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Complementary and Alternative Medicine Use and Adherence to Asthma Medications among Latino and Non-Latino White Families

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Abstract

Objective—The current study sought to evaluate patterns of complementary and alternative medicine (CAM) use in a sample of Latino and Non-Latino white (NLW) children with asthma, to determine whether parental beliefs about conventional medications and barriers to obtaining these medications were related to CAM use, and to assess whether CAM use was associated with decreased adherence to controller medications.

Methods—Participants included 574 families of children with asthma from Non-Latino White, Puerto Rican, and Dominican backgrounds from RI and from Island Puerto Rico. All parents completed a brief checklist of barriers to medication use and an assessment of CAM approaches. A subsample of 259 families had controller medication use monitored objectively for approximately one month by MDILog (fluticasone propionate), TrackCap (montelukast), or dosage counter (fluticasone/salmeterol combination).

Results—Prevalence of CAM use was high among Latino families. Perceived barriers to obtaining medication were related to increased CAM use in Puerto Rican families from RI. Elevated medication concerns were positively associated with CAM use among NLW and Island PR families. CAM use was positively related to objective adherence within NLW families, and unrelated in other groups.

Conclusions—CAM use is common among Latino families with asthma. Among some families, CAM use may be initiated as a way to cope with barriers to obtaining medication or when parents

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have concerns about conventional medications. Families who report CAM use do not appear to be substituting CAM for conventional asthma medication.

Keywords

Asthma; Adherence; Complementary and Alternative Medicine

Pediatric asthma is associated with impaired quality of life and increased health care utilization (1). Minority and disadvantaged populations are disproportionately affected (2). Latinos of Caribbean have particularly high prevalence, morbidity, and health care utilization (3). The sources of these disparities are multifaceted and complex, and include genetics, individual and family beliefs, health care system features, and broad environmental variables such as housing and pollution (4). Attitudes toward conventional medication use, and barriers to obtaining prescribed medications, may be modifiable sources of asthma disparities (5).

National guidelines for asthma management include daily controller medication use to prevent symptoms and exacerbations for those with chronic asthma (6). Research among ethnic minorities consistently demonstrates concerns about controller medication use (7; 8), and lower medication adherence (9). We previously found that controller medication adherence was low among island Puerto Rican and Latino families in the United States relative to Non-Latino white families (10). Data indicate greater acceptance of complementary and alternative medicine (CAM) use among ethnic minority families with asthma (11). Few studies, however, have examined how preference for CAM may relate to adherence to prescribed controller medications (12).

CAM is defined as “a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine” (13). Prevalence of CAM use among families of children with asthma ranges from 33–89% across studies (14). Rates of CAM use for ethnic minority families with asthma range between 48–89%, depending upon ethnicity (15–16). Reasons for CAM use in ethnic minority families are likely multifaceted. In earlier work examining CAM use among Puerto Rican families, patterns of acculturation were related to medication adherence, with higher adherence among families whose parents reported a bicultural orientation (16). CAM use may be related to families’ broader ethnocultural belief systems regarding health and illness (17).

Potential Relation of CAM Use to Beliefs and Barriers

Parental beliefs and concerns about conventional asthma medication may be associated with CAM use. Studies including Latino (5;8) and mixed ethnicity samples (7;18) indicate that parents often have concerns surrounding the use of conventional asthma medication, including immediate side-effects, medication dependence, and long-term effects. These concerns are related to lower reported asthma medication adherence (7) and higher likelihood of uncontrolled asthma (19). Studies relating parental medication beliefs and child asthma medication adherence, however, have used predominantly NLW samples and have not assessed CAM use (18).

Ethnic minority families may be more likely to face barriers to obtaining prescription asthma medications (20). These include financial burden, socio-cultural factors (e.g., limited English proficiency), and practical constraints (e.g., transportation difficulties) (21). For instance, CAM use has been found to be higher among uninsured families and those who perceived financial barriers to asthma care (22). In one report from the sample presented in this paper, barriers to medication use were high among Island PR families relative to Latino

and non-Latino white families (5). These barriers also may play a role in greater CAM use and lower adherence to conventional asthma medications.

CAM and Adherence to Asthma Medication

Latino parents of children with asthma may substitute CAM for asthma medications to prevent symptoms (8). CAM may also be used as a first line treatment for episodes (15). Research regarding CAM use and adherence to controller medications; however, has produced mixed findings. Positive caregiver beliefs surrounding CAM were linked to risk for self-reported nonadherence to asthma medication in a largely minority sample (23). Alternatively, parent report of child medication adherence was not associated with initiation of CAM within a predominantly NLW sample (12). To date, no studies have examined whether CAM use is associated with asthma medication adherence using objective electronic monitoring methods, and whether that association differs by ethnic group.

The Current Study

In a prior report including this sample, we found that adherence to controller medications differed by ethnic group, with the lowest adherence among families of children from Island Puerto Rico, and the highest among NLW families (10). Rates of CAM use; however, and the role of CAM in relation to medication adherence have not yet been reported. In the current study, we evaluated CAM use in a sample of families of children with asthma from NLW, Puerto Rican, and Dominican backgrounds from RI and Island PR, to evaluate patterns of overall CAM use by ethnic group. We also sought to determine whether parental beliefs about conventional asthma medications and barriers to obtaining medications were related to CAM use, and if language preference and years living outside the US (proxies for acculturation) were associated with CAM use among our mainland Latino subgroups (Puerto Rican and Dominican). Lastly, we evaluated whether CAM use was associated with objective adherence to asthma controller medications. We hypothesized that: 1) CAM use would be higher in families of Puerto Rican and Dominican descent, relative to NLW families, 2) negative beliefs surrounding conventional asthma medication and barriers to asthma medication use would be related to greater CAM use for all families, 3) lower levels of acculturation would be associated with reports of CAM use for mainland Latino families, and 4) increased CAM use would be related to lower levels of adherence to controller medications, but only among Latino families (12;23).

Method

Participants were a subset from a larger study ($N = 805$) (24) evaluating mechanisms underlying pediatric asthma disparities between Latino and NLW groups. Previous published work from this study has addressed contributing factors to variations in asthma outcomes across Latino and NLW children, such as asthma severity (25), asthma symptom perception (26), and objective rates of controller medication use (10).

Data collection occurred in Puerto Rico (PR) and Rhode Island (RI). Participants (aged 7–16 years) were recruited from hospital-based and community primary care clinics, community events, and asthma classes. Asthma diagnosis was confirmed through medical history, physical examination, and spirometry; those with complicating respiratory conditions were excluded. Puerto Rican families with a child with asthma were eligible at the PR site. Ethnicity in RI was determined by parent report, and caregivers of Puerto Rican, Dominican, or NLW ethnicity were eligible. For this report, we include only children with persistent asthma (due to greater medication need), and those that completed an evaluation of CAM use.

Procedure

Data collection occurred in four study visits over the course of approximately four months. Visits were generally conducted in the home by research assistants; the clinic visit was conducted in a hospital setting by a study physician or nurse practitioner. Informed consent and demographic information were obtained at enrollment. Data included in this study were collected at the second visit, typically 1–2 weeks after enrollment. During this visit, the family was interviewed regarding asthma management strategies using a standardized interview (27), completed surveys, and was oriented to adherence monitoring procedures. Adherence devices were collected approximately five weeks later. Families were compensated for participation. The protocol was approved by institutional review boards at both sites.

Measures

Asthma Severity—Asthma severity was evaluated by a study clinician during the clinic visit, based on physical exam, history, report of symptom frequency, pre-albuterol FEV1, and current controller medication dose. The four levels of asthma severity were “Mild Intermittent”, “Mild Persistent”, “Moderate Persistent”, and “Severe Persistent”, consistent with guidelines in place at the time of the study (28).

Medication Beliefs—Parents completed a ten-item self-report measure (29) to assess parental beliefs about asthma medication, resulting in index scores of perceived medication necessity (e.g., the medicines are necessary for the child’s health) and medication concerns (e.g., dependence, side effects).

Barriers to Filling Prescriptions—Potential barriers to filling prescriptions were evaluated using an 8-item list devised for the larger study (20; 23). Items represented health care system and contextual barriers such as cost, transportation problems, language barriers, and pharmacy wait-time.

Acculturation—Language preference was coded as preferred language of research interview for RI Puerto Rican and Dominican families; this categorical variable and the number of years the caregiver had lived outside of the mainland US were used as proxies for acculturation.

CAM Checklist—CAM use was assessed with the CAM Checklist, developed for the larger study to assess CAM use among Latino and NLWs (23), administered in the context of an established asthma management interview (27). Items were originally derived through literature review (17), ongoing research with the target population (30) and a series of focus groups with families from different ethnic subgroups. A list of asthma treatment strategies reported by families was independently reviewed by experts in asthma management and cultural issues in RI and PR. Participants indicated whether or not they had utilized various types of CAM to treat their children’s asthma.

Medication Adherence Monitoring—A subset of participants who were prescribed asthma controller medications that could be monitored objectively participated in the medication adherence monitoring protocol. Objective adherence monitoring in the larger study is described in detail elsewhere (10). In brief, adherence was monitored for controller medications in three distinct ways. Adherence to oral montelukast was monitored using the *TrackCap* MEMS monitor (AARDEX), which is a replacement pill bottle with an electronic cap that registers the date and time of each opening. Adherence to inhaled fluticasone was monitored using The *MDIlog II* (Westmed), a small electronic device attached to an inhaler “sleeve” that fits over the inhaler, and records the date and time of inhaler actuation with

inhalation. Adherence to fluticasone/salmeterol combination medication (diskus) was monitored by using a standard protocol to record dosage counter readings at the beginning and end of the monitoring period.

Adherence was monitored for a minimum of 28 days. Data were inspected and cleaned according to standard procedures (31). Seventy-five cases were eliminated from the adherence analysis for a range of reasons (see (10) for specific details regarding device loss and data cleaning), resulting in 277 usable cases. Of these, 259 families had also completed the CAM Checklist. Data used in adherence analyses were available from 77 island PR children, 51 RI PR children, 56 RI DR children, and 75 RI NLW children.

Adherence estimates were calculated as total doses per day/prescribed doses per day. For participants on more than one monitored medication, the adherence estimate represented the average of the two adherence measurements. Given that participants could be prescribed more than one monitored medication, and medication adherence is known to differ by medication type (32; 33), a categorical variable was constructed to represent each medication combination encountered in this study, namely montelukast alone (61.4%), fluticasone alone (7.7%), fluticasone/salmeterol combination (8.9%), fluticasone and montelukast (8.5%), and fluticasone/salmeterol combination with montelukast (13.5%).

Overview of Analyses

Chi square analyses were conducted to determine whether the prevalence of CAM use and CAM types differed by site/ethnicity. T tests, chi square analyses, and logistic regressions were conducted to examine whether acculturation variables, caregiver perceived barriers to prescription medication, and beliefs about asthma medication were predictive of CAM use (yes/no). The total number of barriers to prescription medication and the medication necessity and concerns subscales were entered simultaneously in each regression model.

Adherence estimates, which represent proportional data, were adjusted using a probit transformation prior to analysis. Regression analyses controlling for covariates, specifically the child's asthma severity level, medication monitoring type (e.g., MDIlog, TrackCap, or dosage counter; 32), and child age (31) were conducted to determine whether reported CAM use was associated with objective medication adherence.

Results

Participants

From an initial sample of 805 families, the current sample included children with persistent asthma who completed the CAM checklist. This resulted in a sample of 574 families across sites, including 267 island PR children, 92 RI PR children, 107 RI DR children, and 108 NLW children in RI (Table 1). A subsample of 259 children also had objective adherence data available (see Figure 1).

Prevalence of overall CAM use by Site/Ethnicity

Reported CAM use differed by site and ethnicity (χ^2 (3, $N = 574$) = 97.01, $p < .001$). Island PR families reported the highest rates of CAM use (73%) compared to RI PR (51%), RI DR (62%), and NLW families (19%). Subsequent analyses were conducted within groups.

Prevalence of CAM Type across Site/Ethnicity

Reported types of CAM also differed by site and ethnicity; specifically, mind-body interventions (χ^2 (3, $N = 574$) = 81.70, $p < .001$), biologically-based therapies (χ^2 (3, $N = 574$) = 91.63, $p < .001$), and body-based methods (χ^2 (3, $N = 574$) = 101.30, $p < .001$) all

differed by our site/ethnicity groups (see Figure 2). Island PR families reported the highest rates of CAM use across the three types, followed by RI DR, RI PR, and NLW families. Data regarding use by CAM item and type are presented in Table 2.

Association of CAM Use to Acculturation Variables, Perceived Barriers, and Medication Beliefs

Acculturation variables—The number of years caregivers reported living outside of the US was unrelated to CAM use across groups. Language preference was only related to CAM use in RI DR families, $\chi^2(1, N = 125) = 5.34, p = .021$. CAM use was higher among Spanish speaking (57.6%) than English speaking (5.6%) RI DR families.

Perceived barriers to prescription medication—A higher number of perceived barriers to prescription medication use was associated with CAM use among RI PR families, $\beta = .76, SE = .39, p = .050$ (Table 3), but not among other groups.

Beliefs about medication—Elevated medication concerns were associated with CAM use among Island PR ($\beta = .50, S, .22, pE = .026$) and RI NLW ($\beta = .85, S, .39, pE = .030$; see Table 3) families, but not among RI PR and RI DR families. Medication necessity was not related to CAM use within any group.

Relation of CAM to adherence

CAM use was related to *increased* adherence to controller medications within NLW families, $\beta = .23, p = .047$ (Table 4). For children and families from Latino backgrounds, CAM use was not related to controller medication adherence.

Discussion

Pediatric asthma continues to represent a source of health disparities between Latinos and NLWs (1;3). Given that adherence to controller medications remains challenging for many families (31; 34), and for minority families in particular (10; 32; 33), cognitive and behavioral variables such as attitudes toward medication use, barriers to obtaining medications, and preference for CAM use represent potentially modifiable intervention targets. In our sample, nearly three quarters of Island PR and over half of RI Latino families reported some CAM use, whereas only one fifth of NLW families reported using CAM. Results are consistent with previous research demonstrating a high prevalence of CAM use in Latino families (17, 30).

Self-report of CAM use was associated with language preference among our Dominican group, suggesting that lower-acclimated families were more likely to use CAM. CAM use was modestly associated with beliefs and barriers to medication use, and only for certain groups. Among our RI PR group, barriers to obtaining medications were modestly associated with CAM use. It is possible that these families may turn to CAM when they encounter barriers to obtaining asthma medication. Due to financial strain, barriers to obtaining medications may also serve as barriers to obtaining CAM (e.g., rubs available at the pharmacy, teas). Elevated medication concern was positively associated with CAM use only in the Island PR and NLW groups. Parental concerns could be a factor in the high prevalence rate of CAM use within the Island PR group, and similar concerns may play a role among NLW families. Specific factors that may predict CAM use not measured in this report bear further study, including ease of access to culturally sanctioned CAM methods, such as through a bodega or herbalist in one's neighborhood. A more nuanced examination of acculturation and immigration factors (e.g., cultural identity), health-care system factors

(e.g., consistent asthma care provider), and CAM use in relation to conventional medication use is warranted.

We previously noted the lowest rates of adherence to controller medications among Island PR families, and the highest rates among RI NLW families (10). Our results suggest that factors other than CAM use may account for this effect. CAM use was unrelated to medication adherence among our Latino families in both RI and PR. These findings are consistent with previous research (12), indicating no relation between child medication adherence and CAM use in a predominantly NLW sample.

CAM use was positively related to medication adherence among NLW families in our sample. Some families who are concerned about their child's asthma may try multiple strategies (both conventional and CAM) to manage symptoms. For Latino families in RI and PR this relationship is less clear. CAM use may be related to medication use at multiple levels, and may change over time due to family circumstances. For example, families may hesitate to fill a prescription once received, or use it intermittently according to their financial circumstances. If a medication has run out and they do not have the resources for a refill, praying or using oils may seem a viable alternative if useful in the past. Overall, these results reflect that the relationship between CAM use and use of conventional medications is complex, and CAM use may not indicate poor medication adherence. Research is needed to clarify dynamic, multi-level factors that may predict CAM use and use of conventional asthma medications among specific ethnic groups.

A number of study limitations bear mention. Our checklist was developed to assess CAM use specific to Latinos, and may have missed certain strategies more typically implemented by NLW families (e.g., chiropractic care; 35). Use of objective measures of medication adherence is a strength; however, we were only able to assess adherence to medications that had been *prescribed* and *filled*, and hence did not capture under prescription of controller medications, or nonadherence through failure to fill prescriptions. Qualitative work may be necessary to fully understand how families make decisions about CAM use, and how this affects patterns of filling and using conventional medications.

Although study personnel were fully bilingual and trained in cultural sensitivity surrounding asthma practices, it is possible that RI Latino families underreported CAM use due to perceptions that these strategies might be less acceptable in the dominant US culture. Additionally, administration of measures regarding asthma management prior to adherence data collection may have "primed" families to be more adherent; however, it is not clear this would lead to group differences. Group sample sizes were modest, which may have limited our power to find effects. Lastly, our sample was recruited based on likely asthma diagnosis and through convenience sampling, and hence may not adequately represent families with children under diagnosed or undertreated for asthma.

There is an increasing emphasis on culturally-centered care in the treatment of children with asthma (36). Incorporating the cultural beliefs and practices of families into asthma-related care can improve asthma outcomes compared to standard treatment approaches (37). Following the Awareness-Assessment-Negotiation model (38) may aid clinicians in integrating these findings into patient care. According to this model, clinicians should become aware of commonly held beliefs and practices among cultures for which they provide care, assess these beliefs and practices, and find ways to integrate beliefs and practices into patient care. Clinicians should be encouraged to discuss and assess CAM use and how it may be related to concerns regarding use of conventional asthma medications and family-specific barriers to medication use (17). Culturally-centered care may enhance

the patient-provider relationship and ultimately improve asthma management among families of children at most risk for asthma morbidity.

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What's New

This study evaluates associations between CAM use and parental beliefs about conventional medications and barriers to obtaining these medications among Latino and non-Latino white (NLW) families of children with asthma, and how this use relates to medication adherence. CAM use was positively related to adherence in NLWs, and unrelated among Latinos.

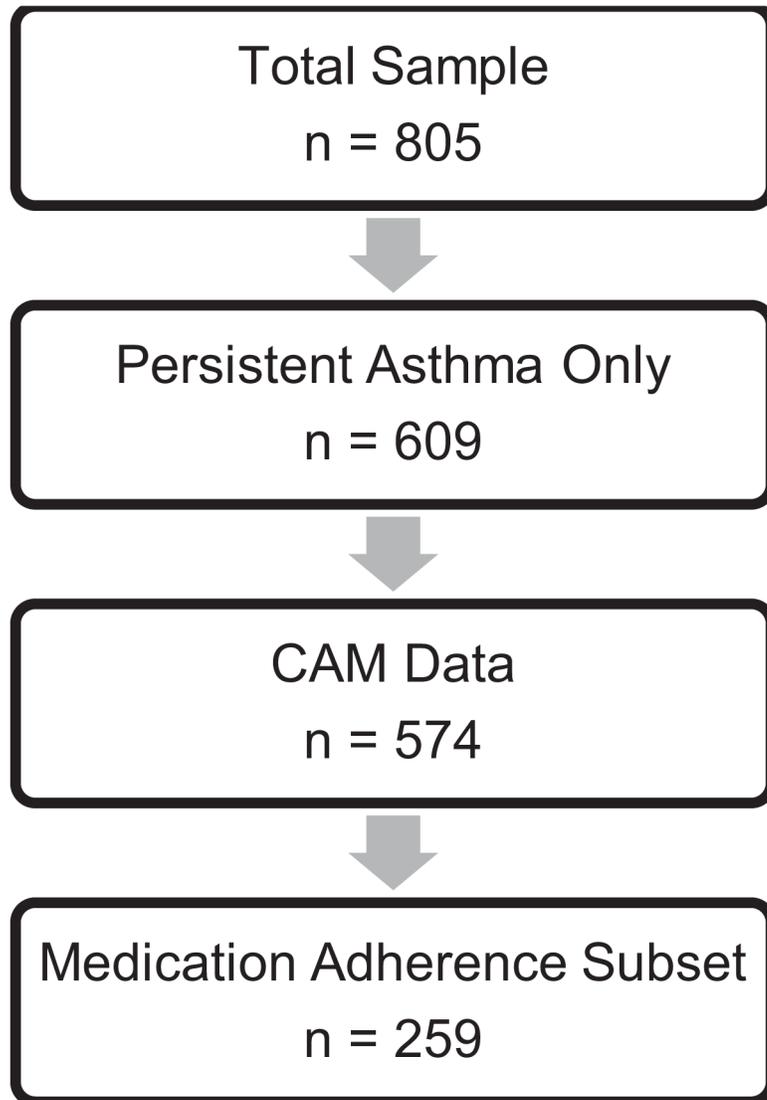


Figure 1.
Participant Flow

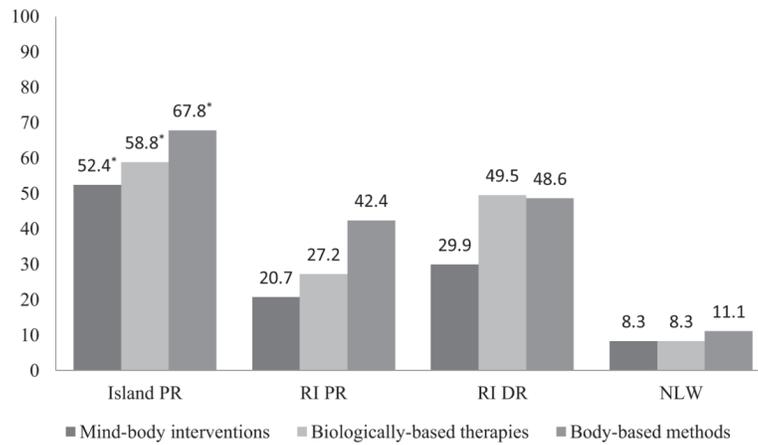


Figure 2. Percentages of CAM Type by Site/Ethnicity

Note. PR = Puerto Rico; DR = Dominican Republic; NLW = Non-Latino White. * $p < .001$ from Chi-square analysis comparing CAM type by site/ethnicity.

Table 1

Demographics of children and caregivers

	Total Sample (<i>n</i> = 574)	No Adherence Data Subsample (<i>n</i> = 315)	Adherence Data Subsample (<i>n</i> = 259)	<i>p</i>
Child ethnicity/site, <i>n</i> (%)				<.001
Island PR	267 (46.5%)	190 (60.3%)	77 (29.7%)	
RI PR	92 (16%)	41 (13.0%)	51 (19.7%)	
RI DR	107 (18.6%)	51 (16.2%)	56 (21.6%)	
RI NLW	108 (18.8)	33 (10.5%)	75 (29.0%)	
Child age, <i>M</i> (<i>SD</i>)	10.54 (2.48)	10.73 (2.51)	10.32 (2.43)	.053
Asthma severity, <i>n</i> (%)				<.001
Mild persistent	209 (36.4%)	132 (41.9%)	77 (29.7%)	
Moderate persistent	231 (40.2%)	143 (45.4%)	88 (34.0%)	
Severe persistent	134 (23.3%)	40 (12.7%)	94 (36.3%)	
Child gender, female, <i>n</i> (%)	242 (42.2%)	133 (42.2%)	109 (42.1%)	.974
Caregiver identity, <i>n</i> (%)				.051
Biological mother	545 (94.9%)	299 (94.9%)	246 (95.0%)	
Biological father	12 (2.1%)	3 (1.0%)	9 (3.5%)	
Other female relative	16 (2.7%)	12 (3.8%)	4 (1.6%)	
Other male relative	1 (.2%)	1 (.2%)	0 (0%)	
Below poverty threshold, <i>n</i> (%)	303 (52.8%)	59.4%	116 (44.8%)	<.001
Combined caregiver years of education, <i>M</i> (<i>SD</i>)	12.72 (2.69)	12.59 (2.67)	12.88 (2.71)	.118
Spanish language preference, <i>n</i> (%)				.617
RI PR	52 (56.5)	20 (6.3%)	32 (12.4%)	
RI DR	92 (86.0)	45 (14.3%)	47 (18.1%)	
Years caregiver lived outside US, <i>M</i> (<i>SD</i>)				
RI PR	13.58 (11.74)	12.31 (12.41)	14.63 (11.18)	.352
RI DR	21.51 (10.25)	21.78 (9.72)	21.26 (10.80)	.795

Note. PR = Puerto Rico; DR = Dominican Republic; NLW = Non-Latino White. Comparisons between adherence subsamples made using chi-square or *t* tests.

Table 2

Percentage of Endorsement of CAM Items

CAM Type	Island PR	RIPR	RIDR	NLW	χ^2
Biological-Based					
Whale Oil	3	0	3.7	0	6.76
Cod Liver Oil	24.3	8.7	24.3	0	40.37*
Honey or Royal Jelly	49.4	21.7	39.3	4.6	76.52*
Onion or Garlic	15.7	6.5	32.7	0.9	49.34*
Almond Oil	6.7	0	2.8	0	15.02*
Castor Oil	7.5	2.2	7.5	0	11.54*
Oregano	2.2	1.1	4.7	0	6.28
Lemon	30.3	15.2	27.1	3.7	35.60*
Aloe Vera Juice	34.5	6.5	16.8	0	72.42*
Siete Jarabes ^d	28.8	13	8.4	0	55.07*
Agua Maravilla ^b	16.9	0	0.9	0	53.00*
Chamomile Tea	8.2	5.4	8.4	3.7	3.12
Eucalyptus Tea	8.2	2.2	0.9	0.9	16.12*
Jarabe de Maguey ^c	12.4	0	1.9	0	34.61*
Turtle Blood or Meat	0.4	0	1.9	0	4.90
Cat or Snake Meat	0.4	0	1.9	0	4.90
Lizard in Boiled Milk	1.1	0	0.9	0	2.19
Many Oils Mixed Together	8.6	4.3	19.6	0	29.53*
Mind-Body					
Praying	51.7	21.7	30.8	8.3	74.51*
Azabache ^d	1.1	0	1.9	0	3.19
Prayer Candles	3.4	0	3.7	0	7.16
Azogue ^e	1.1	0	0	0	3.47
Body-Based					
Vicks Vaporub	62.9	44.6	53.3	14.8	72.71*
Massage	46.4	13	21.5	3.7	88.32*

Note.

- ^aHoney syrup that may contain a mixture of almond oil, castor, oil, wild cherry, and licorice;
- ^bWitch hazel compound that may contain aloe vera juice, honey, garlic, and onion;
- ^cAgave nectar;
- ^dStone used to ward off evil spirits;
- ^eMercury used to ward off evil spirits.

Table 3

Association of CAM Use to Perceived Barriers and Beliefs about Medication

	Island PR			RIPR			RIDR			RINLW						
	β	SE	Wald χ^2	β	SE	Wald χ^2	β	SE	Wald χ^2	β	SE	Wald χ^2	OR			
Medication Barriers	.00	.13	.00	1.00	.77	.39	4.02*	2.17	.23	.30	.57	1.26	.32	.44	.51	1.37
Medication Necessity	-.24	.19	1.64	.79	.16	.32	.24	1.17	.32	.32	.96	1.37	-.02	.39	.00	.98
Medication Concerns	.49	.22	4.93*	1.64	.18	.30	.34	1.20	.03	.29	.01	1.03	.86	.40	4.69*	2.36

Note. PR = Puerto Rico; DR = Dominican Republic; NLW = Non-Latino White.

* $p < .05$.

Table 4

CAM Use and Objective Adherence

Step	Variable	Island PR			RI PR			RI DR			RI NLW		
		β	t	R ²	β	t	R ²	β	t	R ²	β	t	R ²
1	Child Asthma Severity	-.03	-.24	.03	-.04	-.24	.03	.17	1.29	.15	.04	.35	.09
	Child Age	-.16	-1.31		-.15	-.99		-.37	-2.74*		-.30	-2.61*	
	Medication Monitoring Type	.01	.05		.11	.65		.00	.00	1.00	.00	-.03	
2	CAM	.08	.63	.03	.20	1.42	.07	-.23	-1.77†	.20	.23	2.03*	.14

Note. PR = Puerto Rico; DR = Dominican Republic; NLW = Non-Latino White.

† $p < .10$,

* $p < .05$