

# A Comparative Study of Complementary and Alternative Medicine Use Among Heterosexually and Lesbian Identified Women: Data from the ESTHER Project (Pittsburgh, PA, 2003–2006)

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## Abstract

**Objectives:** The prevalence of complementary and alternative medicine (CAM) use among women in the United States is high. Little is known about how CAM use may differ based on sexual orientation. Study aims were to measure the prevalence of CAM use in a community sample of women, explore differences in CAM use patterns by sexual orientation, and identify correlates of CAM use.

**Design/subjects:** Analyses were based on women (Total  $N = 879$ ;  $n = 479$  lesbians) enrolled in the Epidemiologic Study of HEalth Risk in Women (ESTHER) Project, a cross-sectional heart-disease risk-factor study.

**Settings/location:** Data were collected through convenience sampling of adult females in Pittsburgh, PA (2003–2006).

**Outcome measures:** Main outcome measures included lifetime and past 12-month CAM use, and types of CAM modalities used in the past 12 months.

**Results:** The prevalence of having ever used CAM was 49.8%, with 42% having reported CAM use within the past 12 months. Lesbians had greater odds of having ever used CAM (adjusted odds ratio [AOR] = 1.68 [95% confidence interval (CI): 1.23, 2.28]) and of having used CAM in the past 12 months (AOR = 1.44 [CI: 1.06, 1.97]) than heterosexuals. In multivariate analyses, correlates of lifetime and past 12-month CAM use included being lesbian, white, higher educated, and a large-city resident; experiencing perceived discrimination in a health care setting; and having a greater spirituality rating and a history of a diagnosed mental health disorder. Past 12-month CAM use was also associated with having a provider of usual health care. Among women who used CAM within the past 12 months, heterosexuals had significantly higher yoga participation rates than lesbians.

**Conclusions:** Sexual orientation is important in understanding lifetime and past 12-month CAM use. Because of the high prevalence of CAM use found in this study, medical practitioners should inquire about the CAM practices of female patients, particularly lesbians.

## Introduction

COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) refers to a variety of health practices considered to be outside the traditional domain of conventional Western medicine.<sup>1</sup> Since the 1990s, rates of CAM use among Americans have increased steadily to the present rate of 38%.<sup>1–3</sup> In 2007, it was estimated that Americans spent \$33.9 billion on out-of-pocket CAM-related therapies, products, and

classes.<sup>4</sup> The extant research suggests that CAM use is associated with individual attempts to improve general health,<sup>5</sup> treat specific health conditions such as back pain<sup>6</sup> and migraines,<sup>7</sup> and complement conventional medical treatment of life-threatening illnesses such as cancer<sup>8–9</sup> and human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS).<sup>10–11</sup>

In the United States, common types of CAM therapies include natural products, mind–body medicine, manipulative

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and body-based practices, movement therapies, and whole medical systems.<sup>1</sup> A myriad of factors have been shown to influence CAM usage, including demographic characteristics, such as age, gender, and race/ethnicity. Researchers find that CAM use may increase with age and that women tend to use CAM more frequently than men.<sup>12</sup> Current statistics suggest that women between ages 30 and 69 are the primary consumers of CAM.<sup>2,5,12-14</sup> Results from the 2007 National Health Interview Survey (NHIS) indicate that, among adults, native Americans or indigenous Alaskan people (50.3%) and whites (43.1%) reported higher rates of CAM use than Asians (39.9%) or African-Americans (25.5%).<sup>12</sup> Among U.S. women who use CAM, reasons for using CAM may differ by race/ethnicity. A study by Chao et al. showed that, when asked what influenced their decision to use CAM, non-Hispanic white women noted personal beliefs, Mexican-American women cited the high cost of conventional medicine, and African-American women reported having read or heard something about CAM on the radio or television.<sup>15</sup>

Sexual orientation may also play a role in CAM use among women. The two published studies exploring the relationship between sexual orientation and CAM use suggest that sexual orientation may influence overall prevalence rates and motivation of CAM use.<sup>11,16</sup> London et al. assessed past 6 month use of alternative therapists by sexual orientation among individuals with HIV/AIDS, and found that a combined sample of gay and lesbian patients had greater odds of having used CAM therapists than heterosexual patients (adjusted odds ratio [AOR] = 1.95; 95% confidence interval [CI] = 1.25, 3.05).<sup>11</sup> The data from this study are consistent with the extant literature suggesting higher rates of CAM use among medical populations and also indicate that sexual orientation may influence CAM use. However, it is unclear how these findings generalize to nonclinical samples and how use patterns may differ between gay men and lesbians. In a second study, Matthews and colleagues examined the relationship between sexual orientation and CAM use among a community sample of women. Information about rates and types of CAM modalities used was collected as part of a larger survey of lesbian and heterosexual women's health. Overall, 82% of the sample reported any lifetime CAM use. Even after controlling for age, education, race, and health status, lesbians were significantly more likely to have used CAM therapies, compared to their heterosexual counterparts ( $p = 0.039$ ).<sup>16</sup> This study made an important contribution to the literature by demonstrating an association between sexual orientation and CAM use among a nonclinical sample of women. However, this study was limited to a narrow definition of CAM use.

Preliminary evidence suggests that CAM use may differ based on sexual orientation. A potential explanation for these findings is that lesbians may face barriers to accessing culturally competent and appropriate health care services. These barriers may include lower rates of health insurance coverage,<sup>17</sup> lower average income levels, and higher rates of actual or perceived discrimination in health care settings.<sup>16,18</sup> Lesbians may also have a higher prevalence of health-related conditions that have been associated with increased CAM use, such as depression and anxiety.<sup>19</sup> In addition, research is needed to gain a better understanding of rates and correlates of CAM use among community samples of women and to identify how these factors may differ based on sexual orientation.

### *Specific aims*

The overall objective of the current study was to estimate the prevalence and correlates of CAM use among a large community-based sample of women enrolled in a women's health research study, the ESTHER (Epidemiologic Study of HEalth Risk in Women) Project. Specific aims were to: (1) determine the prevalence of CAM use (lifetime, past 12-month, and past 12-month use of specific CAM modalities); (2) determine if the prevalence of CAM use differed between lesbian and heterosexual women; and (3) identify correlates of lifetime and past 12-month CAM use. To address these specific aims, secondary data analyses were performed on data collected as part of the ESTHER Project. Study findings have important implications for understanding how sexual minority status may affect CAM use among nonclinical samples of women.

### **Materials and Methods**

#### *Study design and data collection*

The sample population for this analysis was selected from 1084 participants ( $n = 503$  lesbians) enrolled in the ESTHER Project at the University of Pittsburgh (Pittsburgh, PA) between 2003 and 2006. The purpose of the ESTHER Project was to conduct a cross-sectional study that examined differences in heart-disease risk factors among women in the Pittsburgh, PA area. The main results of the ESTHER Project are currently in preparation for publication. Although efforts were made to recruit a diverse sample of women, the convenience sampling method applied resulted in unequal proportions of selected subgroups of women. Data reduction was conducted systematically to adjust for factors known to be significantly associated with health status, specifically age and race, leaving a sample for analysis that allowed for comparisons by the primary aim of the study, namely sexual orientation. To address the highly skewed distribution of older heterosexuals compared to older lesbians only individuals who were <65 years old were included for analysis, resulting in 1008 participants. Women who did not identify as African-American or white were excluded ( $n = 29$ ) from analysis, given the insufficient power to predict differences among other racial groups. To address the disproportionate low rate of accrual among African-American lesbians ( $n = 38$ ), African-American heterosexuals were then randomly selected ( $n = 32$ ) in the same proportion as African-American lesbians who were recruited into the study. The data sample of 879 remained for analysis and included 38 African-American lesbians, 441 white lesbians, 32 African-American heterosexuals, and 368 white heterosexuals. The study population for our CAM analysis was based on 879 ( $n = 479$  lesbian) women who participated in the ESTHER Project. Because of missing values the sample size for lifetime used CAM was  $n = 878$  (Table 1) and CAM use within the past 12 months was  $n = 877$  (Table 2).

#### **Recruitment**

Questions of sampling and generalizability are known methodological limitations when working with hidden communities, such as lesbian women.<sup>20-22</sup> Obtaining a probability sample of lesbian, gay, bisexual, and transgender (LGBT) persons is difficult and costly. As such, much LGBT

TABLE 1. DEMOGRAPHIC AND HEALTH CHARACTERISTICS AND UNADJUSTED ODDS RATIOS OF LIFETIME HISTORY OF COMPLEMENTARY AND ALTERNATIVE MEDICINE USE AMONG LESBIAN AND HETEROSEXUAL WOMEN ENROLLED IN THE ESTHER PROJECT, PITTSBURGH, PA, 2003–2006

Variable	Lifetime CAM use (ever used CAM) (N = 878)		OR (95% CI)	p
	No (n, %)	Yes (n, %)		
Sexual orientation (n = 878)				<0.0001
Heterosexual	237 (59.3)	163 (40.8)	Reference	
Lesbian	204 (42.7)	274 (57.3)	1.95 (1.49, 2.56)	
Age (n = 878)				0.034
35–39	69 (54.8)	57 (45.2)	Reference	
40–44	118 (57.8)	86 (42.2)	0.88 (0.56, 1.38)	
45–49	103 (47.8)	113 (52.3)	1.33 (0.86, 2.06)	
50–54	66 (42.3)	90 (57.7)	1.65 (1.03, 2.65)	
55–64	85 (48.3)	91 (51.7)	1.30 (0.82, 2.05)	
Race (n = 878)				<0.0001
White	389 (48.1)	419 (51.9)	Reference	
African American	52 (74.3)	18 (25.7)	0.32 (0.19, 0.56)	
Education (N = 878)				<0.0001
High school or less	73 (78.5)	20 (21.5)	Reference	
Some college	124 (58.5)	88 (41.5)	2.59 (1.47, 4.56)	
Bachelors	100 (46.1)	117 (53.9)	4.27 (2.43, 7.49)	
Graduate	144 (40.5)	212 (59.6)	5.37 (3.14, 9.20)	
Household income (n = 862)				0.11
<\$25,000	67 (54.0)	57 (46.0)	Reference	
\$25,000–\$39,999	71 (48.6)	75 (51.4)	1.24 (0.77, 2.01)	
\$40,000–\$59,999	105 (55.0)	86 (45.0)	0.96 (0.61, 1.52)	
\$60,000–\$74,999	44 (39.6)	67 (60.4)	1.79 (1.07, 3.01)	
\$75,000+	143 (49.3)	147 (50.7)	1.21 (0.79, 1.84)	
Self-reported health status (n = 878)				0.944
Excellent	245 (50.3)	242 (49.7)	Reference	
Good	150 (49.7)	152 (50.3)	1.03 (0.77, 1.37)	
Poor	46 (51.7)	43 (48.3)	0.95 (0.60, 1.49)	
Last routine doctor's visit (n = 878)				0.464
<1 Year ago	332 (51.5)	313 (48.5)	Reference	
>1–2 Years ago	62 (46.3)	72 (53.7)	1.23 (0.85, 1.79)	
>2 Years or don't know	47 (47.5)	52 (52.5)	1.17 (0.77, 1.79)	
Have provider of usual care (n = 877)				0.001
No	99 (61.9)	61 (38.1)	Reference	
Yes	341 (47.6)	376 (52.4)	1.79 (1.26, 2.54)	
Perceived discriminated in a health care establishment (n = 878)				<0.0001
No	405 (53.6)	350 (46.4)	Reference	
Yes	36 (29.3)	87 (70.7)	2.80 (1.85, 4.23)	
Health insurance coverage (n = 876)				0.656
Uninsured	36 (52.9)	32 (47.1)	Reference	
Insured	405 (50.1)	403 (49.9)	1.12 (0.68, 1.84)	
Residence (n = 878)				<0.0001
Large city	297 (41.7)	201 (58.3)	Reference	
Not large city	144 (55.7)	236 (44.3)	0.57 (0.43, 0.75)	
Spirituality (n = 823)				<0.001
Somewhat/not at all	176 (54.3)	148 (45.7)	Reference	
Spiritual	154 (52.0)	142 (48.0)	1.10 (0.80, 1.50)	
Very spiritual	76 (37.4)	127 (62.6)	1.99 (1.39, 2.84)	
Diagnosed with:				
Heart-related condition (n = 875)				0.24
No	240 (52.2)	220 (47.8)	Reference	
Yes	200 (48.2)	215 (51.8)	1.17 (0.90, 1.53)	
Cancer (N = 863)				0.829
No	339 (49.8)	402 (50.2)	Reference	
Yes	30 (48.4)	32 (51.6)	1.06 (0.63, 1.78)	
Autoimmune disorder (n = 876)				0.057
No	278 (52.9)	248 (47.2)	Reference	
Yes	162 (46.3)	188 (53.7)	1.30 (0.99, 1.71)	

(continued)

TABLE 1. (CONTINUED)

Variable	Lifetime CAM use (ever used CAM) (N = 878)		OR (95% CI)	p
	No (n, %)	Yes (n, %)		
Respiratory disorder (n = 875)				0.017
No	373 (52.0)	345 (48.1)	Reference	
Yes	65 (41.4)	92 (58.6)	1.53 (1.08, 2.17)	
Mental health–related condition (n = 876)				<0.0001
No	270 (57.5)	220 (42.6)	Reference	
Yes	170 (41.9)	236 (58.1)	1.87 (1.43, 2.45)	
HIV/AIDS (n = 876)				0.381
No	434 (50.2)	431 (49.8)	Reference	
Yes	7 (63.6)	4 (36.4)	0.58 (0.17, 1.98)	
Ulcers (n = 875)				0.016
No	421 (51.1)	403 (48.9)	Reference	
Yes	17 (33.3)	34 (66.7)	2.09 (1.15, 3.80)	

ESTHER, Epidemiologic Study of Health Risk in Women; CI, confidence interval; OR, odds ratio.

research has been conducted with volunteer and convenience samples.<sup>23</sup> Participants for the current study were recruited, using a variety of methods shown to increase recruitment of hard-to-reach populations: news and radio advertisements; health events; lesbian, gay, bisexual and transgender (LGBT) events and socials; and the University of Pittsburgh broadcast phone-message system. Participants were eligible to participate in the ESTHER Project if they were at  $\geq 35$ , identified as a lesbian or heterosexual woman, and had no previous history of heart disease (angina, heart attack, and/or stroke). All instruments and the study protocol were approved by the institutional review board at the University of Pittsburgh. Signed written consent was obtained from each participant.

#### Data collection

Trained research staff members conducted recruitment/screening calls and scheduled individuals who met eligibility criteria for two clinic visits as part of study participation. The first visit was conducted at Magee Womens Hospital (Pittsburgh, PA), where a series of questionnaires, a physical activity interview, a 2-week medication history interview, and fasting blood draws were completed. The second visit included a review of completed 3-day food diaries and a dual-energy X-ray absorptiometry (DEXA) scan of the hip, spine, and whole body. All information used in this analysis was obtained from the recruitment call forms and interviewer-administered (paper/pencil) questionnaires completed at the first clinic visit.

#### Measures: Dependent variables

History of CAM use was defined by self-reported use of lifetime and past 12-month history of alternative health services. Lifetime CAM use was measured by the following question: "Have you ever sought help from any type of alternative health services, such as traditional healing, acupuncture, massage, or herbal therapies? (Exclude clergy and chiropractors)." Past 12-month CAM use was measured by the following question: "Have you sought help from any type of alternative health services in the last 12 months?" If participants answered "yes," they were asked to select which of the following were used in the last 12 months: acupuncture; aromatherapy; biofeedback;

herbal medicine; homeopathy; hypnosis; massage; meditation; reiki, relaxation techniques; Therapeutic Touch; yoga or other.

#### Measures: Independent variables

All independent variables for analysis were selected based on previous reported research and included demographic, health-related, and psychosocial variables.<sup>5,8,11,16,24–27</sup>

**Demographics.** Sexual orientation, age, and race were obtained from screening/recruitment forms. Other demographic factors including years of education, total household income, health insurance coverage, and primary residence (large city or not large city) were taken from the questionnaires completed at the first clinic visit.

**Sexual orientation.** There is no accepted gold standard to assess sexual orientation; however, sexual orientation is generally understood as a person's predisposition toward sexual attraction to persons of the same sex, opposite sex, or both sexes.<sup>28</sup> Similar to other studies of lesbian health,<sup>16,29–30</sup> the measure of sexual orientation used for the current study was based on sexual attraction, identity, and behavior. Heterosexuals were defined as those who self-identified as heterosexual or straight *and* only had male sexual partners since the age of 18. Lesbians were defined as women who did not identify as heterosexual or straight; *and* had emotional, physical, and romantic attractions within the past 5 years toward only or primarily women *or* whose relationships within the past 5 years had been with only or primarily women.

**Discrimination in a health care setting.** Participants were asked in the form of three questions whether they had ever experienced discrimination while getting medical care. The three domains queried included race, gender, and sexual orientation. For analysis, these questions were categorized into one dichotomous variable that assessed overall perceived discrimination in a health care setting (0 = no perceived discrimination versus 1 = any perceived discrimination).

**Spirituality.** Individuals were asked to rate their level of spirituality on a 5-point Likert scale from 1 (not spiritual at

TABLE 2. DEMOGRAPHIC AND HEALTH CHARACTERISTICS AND UNADJUSTED ODDS RATIOS OF COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) USE IN THE PAST 12 MONTHS AMONG LESBIAN AND HETEROSEXUAL WOMEN ENROLLED IN THE ESTHER PROJECT, PITTSBURGH, PA, 2003–2006

Variable	CAM use in past 12 months (N = 877)		OR (95% CI)	p
	No (n, %)	Yes (n, %)		
Sexual orientation (n = 877)				<0.001
Heterosexual	255 (63.8)	145 (36.3)	Reference	
Lesbian	250 (52.4)	227 (47.6)	1.60 (1.22, 2.10)	
Age (n = 877)				0.479
35–39	76 (60.3)	50 (39.7)	Reference	
40–44	123 (60.6)	80 (39.4)	0.99 (0.63, 1.56)	
45–49	127 (58.8)	89 (41.2)	1.07 (0.68, 1.67)	
50–54	87 (55.77)	69 (44.2)	1.21 (0.75, 1.94)	
55–64	92 (52.3)	84 (47.7)	1.38 (0.87, 2.21)	
Race (n = 877)				<0.0001
Caucasian	444 (55.0)	363 (45.0)	Reference	
African American	61 (87.1)	9 (12.9)	0.18 (0.09, 0.37)	
Education (n = 877)				<0.0001
High school or less	77 (82.8)	16 (17.2)	Reference	
Some college	145 (68.4)	67 (31.6)	2.22 (1.21, 4.10)	
Bachelors	115 (53.0)	102 (47.0)	4.27 (2.34, 7.78)	
Graduate	168 (47.3)	187 (52.7)	5.36 (3.01, 9.54)	
Household income (n = 861)				0.313
<\$25,000	76 (61.3)	48 (38.7)	Reference	
\$25,000–\$39,999	78 (53.4)	68 (46.6)	1.38 (0.85, 2.24)	
\$40,000–\$59,999	116 (60.7)	75 (39.3)	1.02 (0.64, 1.63)	
\$60,000–\$74,999	56 (50.5)	55 (49.6)	1.56 (0.93, 2.61)	
\$75,000+	167 (57.8)	122 (42.2)	1.16 (0.75, 1.78)	
Self-reported health status (n = 877)				0.720
Excellent	274 (56.4)	212 (43.6)	Reference	
Good	178 (58.9)	124 (41.1)	0.90 (0.67, 1.21)	
Poor	53 (59.6)	36 (40.5)	0.88 (0.55, 1.39)	
Last routine doctor's visit (n = 877)				0.423
≤1 Year ago	367 (57.0)	277 (43.0)	Reference	
>1–2 Years ago	75 (56.0)	59 (44.0)	1.04 (0.72, 1.52)	
>2 Years or don't know	63 (63.6)	36 (36.4)	0.76 (0.49, 1.17)	
Have provider of usual care (n = 876)				<0.001
No	112 (22.2)	47 (29.6)	Reference	
Yes	392 (54.7)	325 (45.3)	1.98 (1.36, 2.86)	
Perceived discriminated in a health care establishment (n = 877)				0.003
No	450 (59.6)	305 (40.4)	Reference	
Yes	55 (45.1)	67 (54.9)	1.80 (1.22, 2.64)	
Health insurance coverage (n = 875)				0.338
Uninsured	43 (63.2)	25 (36.8)	Reference	
Insured	462 (57.3)	345 (42.8)	1.28 (0.77, 2.14)	
Residence (n = 877)				<0.0001
Large city	169 (49.1)	175 (50.9)	Reference	
Not large city	336 (63.0)	197 (37.0)	0.57 (0.43, 0.75)	
Spirituality (n = 823)				<0.0001
Somewhat/not at all	207 (63.9)	117 (36.1)	Reference	
Spiritual	172 (58.1)	124 (41.9)	1.28 (0.92, 1.76)	
Very spiritual	86 (42.4)	117 (57.6)	2.41 (1.68, 3.45)	
Diagnosed with:				
Heart-related condition (n = 874)				0.204
No	274 (59.6)	186 (40.4)	Reference	
Yes	229 (55.3)	185 (44.7)	1.19 (0.91, 1.56)	
Cancer (n = 862)				0.525
No	459 (57.4)	341 (42.6)	Reference	
Yes	33 (53.2)	29 (46.8)	1.18 (0.71, 1.99)	

(continued)

TABLE 2. (CONTINUED)

Variable	CAM use in past 12 months (N = 877)		OR (95% CI)	p
	No (n, %)	Yes (n, %)		
Autoimmune disorder (n = 875)				0.079
No	315 (60.0)	210 (40.0)	Reference	
Yes	189 (54.0)	161 (46.0)	1.28 (0.97, 1.68)	
Respiratory disorder (n = 874)				0.572
No	415 (57.9)	302 (42.1)	Reference	
Yes	87 (55.4)	70 (44.6)	1.11 (0.78, 1.57)	
Mental-health-related condition (n = 875)				<0.001
No	297 (63.2)	173 (36.8)	Reference	
Yes	207 (51.1)	198 (48.9)	1.64 (1.25, 2.15)	
HIV/AIDS (n = 875)				0.320
No	497 (57.5)	367 (41.9)	Reference	
Yes	8 (72.7)	3 (27.3)	0.51 (0.13, 1.93)	
Ulcers (n = 875)				0.034
No	481 (58.4)	342 (41.6)	Reference	
Yes	22 (43.1)	29 (56.9)	1.85 (1.05, 3.28)	

ESTHER, Epidemiologic Study of Health Risk in Women; OR, odds ratio; CI, confidence interval; HIV/AIDS, human immunodeficiency virus/acquired immune deficiency syndrome.

all) to 5 (very spiritual). Higher scores represented greater reported spirituality, and this variable was collapsed into three categories as follows: (1) not at all or somewhat spiritual (1–3); spiritual (4); and very spiritual (5).

**Self-rated health status.** Participants were asked to rate their health status on a 6-point continuum from excellent to very poor. This variable was collapsed into three categories: excellent (excellent, very good); good (good); and poor (fair, poor, and very poor).

**Health care behaviors.** The two health care behaviors examined included length of time since last routine checkup and having a usual source of health care. The length of time since last routine doctor's visit was categorized as follows: <1 year ago; 1–2 years ago; and ≥2 years ago or do not know. Source of usual health care by a clinic, doctor, nurse or physician's assistant was reported as Yes or No, and coded as such.

**Health-related conditions and illnesses.** To examine the association of specific health conditions with CAM use, participants self-report of diagnosed medical conditions were categorized into heart-related conditions (high blood pressure (BP), high cholesterol, high triglycerides, obesity, diabetes, angina, heart attack, heart disease, stroke); cancer (breast cancer, lung cancer, ovarian cancer, cervical cancer, other cancer (specified); autoimmune disorders (over- or underactive thyroid, arthritis, osteoporosis/osteopenia, and autoimmune disease [e.g., lupus, rheumatoid arthritis]); respiratory illnesses (asthma, emphysema, or chronic bronchitis); and mental health diagnoses (eating disorder [anorexia, bulimia], depression, anxiety). Stomach ulcers and HIV/AIDS were not included in the categories but were included in the analysis as independent conditions.

#### Statistical analysis

Categorical variables were analyzed using Chi-squared and Fisher's exact tests for comparison of proportions,

means, and statistical significance. Variables identified as significant ( $p < 0.05$ ) in unadjusted analyses were included in regression models. Tests of collinearity were performed and variables that had a variance inflation factor (VIF) of  $>10$  were removed. Backward logistic regression models were used to examine the association between sexual orientation and CAM use, adjusting for potential confounders. Statistical significance for multiple logistic regression models was defined as  $p < 0.05$ . No significant and relevant interactions were found. The receiver operating characteristic (ROC) curve and Hosmer-Lemeshow statistic were used to evaluate the overall model fit. All statistical analyses were performed using the SAS system for Windows, version 9.2 (SAS Institute, Cary, NC).

#### Results

The sample was 92.0% ( $n = 809$ ) white and 8.0% ( $n = 70$ ) African-American. Overall participants were highly educated with 65.3% of the sample holding a bachelor's degree or higher. Approximately half of the sample was identified as lesbian (54.5%,  $n = 479$ ). Age, race, and household income did not significantly differ by sexual orientation. The mean age of the sample was 47.8 and 47.4, for heterosexuals and lesbians, respectively. Approximately 49.8% ( $n = 437$ ) of all participants reported they had used CAM in their lifetimes and about 42.4% ( $n = 372$ ) reported CAM use in the past 12 months.

#### Bivariate analyses

As shown in Tables 1 and 2, lesbians had significantly greater odds of having ever used CAM (57.3% versus 40.8%;  $p < 0.0001$ ) and to have used CAM in the past 12 months (47.6% versus 36.3%;  $p < 0.001$ ) than heterosexual women. Additional demographic variables significantly associated with ever having used CAM included: older age; white race; more years of education; and residence in a large city. Other factors significantly associated with having ever used CAM included: perceived discrimination in a health care setting;

having a provider of usual health care; and endorsement of higher levels of spirituality. Significant self-reported medical conditions associated with having ever used CAM were mental health-related disorders, respiratory disorders, and stomach ulcers.

Bivariate results for CAM use within the past 12 months were very similar to ever having used CAM, except that age and having been diagnosed with a respiratory disorder were not significantly associated with CAM use.

The most common CAM modalities used by women were massage (71.4%), yoga (31.9%), meditation (25.4%), and herbal medicines (24.1%). Among women who used CAM within the past 12 months ( $n = 372$ ) only yoga participation significantly varied by sexual orientation, with heterosexual women having higher rates of yoga participation ( $p = 0.002$ ) than lesbians. See Table 3.

#### Multivariate analyses

Multivariate logistic regression analysis concluded that sexual orientation (AOR = 1.68, 95% CI [1.23, 2.28]) was an independent predictor of having ever used CAM after adjusting for potential covariates (Table 4). Other significant covariates associated with ever having used CAM included white race, more years of education, perceived experience of discrimination in a medical establishment, residence in a large city, being very spiritual, and having a history of a diagnosed mental health disorder. The Hosmer-Lemeshow Goodness of Fit Test showed the main effects model was a good fit for the data ( $p = 0.52$ ). The overall classification rate was good, ROC area = 0.726. Logistic regression analysis for CAM use within the past 12 months produced similar results. Lesbians had greater odds of having used CAM in the past 12 months (AOR = 1.44, 95% CI [1.06, 1.97]), compared to heterosexual women. The Hosmer-Lemeshow Goodness of Fit Test showed the main effects model was a good fit for the data ( $p = 0.88$ ). The overall classification rate was good, ROC area = 0.726.

Given the potential interaction of sexual orientation with other factors in the multivariable models, the data were also tested for interactions between sexual orientation and other predictor variables on lifetime and 12-month CAM use.

Statistical testing did not reveal any evidence of interaction (data not shown).

#### Discussion

These findings are among very few reported, examining the differences in CAM use between heterosexual and lesbian women. Secondary data analysis was performed among ESTHER Project participants to determine the prevalence of CAM use, assess differences of CAM use by sexual orientation, and identify factors associated with CAM use. The overall prevalence of having ever used CAM was 49.8% and having used CAM in the past 12 months was 42.4%, which concur with reports by other studies.<sup>3,5,24,31-32</sup> Lesbians had higher prevalence rates of lifetime (57.3% versus 40.8%) and past 12-month (47.6% vs. 36.3%) CAM use than heterosexual women; however, the type of CAM use among those who used CAM within the past 12 months varied little by sexual orientation. After adjusting for other factors, sexual orientation was found to be independently associated with CAM use ever and within the past 12 months. This complements findings by Matthews et al., whose multivariate analysis revealed that a lesbian sexual orientation was an independent predictor of CAM use.<sup>16</sup> Aside from sexual orientation, the current multivariate results concurred with previous findings in that CAM use was associated with: white race<sup>27,33-34</sup>; increasing years of education<sup>5,27,35</sup>; residence in a large city<sup>5</sup>; perceived experience of discrimination in a health care setting<sup>16</sup>; and having been previously diagnosed with a mental health condition.<sup>36-37</sup> Being very spiritual was also associated with CAM use, which was similar to other studies that found CAM use was associated with religiosity,<sup>38</sup> prayer for health-related reasons,<sup>5,25,39</sup> and spirituality.<sup>25</sup>

The current multivariate results also showed that those who had providers of usual health care, compared to those who did not, had greater odds of CAM use within the past 12 months. At first, this may seem to contradict the current finding that patients who experienced discrimination in a health care setting had greater odds of CAM use. One may assume that patients who reported discrimination in a medical establishment may have lower rates of having a current health care provider. The interaction between reported

TABLE 3. COMPARISON OF COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) MODALITY RATES AMONG LESBIAN AND HETEROSEXUAL WOMEN WHO USED CAM IN THE PAST 12 MONTHS, ESTHER PROJECT, PITTSBURGH, PA, 2003-2006

Alternative service	Total (N = 372) N (%)	Lesbian (n = 227) n (%)	Heterosexual (n = 145) n (%)	p
Acupuncture	27 (7.3)	20 (8.8)	7 (4.9)	0.159
Aromatherapy	31 (8.4)	14 (6.2)	17 (11.9)	0.053
Biofeedback	4 (1.1)	4 (1.8)	0 (0)	0.162
Herbal medicines	89 (24.1)	55 (24.2)	34 (23.8)	0.921
Homeopathy	0 (0)	0	0	NA
Hypnosis	13 (3.5)	9 (4.0)	4 (2.8)	0.553
Massage	264 (71.4)	168 (74.0)	96 (67.1)	0.154
Meditation	94 (25.4)	56 (24.2)	39 (27.3)	0.513
Reiki	45 (12.2)	31 (13.7)	14 (9.8)	0.268
Relaxation	75 (20.3)	39 (17.2)	36 (25.2)	0.063
Therapeutic Touch	25 (6.8)	18 (7.9)	7 (4.9)	0.258
Yoga	118 (31.9)	59 (26.0)	59 (41.3)	0.002
Other	63 (17.0)	36 (15.9)	27 (18.9)	0.451

ESTHER, Epidemiologic Study of Health Risk in Women; NA, not applicable.

TABLE 4. ADJUSTED ODDS RATIOS OF LIFETIME HISTORY AND PAST 12-MONTH COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) USE AMONG LESBIAN AND HETEROSEXUAL WOMEN, ESTHER PROJECT, PITTSBURGH, PA, 2003–2006

Variable	Ever used		Used past 12 months	
	AOR (95% CI)	p	AOR (95% CI)	p
Age		0.062		0.557
35–39	Reference		Reference	
40–44	0.92 (0.55, 1.52)		1.16 (0.69, 1.93)	
45–49	1.67 (1.01, 2.77)		1.28 (0.77, 2.13)	
50–54	1.38 (0.81, 2.37)		1.03 (0.60, 1.78)	
55–64	1.41 (0.83, 2.38)		1.47 (0.87, 2.48)	
Sexual orientation		0.001		0.021
Heterosexual	Reference		Reference	
Lesbian	1.68 (1.23, 2.28)		1.44 (1.06, 1.97)	
Race		<0.001		<0.0001
White	Reference		Reference	
African-American	0.31 (0.16, 0.59)		0.17 (0.08, 0.38)	
Education		<0.0001		<0.0001
High school or less	Reference		Reference	
Some college	2.21 (1.22, 4.39)		1.71 (0.88, 3.33)	
Bachelors	3.77 (2.00, 7.13)		3.16 (1.63, 6.11)	
Graduate	4.16 (2.26, 7.64)		3.54 (1.89, 6.64)	
Perceived discriminated in a health care establishment		<0.001		0.036
No	Reference		Reference	
Yes	2.48 (1.53, 4.03)		1.63 (1.03, 2.57)	
Residence		0.004		0.002
Large city	Reference		Reference	
Not large city	0.63 (0.46, 0.86)		0.62 (0.45, 0.84)	
Spirituality		<0.001		<0.0001
Somewhat/not at all	Reference		Reference	
Spiritual	1.03 (0.73, 1.45)		1.21 (0.86, 1.72)	
Very spiritual	2.27 (1.50, 3.44)		2.74 (1.83, 4.10)	
Have provider of usual care				0.005
No			Reference	
Yes			1.81 (1.19, 2.76)	
Mental health–related condition		0.013		0.043
No	Reference		Reference	
Yes	1.48 (1.09, 2.02)		1.38 (1.01, 1.89)	

ESTHER, Epidemiologic Study of Health Risk in Women; CI, confidence interval; AOR, adjusted odds ratio.

CAM use ever adjusted for: Age, race, education, sexual orientation, reported discrimination in a health care establishment, residence, spirituality, and previous mental health diagnosis.

Past 12-Month CAM adjusted for: Age, race, education, sexual orientation, reported discrimination in a health care establishment, residence, spirituality, have provider of usual care, and previous mental health diagnosis.

discrimination in a health care setting and having a health care provider was not significant ( $p=0.68$ ). Among CAM users, both those who reported discrimination in a health care setting and those who did not had similar rates of having a current provider (89.6% and 86.9%). This may be the result of measuring lifetime discrimination and current provider of usual care. Perhaps those who experienced discrimination in a health care setting no longer attended the practices where the events occurred, but may currently have providers of usual care. Further investigation is needed into the unique relationship between lifetime discrimination in a health care setting and current status of having a usual health care provider.

The current results diverge from published studies in several ways. The current research did not find age to be a significant predictor of CAM use after adjusting for other covariates. Age as a predictor of CAM use has revealed mixed results across studies.<sup>27</sup> The current results may reflect the limited age range (35–64) of women in the ESTHER Project. In

addition, unlike some studies, the current analysis did not find associations between having been diagnosed with cancer or HIV/AIDS and CAM use (ever and past 12 months); however, this may reflect the small sample of individuals who reported a cancer ( $n=62$ ) or HIV/AIDS ( $n=11$ ) diagnosis.

Although the current findings contribute to investigations of CAM use, these results should be interpreted in light of several limitations. Although recruitment for the ESTHER Project consisted of a range of strategies designed to obtain a diverse cross-section of lesbian and heterosexual women, the convenience-sampling frame used introduced the possibility that results may not be representative of the general population of women. These current results also represent women who revealed their sexual identity, attractions, and relationships to research staff members, therefore, only lesbians who were willing to self-identify were classified as lesbians. Given the more stringent criteria for classification of heterosexual women, it is unlikely that bisexual or lesbian



women were classified as heterosexual. The study population was primarily composed of middle-age white women. Differences in CAM use across the lifespan and among racial-minority heterosexual and lesbian women could not be adequately investigated with the current sample.

Other biases may have influenced these results. Because healthy, highly educated individuals with more expendable time tend to participate in research more frequently than individuals with significant illnesses, less education, or with limited expendable time, volunteer bias could be present. Furthermore, like other CAM studies, the lack of a standard definition of CAM use in research made the current results more difficult to compare with those of other studies. Because the main purpose of the ESTHER Project was to collect information on CHD risk factors, the definition of CAM use in the current study was limited to lifetime and past 12-month use and did not include information on chiropractic services or religious prayer, both of which may have contributed to an increased measure of CAM use. Other general features of CAM research that make results difficult to compare across studies include the timeline selected to examine CAM use<sup>3,16,24</sup>; whether CAM is defined by self-prescribed use<sup>3,24</sup> or by use of a CAM practitioner<sup>10</sup>; whether participants use CAM in conjunction with or in place of conventional medicine<sup>3,24</sup>; and if the study population is from a general<sup>3,24</sup> or clinical population.<sup>10,40</sup>

### Conclusions

The presented findings provide insight into the relationship between sexual orientation and CAM use in a healthy population of women, providing updated prevalence rates of CAM use among lesbians, and using a broader definition of CAM use reporting for heterosexual and lesbian women. The results of this study indicate that CAM use was prevalent among a nonclinical, community sample of women. Findings also suggest that lesbian women have greater odds than heterosexual women of having ever used CAM and of having used CAM in the past 12 months. Therefore, sexual orientation may play a role in understanding why some women choose to use CAM. Future studies to determine if reasons for seeking CAM care, modality of CAM use, and effect of CAM use differ between heterosexual and lesbian women are warranted. Longitudinal studies would be ideal to explain how life events, such as lack of health care insurance or diagnoses of specific medical conditions, are associated with the initiation or discontinuation of CAM use. Given the greater prevalence of CAM use reported by the lesbian women, future research may focus on clinicians' understanding of CAM use among women and specifically how CAM's relationship to sexual orientation is reflected in clinical practices. Finally, a more focused investigation, designed to develop a better understanding of how and why lesbian women use CAM and to determine if specific CAM modalities are used more often in conjunction with, or in place of, conventional medicine would significantly contribute to our understanding of CAM use among lesbians.

### Acknowledgments

We would like to thank the women of Pittsburgh, PA for their involvement in this study. This research was supported by the National Heart, Lung and Blood Institute,

R01HL067052 (Deborah Aaron, PhD, PI). The authors would like to acknowledge Dr. Aaron, now deceased, for her pivotal role in the ESTHER Project and for her many contributions to lesbian health. Dr. Smith was supported by the Agency for Healthcare Research and Quality (AHRQ) under Ruth L. Kirschstein National Research Service Award T32-HS017587.

### Disclosure Statement

No competing financial conflicts exist for any of the authors.

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