

Use of Complementary and Alternative Medicine in Bayamón, Puerto Rico

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Objective: To profile complementary and alternative medicine (CAM) utilization patterns in the municipality of Bayamón, Puerto Rico.

Methods: The study consisted of a cross-sectional household survey conducted in 2008. A multi-stage probabilistic sampling method was used to obtain a total of 203 household interviews. The survey used was based on a culturally adapted version of the Complementary and Alternative Medicine Supplement of the 2007 National Health Interview Survey (NHIS), conducted by the U.S. Department of Health and Human Services. The statistical analysis included means, frequency distributions, and a multiple logistic regression model.

Results: The prevalence rates of CAM use ranged from 55.7% to 92.1%, depending on the modalities included under CAM. The most frequently reported medical conditions treated with CAM included back problems, headaches, allergies, anxiety, and depression. Sixty-four percent of the respondents had not informed their physicians that they used CAM. The results showed a marginal association ($0.05 < p < 0.1$) between using CAM, being female, having a high level of education, having a family income level of \$12,000 to 23,999 (based on reference value) and having insurance coverage for CAM.

Conclusion: The results suggest that a relatively large segment of the Bayamón population used one or more CAM modalities in the year prior to the survey. The findings suggest that the prevalence rates of CAM use change depending on which therapeutic modalities are included when “CAM” is being defined. The health issues treated with CAM were associated with chronic conditions. The large portion of respondents not disclosing their use of CAM to their physicians is worrying in terms of patient safety. [*PR Health Sci J* 2016;35:69-75]

Key words: Complementary and alternative medicine, Chronic conditions, Health care utilization, Health care access, Patient safety

The National Center for Complementary and Integrative Health (NCCIH) defines complementary and alternative medicine (CAM) as a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine. These products, practices and systems are not necessarily considered to be part of mainstream western or conventional western medicine. According to the National Center for Complementary and Integrative Health (NCCIH), this array of non-mainstream health care approaches may also be considered to be part of integrative medicine (also known as integrative health care) (1). CAM has also been defined as diagnoses, treatments, and/or methods of prevention that complement or substitute for mainstream medicine by contributing to a common whole, thereby satisfying a demand not met by orthodoxy or diversifying the conceptual framework of medicine (2). Studies indicate that the use of CAM by health care consumers is widespread and becoming increasingly more common.

CAM is not used only to address specific conditions but also to improve the individual user's overall well-being. This has been documented by multiple studies conducted in the United States as well as in other countries throughout the world (3–16).

The use of unconventional health care services has multidimensional implications and raises significant health issues which deserve special attention. CAM users in the U.S. represent a multi-billion dollar market; their spending on CAM services, therapies, and products equals the out-of-pocket

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costs for all U.S. physician services and prescription drug use (9, 17–19). An even more serious concern is the utilization, effectiveness, and safety of over-the-counter supplements (vitamins and herbal products) by health care consumers. Various studies conducted in the U.S. show that, in their quest for the improvement of their health status, a significant portion of patients who use CAM therapies do not report that use to their regular primary care physicians (3,9).

It is noteworthy that Millar (7) found that the use of alternative health care is positively associated with the number of diagnosed chronic illnesses (3 or more chronic conditions). This pattern has been validated by experts who have thoroughly examined CAM issues (20). Given the aging of the population, it is expected that the proportion of individuals with multiple chronic illnesses will also increase, and with it, the consequent demand for CAM services. In fact, a recent study determined that the use of nutritional supplements—mostly multivitamins and calcium—was on the rise among senior citizens in Puerto Rico (21). The study found an association between the high use of supplements and both hypertension and arthritis. Given Puerto Rico's high prevalence of chronic illnesses (22–23), it is important to determine the role of CAM in Puerto Rico's health care system.

Surveys of other specific populations have also reported high rates of CAM use among persons with various chronic conditions. For example, Fairfield (24) found that many patients with HIV use CAM to relieve pain, neuropathy, stress, depression, and nausea, any or all of which might be associated with the primary illness. However, a few such patients use CAM in the belief that it will cure their HIV or that it has one or more specific antiviral effects (with “it” referring, in both cases, to one or more non-specified products, therapies, services, or combination falling under the umbrella term of “CAM.”) Cancer patients frequently use CAM to minimize the side effects of or serve as an alternative to conventional chemotherapy and to manage their symptoms (25) Another study, this one by Sparber et al (26), looked at the use of CAM by adult patients participating in HIV-AIDS clinical trials and reported that CAM was primarily used for HIV-/AIDS-related problems, that is, nausea, depression, insomnia, weakness, and dermatological conditions. Both adult and child patients also use CAM to manage and treat problems related to chronic back pain (27–30). This kind of pain is often ancillary to a primary condition, often incurable; CAM can aid in alleviating a given patient's pain or help that patient to better cope with it.

Broadly speaking CAM in Puerto Rico has not been studied scientifically. Other than the Bird and Canino publication on Puerto Rican spiritism (31) and the Olivera and Palacios study references above (21), the only published article (Hernández et al., 1984) on a CAM-related research topic that we know described the use of medicinal plants by ambulatory patients (32). Medicinal plants were used by 57% of the 802 patients studied. Two potentially toxic plants were among the most commonly used ones. This highlights the importance of having

scientific data to identify patient safety problems related to toxicity or interference with conventional treatments.

In this descriptive study, we aimed to profile the CAM utilization patterns of a sample population in a specific city in Puerto Rico. The following research questions were addressed by the study:

- What is the extent of CAM use in a particular Puerto Rican urban municipality?
- For what medical conditions do the residents of that municipality most commonly use CAM?
- What are the most frequently used CAM modalities?
- To what extent do patients who use CAM inform their medical doctors of that use?
- What are the social and demographic characteristics that distinguish CAM users from CAM non-users?

Materials and Methods

Design and Sampling

Given the descriptive nature and exploratory scope of this study, the research team decided to focus the investigation on one municipality in Puerto Rico: Bayamón. According to the U.S. Census Bureau's definition and statistics, the municipality is 100% urban. With a total population of 208,116, this municipality is part of the highly populated San Juan metropolitan area (33).

The research design involved a cross-sectional, household survey study conducted in 2008. A multi-stage probabilistic sampling plan was designed based on Bayamón's total number of Census tracts which were stratified by socioeconomic status based on criteria used by the U.S. Housing and Urban Development Administration (HUD). Stratification was defined proportionately to the number of households. Within each stratum, blocks were selected based on a self-weight approach. Once the blocks were selected, segments of 6 households were selected (based on the number of households in the block) to be interviewed. Finally, a within-household respondent was selected randomly using the Kish method. Eligibility for interview selection was based on the potential participant's being 18 years of age or older. A pre-testing phase was completed, in which 10 random subjects responded to the instrument. Minor changes were made to the questionnaire. The residents of a total of 300 households were contacted to be interviewed; 203 interviews were completed, a response rate of 67%.

The sampling design did not include weighting since this was a pilot study intended to develop the instrument rather than to estimate population parameters.

Instrument

The study was based on a culturally adapted version of the Complementary and Alternative Medicine Supplement of the 2007 National Health Interview Survey (NHIS). The research on instrument development presented in this article

was guided by Aday and colleagues’ conceptual framework for applying health services research in evaluating health services systems (34). The Supplement was part of the 2002 and 2007 National Health Interview Survey (NHIS) studies conducted by the U.S. Department of Health and Human Services. The face-to-face survey instrument was already validated by Centers for Disease Control and Prevention researchers and is available, in English and Spanish, to Latino individuals in the U.S. Our research team made a cultural adaptation of the original instrument and, after having done so, assessed its face validity, overall cultural appropriateness, content, valid use of the Spanish language, and relevance within the Puerto Rican context. In addition, we conducted focus-group meetings with CAM providers (including physicians and naturopaths) as well as with CAM consumers, all of whom provided input on the questionnaire based on the abovementioned assessment areas. Primarily, modifications to the instrument were related to content, terminology, idioms particular to Puerto Rican residents, the exclusion of service modalities not known in P.R., and the addition of services not used in the U.S. but used in P.R. Table 1 details several of the modifications that were made to the questionnaire in order to ensure its cultural appropriateness. One significant recommendation made by the participants in the focus groups was to create a medicinal plant–supplement made of those plants commonly used by members of the Puerto Rican population to manage their health-related needs. An inventory of medicinal plants was created based on the input of the CAM experts and the consumers who participated in the focus groups. In addition, other experts and Puerto Rico medicinal-plant references were used to complete the NHIS supplement (35). Finally, the revised instrument included the services defined by the National Center for Complementary and Integrative Health (1) under the major categories of alternative medical systems

(acupuncture, Ayurveda, homeopathic treatment, naturopathy, traditional healers); biologically-based therapies (chelation, natural products/medicinal plants); manipulative/body-based therapies (chiropractic, massage, and movement therapies); and mind-/body-based therapies (meditation, biofeedback, guided imagery, progressive relaxation, deep breathing exercises, hypnosis, yoga, tai chi, qi qong, and energy healing therapy).

Measures selected

For this study, a number of variables from the questionnaire were selected, including CAM use, the specific health problems or conditions treated with CAM, the most frequently used CAM modalities, the disclosure of CAM use to conventional doctors, and the sociodemographic characteristics of the respondents. Regarding CAM use, respondents were asked about provider-based therapies (e.g. acupuncture) as well as other, non-provider-based, CAM therapies that respondents had been able to access on their own (e.g. natural supplements). Specific questions included, “Have you ever seen a medical professional or other health practitioner to receive [a specific therapy, such as acupuncture]?” If the respondent answered in the affirmative, he or she was then asked: “During the past 12 months, have you seen a medical professional or other health practitioner to receive [a specific therapy, such as acupuncture]?” Using the same basic series of questions, we explored each of the CAM modalities that were both recognized by the study and provided by recognized medical professionals and other kinds of health practitioners. In the case of non-provider-based CAM therapies, the respondents were asked, “During the past 12 months, did you use [a specific therapy, for example the Zone Diet] for 2 weeks or more for health purposes?” The same question was asked for each of the non-provider-based CAM therapies recognized by the study. The responses to the questions exploring both types of therapies (provider-based and non-provider-based) were coded individually using a dichotomous (yes/no) coding format.

The respondents were also asked, “For which of the following health problem(s) or condition(s) did you use [a specific therapy, such as acupuncture]?” An adapted list of conditions/health problems similar to the list used by the NHIS in the U.S. was presented to the respondents. The responses to the questions exploring each of the conditions were coded as dichotomous variables (yes/no). In addition, we explored a given respondent’s disclosure of CAM use to a conventional physician with the following question: “During the last 12 months, did you mention to a conventional medical practitioner that you used [a specific therapy, for example hypnosis]?” The response to the question was coded as a dichotomous variable (yes/no). Finally, some questions regarding

Table 1. Sample of the modifications made in the questionnaire as a result of the cultural adaptation: response options for question on diets used by respondents over the last 12 months.

Diets		
Original english version U.S.	Original spanish version U.S.	Decision/Final wording P.R.
Vegetarian (Include vegan)	Vegetariana estricta/Vegan	Vegetariana (Vegetariana estricta/ Vegan, Ovolactovegetariana, lactovegetariana)
Macrobiotic diet	Macrobiótica	No change
Atkins	Atkins	No change
Pritikin	Pritikin	Item deleted
Ornish	Ornish	Item deleted
Zona	Zona	No change
South Beach	South Beach	No change
		Ayurveda (Aryurvedic Diet)*
		Tipo de sangre (Blood type)*
		Alimentos vivos/Biogermminados*
		Sistema chino*
		Dieta mediterránea*

*These response options were added to instrument based on focus group recommendations.

sociodemographic variables were defined as continuous (age, education), while others were created as categorical (gender, family income, marital status, health-insurance status, the current status with regard to CAM coverage by health insurance, doing regular exercise, and following a diet).

Statistical analysis

The new version of the NHIS CAM instrument was formatted electronically using Questionnaire Design System (QDS) software, which allowed the administration of the 203 face-to-face interviews without requiring manual data entry. Data management and analysis was performed using SPSS Version 12.0. The analysis included basic univariate frequency tables. A logistic regression model (36) was used to assess the strength of the association between different demographic characteristics and CAM use. Based on this model, the strength of this association was estimated using odds ratios with 95% confidence intervals.

This study was approved by the Institutional Review Board (IRB) for the protection of human subjects of the University of Puerto Rico Medical Sciences Campus.

Results

As mentioned earlier, interviews were conducted in 203 households. As can be seen in Table 2, the sample’s demographics indicate that approximately two thirds (34%) of the study population was female and that the median age of the sample was 52. Education was measured in terms of the number of years of education. Results indicate that the median number of years of education was 13, meaning that the typical respondent in this sample had attended up to 1 year of college. About one third of the respondents reported that they were married (or in a consensual union). In terms of health insurance status, 9 out of 10 respondents reported that they were covered by a health insurance plan. Seventeen percent of those subjects covered by a health insurance plan reported that their plans had some type of coverage for CAM. Approximately, three quarters of the participants had an annual family income of less than \$30,000.

Table 3 presents the prevalence of CAM use based on a 12-month recall question. Separate calculations of prevalence were done, both including and excluding (2) CAM modalities that have been reported in the literature to affect prevalence: *prayer* and *medicinal plants* (15). When *prayer* and *medicinal plants* were excluded from the analysis (Table 3), the prevalence of CAM in the sample population was 55.7. The prevalence was 52.4% when excluding the use of medicinal plants and including *prayer* and 73.2% when including *medicinal plants* and excluding *prayer* as healing modalities. In contrast, when *prayer* and *medicinal plants* were both included, the prevalence was 92.1%.

Table 4 shows that the most widely used CAM modalities among respondents were, by a large margin, prayer (92.1%), medicinal plants (73%), and health-product supplements

Table 2. Demographic characteristics of the sample (N=203)

Demographics	n	%
Gender		
Male	69	34.0
Female	134	66.0
Age		Percentiles
Median	52.0 years old	25 36.0
		50 52.0
		75 67.0
Education		Percentiles
Median years of education	13.0 years	25 12.0
		50 13.0
		75 15.0
Marital status		
Never married	68	33.5
Married/consensual relationship	60	29.6
Divorced	37	18.2
Widowed	32	15.8
Separated	6	3.0
Health insurance status		
Insured	189	93.1
Uninsured	14	6.9
Health insurance with/without CAM benefits		
CAM covered	34	16.7
CAM not covered/Do not know	155	76.3
Annual family income		
Less than \$30,000	151	77.4

Table 3. Overall CAM-Use prevalence rate during last 12 months (N = 203)

	n	Bayamon, P.R., 2008 (%)
Medicinal plants & prayer excluded	113	55.7
Medicinal plants excluded & prayer included	98	52.4
Medicinal plants included & prayer excluded	157	73.2
Medicinal plants & prayer included	187	92.1

Table 4. Top CAM modalities by prevalence-use rate during past 12 months (N = 203)

Modality	n	Percent (%)
Prayer	168	92.1
Medicinal plants	93	73.2
Health-product supplements	71	67.6
Deep breathing exercises	59	29.1
Meditation	50	24.6
Stress-management methods	24	11.8
Music therapy	23	11.3
Peer support groups	19	9.4
Progressive relaxation	16	7.9

(68%). Following in frequency were deep breathing exercises (29%), meditation (25%), stress management methods (12%), music therapy (11%), peer support groups (9%), and progressive relaxation (8%).

Table 5 presents a summary of the most frequently reported medical conditions treated with CAM in the Bayamón population. On the questionnaire, the respondents were asked to detail the 1 or more medical conditions for which they had used CAM modalities. The results revealed that the top-reported conditions were back problems (48%), headaches (44%), allergies (42%), anxiety (40%), and depression (38%). Other conditions reported included high blood pressure (37%), other musculoskeletal ailments (35%), sleep problems (34%), gastrointestinal problems (31%), weight problems (26%), and reflux and gastritis (26%).

We looked at describing the profile of subjects in the study who were CAM users in contrast to that of non-CAM users. Based on marginal significance levels ($0.05 < p\text{-value} < .10$), Table 6 shows that CAM users in our study were associated with being female, having relatively higher levels of education and family income (\$12,000–23,999 based on reference value), and having coverage for CAM in their health insurance. Based on those 4

Table 5. Most frequently reported medical conditions treated with CAM (N = 203)

Medical condition	n	Percent (%)
Back problems	94	47.7
Headaches	86	43.7
Allergies	82	41.6
Anxiety	79	40.1
Depression	75	38.1
High blood pressure	74	37.6
Musculoskeletal problems	69	35.0
Sleep problems	67	34.0
Gastrointestinal problems	62	31.5
Weight problems	52	26.4
Reflux, gastritis	52	26.4

Table 6. Logistic regression on demographic factors associated with use of complementary and alternative medicine (N = 203)

Variables	β	SE	P-Value	CAM Use Exp (β)	95% C.I. for Exp (β)
Gender					
Male (Ref)				1.000	
Female	0.567	0.320	0.076*	1.763	(0.942, 3.301)
Education					
High school or less (Ref)				1.000	
More than high school	0.582	0.325	0.073*	1.790	(0.947, 3.387)
Family income					
Less than \$12,000 (Ref)				1.000	
\$12,000–\$23,999	0.620	0.374	0.097*	1.860	(0.894, 3.870)
\$24,000 or more	0.368	0.381	0.334	1.445	(0.685, 3.051)
Health Insurance Status					
No CAM coverage (Ref)				1.000	
Have CAM coverage	0.858	0.475	0.071*	2.357	(0.929, 5.980)
Do not know if have CAM coverage	-0.466	0.328	0.155	0.627	(0.330, 1.193)
Exercise					
No exercise (Ref)				1.000	
Exercise	-0.300	0.305	0.325	0.741	(0.408, 1.346)

* $0.05 < p\text{-value} < 0.10$

indicators, the odds ratio for CAM use was also of a high order of magnitude. The small sample size may have been a limiting factor on these statistical results.

Finally, the study included a question regarding whether participants had informed their regular physicians that they used (or had used) CAM. Two thirds (64%) of the respondents reported that they had not disclosed such use to their physicians. No gender or education-level differences were found in the reported disclosure rate of herbal supplements used. However, those individuals who were 59 years old or younger and who reported having 2 or more chronic conditions were the least likely to have told their doctors about their CAM use.

Discussion

To our knowledge, this is the first scientific study of CAM use patterns (and the prevalence of same) to be done with the general population in a Puerto Rico municipality (Bayamón). Previous information on CAM use practices in Puerto Rico has been anecdotal in nature. Thus, an important contribution of the study, regardless of its limitations and exploratory scope, is its ability to scientifically inform health care professionals and public health policy makers on CAM use patterns in a municipality in Puerto Rico.

The sample studied included a population from an urban, densely populated geographic area in Puerto Rico. It is well documented in the literature (15) that statistics on CAM use vary depending on the definition of “CAM” that is used by researchers. In particular, the inclusion of prayer as a CAM modality in research studies has been found to increase CAM prevalence. For this study we calculated statistics including prayer and excluding prayer in order to be as conservative as possible. We also calculated rates including and excluding the use of medicinal plants. The results suggest that there are quite different CAM use prevalences. Consistent with the literature, the inclusion of prayer, in particular, increased the overall prevalence dramatically. The inclusion of medicinal plants was also found to have an increasing effect on prevalence. This supports the scientific findings in the literature that claim that the way in which CAM services are defined has a significant impact on statistical output (15).

The results from the 12-month recall overall prevalence calculated in the study for Bayamón suggest that a large segment, relatively speaking, of the sampled population used 1 or more CAM modalities. When prayer, use of medicinal plants, or both are factored in, the prevalence rate increases from 55% (no prayer or medicinal plants) to 92% (both

prayer and medicinal plants). Harris et al. (15), reported overall prevalence rates ranging from 9.8 to 76% when comparing multiple countries. However, because of the limited sample in this study, it is not possible to make comparisons with countries that conduct large national or subnational studies on this subject.

In our study, respondents' reports on medical conditions treated with CAM painted a picture of chronic conditions consistent with the literature on CAM studies (3,9,20). This included a high prevalence of back problems, allergies, anxiety, headaches, and depression, at the top of the list, followed by other conditions, such as weight, gastrointestinal, and sleep problems. This supports reports from the Institute of Medicine (20) which concluded that CAM is most commonly used to manage specific illnesses that lack definitive cures, have unpredictable courses and prognoses, and are associated with substantial pain, discomfort, or medical side effects; this kind of use is increasing in popularity.

It is important to highlight that, by far, the respondents most frequently used CAM modalities were prayer, medicinal plants (not included in other studies), and herbal products. Much lower in ranking but still frequently used were mind and body approaches such as deep breathing and meditation. One possible explanation for this pattern is that consumers may seek low cost, non-provider-based CAM services rather than the more expensive provider-based therapies. It is important to keep in mind that only one fifth of the population studied had CAM coverage included in their insurance plans.

A very significant finding is that a large proportion (two thirds) of the population studied had not informed their regular conventional physicians that they were using CAM modalities. This is remarkably similar to findings reported in the literature (3,9). Because the combined use of some prescribed drugs and CAM medications may be contraindicated, this lack of transparency on the part of these patients highlights the need to improve patient-physician communication in health services delivery. Our finding may indicate that these patients did not reveal their CAM use to their conventional physicians out of fear. Our finding may indicate that these patients did not reveal their CAM use to their conventional physicians out of fear.

Regarding the characteristics of CAM users, the study findings are consistent with the literature (3,9), which confirms that typical CAM users are likely to be female, to have relatively high educations, and to have relatively high family income levels.

In summary, the findings of this scientific study suggest that a substantial portion of the sample uses CAM modalities. The implication is that the use of CAM may be an important force within the health care delivery system in Puerto Rico. However, because of the pilot nature of the study and the small sample size, these findings cannot be extended to the greater population of Puerto Rico. Future research should be guided toward a comprehensive CAM prevalence study using a more representative sample.

Resumen

Objetivo: Describir patrones de uso de medicina alternativa y complementaria (MAC) en Bayamón, Puerto Rico. **Métodos:** El estudio consistió de un diseño de investigación transversal de encuesta de viviendas en el año 2008. Se utilizó un diseño de muestra probabilística multi-etápico estratificado en el cual se completaron 203 entrevistas. La investigación estuvo basada en una adaptación cultural del "National Health Interview Survey-CAM Supplement" del Departamento de Salud y Servicios Humanos de los EE.UU. (2007). El análisis estadístico incluyó medias, distribuciones de frecuencias y Modelo de Regresión Logística multivariado. **Resultados:** La prevalencia de uso de MAC varió de 55.7% a 92.1%, dependiendo en las modalidades incluidas bajo la definición de MAC. Las condiciones médicas más reportadas tratadas con modalidades de MAC fueron problemas de la espalda, dolores de cabeza alergias, ansiedad y depresión. El 64% de los entrevistados indicó que no le informaba a su médico que utilizaba MAC. Se demostró una asociación marginal ($0.05 < p < 0.1$) entre usar MAC, ser mujer, tener altos niveles de educación, ingresos familiares de \$12,000-23,999 (basado en valor de referencia) y tener beneficio de seguro médico para servicios de MAC. **Conclusión:** Una proporción relativamente grande de la población de Bayamón usó una o más modalidades de MAC. Los hallazgos sugieren que la definición de modalidades terapéuticas incluidas bajo MAC influye en los resultados de prevalencia de uso. Los problemas de salud tratados con MAC están asociados a condiciones crónicas. La proporción notable de entrevistados que no informan a su médico del uso de MAC preocupa en cuanto a la seguridad del paciente.

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