other than HRT. Despite the internal validity of responses to the 3 mastalgia questions, our measure of mastalgia has not been further validated. Shortly after our study was completed, Khan and Apkarian³⁰ published standardized mastalgia questions, some of which were adapted from the McGill Pain Questionnaire, and include a visual analog scale, a present pain index, and 4 quality-of-life indicators. Khan's detailed instrument appears well-suited for epidemiologic studies. It includes some brief, mastalgia-specific questions, which are similar to those we developed (severity of pain, frequency) and, if validated, may be useful screening questions in a clinical setting, as well. Finally, our measures of fibromyalgia, chronic pelvic pain, and irritable bowel syndrome included only self-report of having these syndromes, and did not measure of the severity of women's symptoms.

Despite these limitations, this study adds to the literature on mastalgia in several important ways. The present study confirmed the association between mastalgia and depression or panic disorder, which had been previously described only in women seeking treatment in breast clinics. In addition, this study identified associations between mastalgia and eating disorders and history of domestic violence, which have not previously been described. This study also identified an association between mastalgia and alcohol misuse, which is common but under-recognized among women veterans, and is associated with health problems related to cirrhosis, injuries, and risky sexual behavior.¹⁷ The association between frequent mastalgia and fibromyalgia, chronic pelvic pain, and irritable bowel syndrome have also not been previously explored. The present study also adds to the literature by demonstrating an association between mastalgia and a specific form of anxiety disorder that is common among women veterans: PTSD. Moreover, in contrast to most other studies of mastalgia, we included patients with both cyclic and noncyclic breast pain.

Our findings suggests that in a general clinical population there may be 2 types of breast pain, and assessing the fre-

quency of breast pain may help distinguish these groups. Infrequent mastalgia appears to be milder and quite common, whereas mastalgia that occurs weekly or more often (presumably noncyclic) is less common, but more significant to those affected. Frequent mastalgia is strongly associated with fibromyalgia, chronic pelvic pain, and irritable bowel syndrome. The pathophysiology of these unexplained pain syndromes is not well defined, but they are associated with exposure to traumatic life experiences, which are reported commonly by veteran women.²⁴ A multidisciplinary approach to treatment of these unexplained pain syndromes has been advocated, and medications or cognitive behavioral therapy targeting psychiatric symptoms have also shown some efficacy.^{19,21,22} Future studies among veteran women should determine whether period of military duty, or specific exposures during service, impact prevalence and frequency of mastalgia. Further studies among veteran and nonveteran women should investigate whether mastalgia is associated with lifetime trauma other than domestic violence, particularly sexual trauma. Because of the probable multidirectional association between psychiatric conditions and mastalgia, studies are needed to determine whether medications or behavioral therapy to treat psychiatric symptoms are effective in improving mastalgia symptoms, and whether medications or other modalities to treat mastalgia can decrease depression or alcohol intake.

In summary, women experiencing mastalgia that occurs weekly or more—9% of this VA population—have a high prevalence of psychiatric symptoms and co-morbid unexplained pain syndromes. Report of mastalgia monthly or less often, in contrast, is only weakly associated with psychiatric symptoms. Because no large study has previously included patients with both types of breast pain, the differences between these groups may have been overlooked. Furthermore, asking whether breast pain occurs weekly or more often may be an efficient way to distinguish noncyclic mastalgia from the more common cyclic mastalgia and to determine who might benefit from psychologic interventions. Based on results of this study, clinicians treating women veterans with frequent mastalgia should consider the possibility of unrecognized psychiatric comorbidity, alcohol misuse, and history of trauma.

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REFERENCES

- Boyle CA, Berkowitz GS, Kelsey JL. Epidemiology of premenstrual symptoms. *Am J Public Health.* 1987;77:349-50.
- Leinster SJ, Whitehouse GH, Walsh PV. Cyclical mastalgia: clinical and mammographic observations in a screened population. *Br J Surg.* 1987;74:220-2.
- Deschamps M, Band PR, Coldman AJ. Clinical determinants of mammographic dysplasia patterns. *Cancer Detect Prev.* 1996;20:610-9.

4. **Ader DN, South-Paul J, Adera T, Deuster PA.** Cyclical mastalgia: prevalence and associated health and behavioral factors. *J Psychosom Obstet Gynaecol.* 2001;22:71–6.
5. **Ader DN, Browne MW.** Prevalence and impact of cyclic mastalgia in a United States clinic-based sample. *Am J Obstet Gynecol.* 1997;177:126–32.
6. **BeLieu RM.** Mastodynia. *Obstet Gynecol Clin North Am.* 1994;21:461–77.
7. **Gateley CA, Mansel RE.** Management of cyclical breast pain. *Br J Hosp Med.* 1990;43:330–2.
8. **Ader DN, Shriver CD.** Cyclical mastalgia: prevalence and impact in an outpatient breast clinic sample. *J Am Coll Surg.* 1997;185:466–70.
9. **Gateley CA, Maddox PR, Mansel RE, Hughes LE.** Letter: Mastalgia refractory to drug treatment. *Br J Surg.* 1990;77:1110–2.
10. **Davies EL, Gateley CA, Miers M, Mansel RE.** The long-term course of mastalgia. *J Roy Soc Med.* 1998;91:462–4.
11. **Gateley CA, Miers M, Mansel RE, Hughes LE.** Drug treatments for mastalgia: 17 years experience in the Cardiff mastalgia clinic. *J Roy Soc Med.* 1992;85:12–5.
12. **Smith RL, Pruthi S, Fitzpatrick LA.** Evaluation and management of breast pain. *Mayo Clin Proc.* 2004;79:353–72.
13. **Preece PE, Mansel RE, Hughes LE.** Mastalgia: psychoneurosis or organic disease? *Br Med J.* 1978;1:29–30.
14. **Jenkins PL, Januil N, Gateley C, Mansel RE.** Psychiatric illness in patients with severe treatment-resistant mastalgia. *Gen Hosp Psychiatry.* 1993;15:55–7.
15. **Colegrave S, Holcombe C, Salmon P.** Psychological characteristics of women presenting with breast pain. *J Psychosom Res.* 2001;50:303–7.
16. **Davis TM, Bush KR, Kivlahan DR, Dobie DJ, Bradley KA.** Screening for substance abuse and psychiatric disorders among women patients in a VA health care system. *Psychiatr Serv.* 2003;54:214–8.
17. **Bradley KA, Bush KR, Davis TM, et al.** Binge drinking among female Veterans Affairs patients: prevalence and associated risks. *Psychol Addict Behav.* 2001;15:297–305.
18. **Warnock JK, Clayton AH.** Chronic episodic disorders in women. *Psychiatr Clin North Am.* 2003;26:725–40.
19. **Leventhal LJ.** Management of fibromyalgia. *Ann Intern Med.* 1999;131:850–8.
20. **Bennett RM.** The rational management of fibromyalgia patients. *Rheum Dis Clin North Am.* 2002;28:181–99, v.
21. **ACOG Practice Bulletin No 51.** Chronic pelvic pain. *Obstet Gynecol.* 2004;103:589–605.
22. **Mertz HR.** Irritable bowel syndrome. *N Engl J Med.* 2003;349:2136–46.
23. **Escalona R, Achilles G, Waitzkin H, Yager J.** PTSD and somatization in women treated at a VA primary care clinic. *Psychosomatics.* 2004;45:291–6.
24. **Dobie DJ, Kivlahan DR, Maynard C, et al.** Screening for post-traumatic stress disorder in female Veteran's Affairs patients: validation of the PTSD checklist. *Gen Hosp Psychiatry.* 2002;24:367–74.
25. **Spitzer RL, Kroenke K, Williams JB.** Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. *Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire.* *JAMA.* 1999;282:1737–44.
26. **Freund KM, Bak SM, Blackhall L.** Identifying domestic violence in primary care practice. *J Gen Intern Med.* 1996;11:44–6.
27. **Bradley KA, Bush KR, Epler AJ, et al.** Two brief alcohol-screening tests from the Alcohol Use Disorders Identification Test (AUDIT): validation in a female Veterans Affairs patient population. *Arch Intern Med.* 2003;163:821–9.
28. **Dobie DJ, Kivlahan DR, Maynard C, Bush KR, Davis TM, Bradley KA.** Posttraumatic stress disorder in female veterans: association with self-reported health problems and functional impairment. *Arch Intern Med.* 2004;164:394–400.
29. **Ginsburg ES, Mello NK, Mendelson JH, et al.** Effects of alcohol ingestion on estrogens in postmenopausal women. *JAMA.* 1996;276:1747–51.
30. **Khan SA, Apkarian AV.** The characteristics of cyclical and non-cyclical mastalgia: a prospective study using a modified McGill Pain Questionnaire. *Breast Cancer Res Treat.* 2002;75:147–57.

Voices of Women Veterans (continued)

PRIDE IN SERVING

“Very positive—even though as a WAVE, I was stationed in the middle of the country—except that we were relieving the men for active duty and not exactly welcomed. I don’t think about it too much – it was a long time ago. I’m somewhat grimly amused that every patriotic day we are told that WWII vets are dying at a rate of 1,000-1,100 per day!”

“I took great pride in my uniform and in fact serving my country. I felt very patriotic. I felt like a minority due to (the) men population far outmeasuring women. Sometimes this felt overwhelming. Military experience improved my self-image and confidence. I learned a skill useful in civilian life.”

“It was stressful, yet civilians looked at me (while in uniform) and told me how proud they are to see women serve. Being a veteran helped me become more mature. I learned a trade and various customs. I think about it all the time, with smiles. It is a chance for young kids to travel. The first time around, I was told I was not eligible for benefits.”