Prevalence of Complementary/Alternative Medicine use in Cancer Patients in a Tertiary Hospital in Puerto Rico

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Objective: We conducted a study in a tertiary hospital to investigate complementary and alternative medicine (CAM) prevalence in a Puerto Rican population. The study also evaluated demographic and clinical factors in order to correlate them with CAM use.

Methods: Spanish-speaking residents with a known diagnosis of cancer being followed in the outpatient facilities at Auxilio Mutuo Cancer Center were invited to participate in the study. Patients who read and signed a consent form were given a questionnaire inquiring, among various things, on their use of any CAM treatment, education level, gender, place of residence and whether they had consulted their oncologist. The questionnaire also asked about their expectations for use of CAM.

Results: 215 patients were approached to participate out of which 200 signed the consent and accepted to participate. A total of 95 of 200 patients (47.5%) mentioned that they utilized at least one CAM treatment. Six factors were then analyzed for their correlation with CAM usage and three yielded statistically significant results at p<.05: age group, education level, and area of residence. After multivariate analysis all of these three factors behaved as independent variables. Gender, tumor type and stage were not significantly associated with use of CAM.

Conclusion: Our data show that CAM use is significantly more common in those with higher education, younger age, and those living in non-metropolitan areas. Vitamin C and soursop (Graviola or guanábana) proved to be the two most common CAM treatments, respectively. [*P R Health Sci J 2020;39:294-299*]

Key words: Alternative Medicine, Complementary Medicine, Vitamin C, Turmeric

Complementary/alternative medicine (CAM) has increased in popularity. Alternative medicine refers to any therapy that is used for treating the cancer or its symptoms and that is not part of the standard treatments used by the medical community. The latter include chemotherapy, radiotherapy, surgery, biologic therapy and immunotherapy. If the alternative medicine is utilized along with any standard treatment, it is considered as complementary medicine.

CAM use has become a global phenomenon, with reports showing increasing numbers of patients utilizing it in some way. Previous studies have estimated that 25% of United Kingdom residents (1), 50% of German (1), French (1), and Australians utilize some form of CAM with or without simultaneous conventional treatment (2) while in USA, the numbers range from 42% to 69%. Between 1990 and 1997, the prevalence of CAM use in USA increased from 33.8% to 42.1% and visits to CAM practitioners also increased from 427 million to 629 million (3).

A summary of 26 surveys across 13 countries concluded that total CAM use among cancer patients was 31.4% (4) but currently there are no equivalent data regarding CAM utilization in Puerto Rico. Information about the prevalence of CAM in cancer patients is potentially useful knowledge for oncologists because some of those treatments, particularly antioxidants, can interfere with the activity of chemotherapy and radiotherapy (5).

CAM therapies can be divided into three main categories: special diet, movement/physical therapies/mind/body, vitamins/herbs, as well as other forms of CAM not specified in these categories. The main goals of our study are: 1- to determine the prevalence of CAM utilization in outpatients seen in a cancer center in Puerto Rico 2- to determine if there are any differences in CAM utilization between Puerto Rico as compared to other countries. 3- explore the correlations between use of CAM with certain demographic and clinical features described below.

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Methods

Patient eligibility

Spanish speaking residents of Puerto Rico > 18 years of age who had been diagnosed with any form of cancer at the Auxilio Cancer Center which is part of Auxilio Mutuo Hospital were considered eligible to participate in the study. After patients arrived at the outpatient clinic, a research assistant introduced the study. Patients were required to sign a consent form before proceeding to fill out an IRB approved questionnaire which inquired about the use of CAM therapy and specifically which modalities were utilized.

CAM therapies were divided into five main groups: special diet, movement/physical therapies, mind/body, natural therapies, and any other therapies not specified in the previous categories. For each category, the patient had to check off the specific therapies they had utilized after their official diagnosis. If applicable, the questionnaire asked whether the patient had consulted with their oncologist regarding their CAM use and also about the expectations of their CAM therapy. The study protocol as well as the consent form were approved by the Auxilio Mutuo Hospital Institutional Review Board (IRB).

Statistical analysis

The null hypothesis set for the study was that patients in our cancer center do not use CAM frequently (defined as less than 20%). Expectations were that the null hypothesis would be rejected. Given a sample size of 200 patients, if 55 answered that they were CAM users, then the 95% confidence interval would range from 21.4%-34.2%; consequently if at least 55 patients responded positively to the question about CAM usage, the null hypothesis would be rejected.

We analyzed the following factors for their correlation with use of CAM: gender, age, educational level, area of residence, tumor type, and tumor stage.

Two-sided chi square test was used to analyze the statistical significance of those factors associated with CAM use. Multivariate analysis, specifically logistic regression, was used to determine the contribution of those factors that were significant in the univariate analysis. A generalized linear model was used to accomplish this task.

Results

A total of 215 patients were approached over the course of the study and 200 of these signed the consent and participated in the study, while 15 did not wish to participate. The demographic characteristics of the study population is shown in table 1. Area of residence was divided into metropolitan and non-metropolitan municipalities. The metropolitan area is composed of Bayamon, Caguas, Carolina, Cataño, Dorado, Guaynabo, San Juan, Toa Baja, and Trujillo Alto.

A total of 95 of 200 patients (47.5%) responded that they utilized at least one CAM treatment or therapy. Table 1 shows the demographic and clinical factors analyzed and their corresponding frequency. In order to determine their association with CAM usage, the six factors shown in table 1 were then subjected to statistical analysis.

Table 1. Study population characteristics

	Number of patients N (%)
Gender	
Male	79 (39.5)
Female	121 (60.5)
Age group	
18-64 yrs	115 (57.5)
65+ yrs	85 (42.5)
Median age	61
Education level*	
High school or lower	44 (22.1)
University, college, or post graduate studies	154 (77.9)
Area of residence**	
Metropolitan area	109 (54.8)
Non-metropolitan area	90 (45.2)
Tumor type	
Solid tumor	115 (57.5)
Lymphoid tumor	85 (42.5)
Tumor stage	
Localized	96 (48.0)
Advanced	104 (52.0)

*Two patients declined to answer the question regarding education level. ** One patient declined to answer the question regarding area of residence

Table 2 depicts the six factors analyzed with their respective p values in regards to their association with the use of CAM and the two other factors not associated with CAM use.

Table 3 depicts the results of the multivariate logistic regression analysis which revealed that all three factors identified in the univariate analysis: age, area of residence, and educational level were independent variables associated with more frequent use of

Table 2. Factors associated with CAM use

Category	Use CAM N (%)	Do not use CAM	Total	P-value
Gender				
Male	35 (44.3)	44 (55.7)	79 (39.5)	0.46
Female	60 (49.6)	61 (50.4)	121 (60.5)	
Age Group				
18-64 yrs	66 (57.4)	49 (42.6)	115 (57.5)	0.0011
65+ yrs	29 (34.1)	56 (65.9)	85 (42.5)	
Education level			198	
High school or lower	15 (34.1)	28 (65.9)	43 (22.0)	0.050
University, college, or post graduate studies	80 (51.4)	75 (48.6)	155 (77.5)	
Area of residence			197	
Metropolitan area	47 (39.4)	71 (60.6)	118 (54.8)	0.011
Non-metropolitan area	46 (56.7)	33 (43.3)	79 (45.2)	
Tumor type			200	
Solid tumor	54 (46.9)	61 (53.1)	115 (57.5)	0.731
Lymphoid tumor	42 (49.4)	43 (50.6)	85 (42.5)	
Tumor stage				
Localized	46 (47.9)	50 (52.1)	96 (48.0)	0.909
Advanced	49 (47.1)	55 (52.9)	104 (52.0)	

CAM. Residence in a non-metropolitan area, younger age and high educational level were associated with more frequent use of CAM.

The number of patients using a specific type of CAM treatment is shown in table 4. Note that 23 patients (11.5%) stated that they utilized other forms of alternative therapies not listed above, such as transfer factor. The most commonly used were vitamins, fruits and relaxation therapies.

Table 3. Multivariate analysis of factors significant in univariate analysis

Category	Odds ratio	Standard error	Z-value	P value	95% confidence interval
Age	.4405682	.1360368	-2.65	0.008	.2405375 .8069442
Area of residence	.3922528	.1245696	-2.95	0.003	.210497 .7309474
Education level	.4302832	.1700501	-2.13	0.033	.1983148 .9335845

Table 4. Frequency of CAM modalities used

Category	Number of patients N (%)
Special diet	35 (17.5)
Vegetarian	11 (5.5)
Vegan	6 (3.0)
Macrobiotic	2 (1.0)
Other special diet	20 (10.0)
Any relaxation (mind / body) or movement / physical therapy	51 (25.5)
Yoga	9 (4.5)
Tai Chi or Chi Gong	2 (1.0)
Massage	20 (10.0)
Hypnosis	1 (0.5)
Meditation	17 (8.5)
Curative energy / therapeutic touch	7 (3.5)
Music therapy	8 (4.0)
Other form of therapy	14 (7.0)
Any natural (vitamins / herbs) and other therapies	205 (102.5)
Vitamins	62 (31.0)
Vitamin C oral	46 (23.0)
Vitamin C (intravenous)	6 (3.0)
Vitamin D	4 (2.0)
Vitamin B-12	2 (1.0)
Vitamin B-17 (laetrile)	9 (4.5)
Multivitamins	6 (3.0)
Melatonin	12 (6.0)
Chinese herb therapy	16 (8.0)
Shark cartilage	4 (2.0)
Fruits	51 (25.5)
Soursop	45 (22.5)
Moringa	2 (1.0)
Other fruits	10 (5.0)
Turmeric	26 (13.0)
Homeopathy	2 (1.0)
Magnet bed	1 (0.5)
Ayurvedic remedies	1 (0.5)
Cannabis	20 (10.0)

The total number of CAM therapies per patient who responded "yes" to using CAM was also recorded. The median was 5 treatments per patient (range 1-15).

We also asked whether the patient had informed their oncologist regarding their CAM use. Three patients refused to answer the question. A total of 51 of the 92 (55.4 %) who had responded that they utilized CAM, answered that they had informed their oncologist while 41 patients (44.6 %) reported they had not (table 5).

Information about patient's expectations regarding their use of CAM are shown in table 5. The most common expectation was that the treatment would help boost their immune system.

Table 5. Treatment expectations

Expectations regarding their CAM use	Number of patients N (%)
Treatment will cure my cancer	16 (17.5)
Treatment will help with symptoms	40 (43.9)
I have hope that the treatment will help in some way	40 (43.9)
Treatment is not toxic	24 (26.4)
Treatment will help improve my immune system	45 (49.5)
Other reason	9 (9.9)
Total	91

Discussion

Comparison with other CAM studies

Overall, our results and demographics are similar to other global CAM studies with some differences. A study conducted in Australia by Maclennan et al (2) revealed similar results to ours. A total of 48.5% of patients reported to have used alternative medicine, very close to 47.5% in our study. Molassiotis et al. (6) reported CAM use in 14 European countries. Overall CAM use and study population varied highly among all countries, with the lowest reported being Greece (14.8%) and the highest Italy (73.1%). The latter study covered CAM use, before and after diagnosis as well as current use.

We compared our results to the percentage of patients currently using alternative medicine in Molassiotis study. Herbal medicine proved to be the most popular treatment (12.1 %), one that was less common in our study population (8.0%). Vitamins were the second most used (5.1%), although percentage-wise it is very low when compared to our population (31.0%).

Their data also showed similar trends to ours, with younger patients, females, and better educated patients the most likely to utilize at least one CAM treatment, a trend also reflected in our results, although in our case the association with gender did not reach statistical significance.

Eisenberg et al. (3) also showed that women were more prone to use alternative medicine than men (48.9% vs 37.8%, P = .001). In Molassiotis' study, women as well as those with a higher educational level were more likely to utilize alternative medicine. However, in Eisenberg's study the frequency of CAM

usage according to age was contrary to our experience, with older patients utilizing alternative medicine more commonly. Since our study showed an inverse correlation between age and educational level, it is likely that the younger age of our frequent CAM users could correspond to a higher educational level. However, in our multivariate analysis these two factors were independent, each contributing on their own. Our results are consistent with other studies which have concluded that age is significantly associated with CAM use.

We inferred that the popularity of CAM is associated with ignorance and poor education. Contrary to this, our findings indicate that the most educated patients are the ones that utilized CAM the most. This finding is in keeping with other studies. In both Eisenberg's and Molassiotis' studies, educational level was associated with more frequent use, like our experience.

We hypothesized that patients who live in metropolitan areas would use CAM more frequently than those living in rural areas. Our hypothesis was based on the idea that metropolitan area residents have a higher purchasing power that allows them to pay for expensive non-reimbursable treatments. Our results proved to be contrary to our hypothesis, as patients living in metropolitan areas were the least likely to use CAM. No previous studies have investigated this association between CAM use and area of residence.

The study by Eisenberg et al showed that relaxation techniques, although not extremely common, still are among the most popular among Americans in 1990 and 1997 (3) (13.1% and 16.3%, respectively). Our study similarly showed that relaxation techniques were utilized by 11.5%.

We couldn't find any correlation between use of CAM with type of cancer or stage. Other studies have also failed to show any association with these two features (1-4).

Consultation with Oncologist and Expectations

We considered that it was important to investigate if patients had consulted with their oncologist because of the potential of interference with the delivery of some types of treatments such as chemotherapy and radiotherapy. Although expectations were that most patients would report that they did not consult their oncologist regarding their CAM use, results showed the contrary. Of the patients who reported to have used at least one alternative medical treatment or therapy, most of them stated that they had consulted their oncologist regarding their CAM use (55.4%). Note that this does not reflect whether they have consulted their oncologist regarding each of their treatments. The opinion or recommendations from their oncologists was not recorded.

Patient's expectations regarding use of CAM

Expectations regarding patient's use of CAM varied. Most patients expect their treatments to boost their immune system (49.5%). Patients boosting their immune system tend to be the ones choosing vitamins and other supplements. The second most common expectation was between helping with symptoms

and having hope that the treatment will help in some way. Note that many patients chose more than one expectation for their treatment, thus, the number of patients for each choice does not reflect the number of patients with only that expectation. A small percentage of patients expect that the treatment(s) will cure their cancer (17.5%).

Similar results regarding expectations were reported in a study carried out by Richardson et al (7). In that study, the most common reason reported for using CAM was a desire to feel optimistic and hopeful (73.0%), other reasons being that they thought these approaches are nontoxic (48.9%) and that they wanted more control over their medical decisions (43.8%). Most patients expected CAM to improve their quality of life (76.7%), boost their immune system (71.1%), extend their life duration (62.5%), or relieve symptoms (44.0%). About one third of the patients expected that CAM could cure their disease (37.5%).

Types of CAM used

Vitamins seemed to be the most common CAM used in the Australian study (37.6%), a trend also observed in our study population (31.0%). Most alternative medical treatments reported by Maclennan et al. (2) correspond to herbs and other natural treatments. No special diets, physical therapies nor mind / body therapies were reported by any patient.

In our study, two of the most popular alternative medicines belong under the category of vitamins (31.0 %) and herbs (25.5 %). Although studies have suggested that vitamin D has anti-cancer properties, (8-10) in our study ironically most patients who use vitamins report that they use vitamin C which has not been associated with proven anti-cancer activity in humans. In fact, only 4 patients (6.5 %) reported that they utilized vitamin D.

Under the category of fruits, most patients utilized Graviola (soursop or guanabana) in some way, ranging from tea prepared from the leave to drinking soursop juice or taking Graviola pills. Most patients who consume Graviola are middle-aged, while younger ones do not use it as much.

A systematic literature search was carried out by Ortiz et al. (11), compiling different sources of data from studies that focused on CAM use by several Hispanic populations. While the studies listed mostly cover all spectra in the medical field, ranging from populations with chronic conditions to some populations with a specific disease, we need to highlight two of these studies listed. The first, carried out in 2001 by Factor-Litvak (12), revealed that CAM users utilized vitamins very commonly, a finding similar to ours. The second, by Raji in 2005 (13), similarly reported the frequent use of vitamins.

Conclusions

In summary, our overall results are consistent with other studies carried out around the world with the most notable differences being the lack of a statistically significant difference between gender and frequency of CAM utilization in our study. In spite of this, we did observe a non-statistically significant

trend for females to use more CAM than males (table 2) consistent with other reports. Regarding the type of CAM used, our data point out that vitamins and fruits are two of the most popular treatments, specifically vitamin C and Graviola (soursop), the latter being a finding different from other studies outside of Puerto Rico.

Most patients have reported that they consult their CAM use with their oncologist. However, almost half of patients fail to mention it and the use of some of these modalities, such as antioxidant vitamins, potentially could interfere with the mechanism of action of chemotherapy and radiotherapy (9). The finding underscores the need for clinicians to inquire about use of CAM since we can't rely on all of them reporting it spontaneously.

Ironically, in our study, the most common CAM modality used was vitamin C which has not shown any definitive anti-tumor activity in clinical trials while vitamin D, which does have activity in reducing the risk of cancer in randomized trials was one of the less commonly used vitamins by our patients (8-10).

A frequent misconception in our medical community is that CAM use is linked with ignorance and low educational level. In this regard, the findings in our study that a higher educational level is associated with more frequent use of CAM is surprising and counterintuitive. However, this has been described before in other studies (2, 3).

To the best of our knowledge this is the first study of the use of CAM in cancer patients in Puerto Rico. It would be convenient to have our data confirmed independently since the patient population in our hospital, which is a tertiary care center, might not necessarily reflect the average population in our island. It is possible that our population is biased towards a higher education level. However, we do see patients from all parts of the island and they all belong to different educational backgrounds. In these regards, it is important to point out that the use of CAM in our population is different between the higher and lower education level, with use favoring higher education level. Also, in our experience, our patients from the metropolitan area tend to use it more than the rest of the island.

Resumen

Objetivos: Realizamos un estudio en un hospital terciario para investigar la prevalencia del uso de medicina alternativa o complementaria (MAC) en una población puertorriqueña. El estudio también evaluó factores clínicos y demográficos para determinar su correlación con el uso de MAC. Métodos: Pacientes hispanoparlantes con un diagnóstico de cáncer que se estaban siguiendo en las clínicas ambulatorias del Centro de Cáncer Auxilio Mutuo fueron invitados a participar en el estudio. Aquellos que firmaron un consentimiento entonces llenaron un cuestionario en el cual se les preguntó, entre otras cosas, sobre el uso de cualquier tratamiento de MAC, nivel de educación, género, lugar de residencia, edad y si habían consultado el uso de MAC con su oncólogo al igual que sus expectativas del MAC. Resultados: 215 pacientes fueron abordados para participar en el estudio de los cuales 200 firmaron el consentimiento y llenaron el cuestionario. Un total de 95 de los 200 pacientes (47.5%) mencionaron que habían utilizado por lo menos un tratamiento de MAC. Luego analizamos seis características de las cuales tres correlacionaron significativamente con uso de MAC: edad, nivel de educación y área de residencia. Análisis multivariable demostró que los siguientes tres factores se comportaron como variables independientes. Sexo, tipo de cáncer y la etapa del tumor no demostraron una asociación significativa. Conclusiones: Nuestros datos señalan que el uso de MAC fue significativamente más común en pacientes más jóvenes con educación alta y con residencia en áreas rurales. Vitamina C y guanábana fueron los tratamientos de MAC más populares.

Acknowledgments

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Este cuestionario tiene el propósito de investigar el uso de tratamientos de medicina alternativa en pacientes con cáncer en Puerto Rico. Marca la respuesta o respuestas que aplica a usted. Si no se siente cómodo contestando una pregunta, puede omitirla.

Parte A: **Información sobre usted**

1) Nombre: _____

2) ¿Cual es su edad? _____

3) Sexo: □ Masculino □ Femenino

4) ¿Qué grado has completado?

　□ No terminé escuela superior.

　□ Me gradué de la escuela superior.

　□ Empecé universidad o instituto, pero no terminé.

　□ Me gradué de la universidad o instituto.

　□ Estudio post graduado (maestría, doctorado)

　□ Otro POR FAVOR ESPECIFIQUE: _____
　_____

Parte B: Terapias de medicina alternativa que ha utilizado
Tratamientos de medicina alternativa son tratamientos de bajo riesgo para el cáncer que se usan en lugar de los convencionales (estándar). Se puede utilizar junto con tratamientos convencionales.

1) ¿Usted ha o esta utilizado por lo menos un tratamiento de medicina alternativa?

　□ Si, he utilizado por lo menos un tratamiento de medicina alternativa.

　□ No, nunca he utilizado ningún tratamiento de medicina alternativa.

　Si usted contesto que no ha utilizado tratamiento de medicina alternativa, por favor notifique al asistente del estudio para que recoja el cuestionario. Gracias.

2) Por favor marque los tratamientos de medicina alternativa que usted está utilizando o ha utilizado:

　1. Dieta especial:

　　□ Vegetariano

　　□ Vegano (no carne roja, productos lácteos, o huevos)

　　□ Macrobiótica

　　□ Otro POR FAVOR ESPECIFIQUE: _____
　　_____

　2. Terapia física

　　□ Yoga

　　□ Tai chi o chi gong

　　□ Masaje

　3. Cuerpo / mente

　　□ Hipnosis

　　□ Meditación

　　□ Biorretroalimentación

□ Energía curativa / Toque terapéutico

□ Terapia de música

□ Otro POR FAVOR ESPECIFIQUE: _____
_____

4. Vitaminas / hierbas para tratar o mejorar el cancer

　□ Vitaminas / suplementos

　　□ Vitamina C por boca

　　□ Vitamina C por vena

　　□ Vitamina B-17 (laetrile)

　□ Melatonina

　□ Terapia de hierbas

　□ Cartílago de tiburón

　□ Frutas (moringa, guanábana, etc.) POR FAVOR ESPECIFIQUE:
　_____

　□ Cúrcuma

　□ Homeopatía

　□ Cama de imanes

　□ Remedios ayurdevicos

　□ Cannabis

　□ Remedios caseros

5. Otro tipo de terapia
　□ POR FAVOR ESPECIFIQUE: _____
　_____

Parte C: Información sobre uso de medicina alternativa

1) ¿Usted ha discutido su uso de medicina alternativa con su oncólogo?

　□ Si, he mencionado el uso de medicina alternativa a mi oncólogo.

　□ No, no he mencionado el uso de medicina alternativa a mi oncólogo.

2) ¿Cuáles son sus expectativas de su tratamiento(s) de medicina alternativa?

　□ El tratamiento(s) me va a curar el cáncer.

　□ El tratamiento(s) me va a ayudar con los síntomas que presento debido al cáncer.

　□ Tengo esperanza que el tratamiento(s) me va ayudar con el cáncer de alguna forma.

　□ El tratamiento(s) no es toxico.

　□ El tratamiento(s) me va a mejorar el sistema inmunológico.

　□ Otro POR FAVOR ESPECIFIQUE: _____
　_____

Por favor notifique al asistente del estudio para que recoja el cuestionario. Gracias.

_____