

Spirituality, Religious Involvement, and Health System Utilization in Tegucigalpa,
Honduras

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Thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science in the Department of Global Health in the
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ABSTRACT

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Abstract

Background: Spirituality and religious practices can motivate proactive health behavior. Although beliefs and practices may lead to different health behaviors, it is important to recognize the contribution of both to allopathic and complementary and alternative health system utilization. There is a lack of empirical research in this area, especially in Honduras, containing a culture rich in spirituality and religious affiliation.

Methods: Ethical review boards at Duke University and the National Autonomous University of Honduras approved the study protocol. A cross-sectional questionnaire survey was administered in urban Tegucigalpa, Honduras, and a final sample of 600 respondents was obtained. The primary independent measures were self-rated spirituality, religious affiliation, church attendance, and private devotion time. The primary outcome measures were: 1) hypothetical health system use, 2) an estimate of actual preventive health system use, 3) an estimate of actual curative health system use, and 4) an estimate of the relative risk of non-adherent behavior using the Medication Adherence Report Scale (MARS).

Results: Among the 600 respondents of the final sample, 499 (83.2%) had seen a physician in the previous year, either for routine check-up or for “sick use” and received some form of medication. Fewer (430/600, 72.0%) had used a complementary and alternative medical system or treatment (excluding prayer used for health reasons). The majority of respondents believed that natural medicine has no side effects (70.2%) and

does not interfere with medicine from the physician (62.8%). Nearly all (93.2%) of the respondents felt that prayer was “very important” in curing sickness. Respondents were significantly more likely to prioritize the physician first, compared to natural medicine, if they were older than 25, had less than secondary education, were not a student, knew that natural medicine has harmful side effects, and knew natural medicine can interfere with medicine from a physician. Respondents were significantly more likely to use a combination first if they were 18-24 years old, had at least a secondary education, were unemployed, were students, and thought natural medicine does not interfere with medicine from the physician.

Self-rated spirituality, religious affiliation, church attendance, and private devotion time had significant crude associations with some, but not all, of the outcome measures. There were no significant associations with hypothetical health system use. Nearly two-thirds (65.9%) of those who associated with a specific religion went to a physician for a routine check-up last year compared to 43.0% of those who did not ($p < 0.001$). Among those who attended church, 67.3% went for a routine check-up compared to 44.0% of those who did not attend ($p < 0.001$). In addition, 64.9% of respondents who had a private devotion time, compared to 40.3% of those who did not, had a routine check-up ($p < 0.001$). Self-rated spirituality had only a mild association with having a routine check-up ($p < 0.05$) and using non-prayer complementary and alternative medicine ($p < 0.05$). Those who associated with a religion were more likely to

have received some form of medicine from an allopathic physician last year (80.7% vs. 61.3%, $p < 0.001$). Likewise, 82.0% percent of churchgoers compared to 62.7% of those that did not go to church received medicine ($p < 0.001$). Finally, 58.9% of those with a daily private devotion time, compared to 44.2% of those without one, reported adherent behavior ($p < 0.01$).

Conclusion: Self-rated spirituality and religious involvement are significantly associated with the utilization of the preventive and curative allopathic health systems and adherence to medication in Tegucigalpa, Honduras. These findings deserve further consideration and have implications in both health policy and patient care in Honduras, a country with a thriving spiritual and religious culture.

Dedication

I dedicate this paper to my mom, dad, brother, and two sisters for their support while I was attending Duke University and participating in my fieldwork in Honduras.

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1. Introduction

Spirituality and religious involvement can be barriers to or motivators of health-seeking behavior, and may work in conjunction with or in opposition to one another.

Spirituality is multidimensional, complex in nature, and very difficult to define (MacDonald, 2000). However, there are dimensions of spirituality that are definitive and can be measured (Chuengsatiansup, 2003). From my experience in Honduras, and a review of the general literature on spirituality and health, the dimensions of spirituality in Honduras are best defined as: (a) faith in a transcendent force, most commonly the Christian God, (b) a personal relationship with God that extends to one's relationship with oneself and others, and (c) active development of that relationship by interaction with God and obedience to him in one's life, most commonly through religious involvement. Spirituality extends to all aspects of life, but we are interested in how spirituality affects health behaviors, good or bad, that inevitably will lead to the improvement or deterioration of one's health.

The health system in Honduras is comprised of the conventional, or allopathic, health system, practiced by a medical doctor (M.D.) or doctor of osteopathy (D.O.), and a complementary and alternative medical system, composed of traditional remedies and natural medicines. From my observations in Honduras, spiritual and religious practices are viewed, in the minds of those who use them, as a form of complementary and alternative medicine (CAM). The National Center for Complementary and Alternative

Medicine¹ (NCCAM) defines CAM as “a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine” (<http://nccam.nih.gov/>). NCCAM defines natural medicine as “[an] area of CAM [that] includes [the] use of a variety of herbal medicines (also known as botanicals), vitamins, minerals, and other “natural products” (<http://nccam.nih.gov/>). From my observations, these definitions are accurate in Honduras. Globally, there is some confusion about how to classify and define complementary, alternative, natural, and traditional medicine (World Health Assembly, 2003). When describing my results, I will use the terms “CAM” and “natural medicine” as they are defined by NCCAM and used in Honduras. This may limit the application of my findings to other populations, but these terms are suitable for the purpose of providing information about Honduras.

Whether or not prayer should be considered a component of the alternative health system is debatable. Studies often inquire about the use of prayer for health reasons but exclude prayer as a component of CAM (Eisenberg et al., 1998; Gohar et al., 2008). Eisenberg et al. distinguish between prayer or spiritual healing by others and prayer or spiritual practices for individual concern (1998). In other words, prayer is considered a health service if it is provided by someone else. The problem is that when someone prays, they are asking for assistance from God/Higher Power. In this case, prayer for individual concern should be included as a CAM as well. In my opinion, if

¹ The National Center for Complementary and Alternative Medicine is part of the National Institutes of Health (Bethesda, Maryland)

prayer is used to treat sickness, regardless of whether or not it is effective, it should be included. However, since prayer is a component of spirituality and religious involvement, the main variables of interest in this study, prayer will only be included in the initial description of the population and excluded as a component of CAM for subsequent analyses. I will use the term non-prayer CAM users. Non-prayer CAM users were those who used one or more of the non-prayer CAM modalities. Non-prayer CAM use was used for all analyses (i.e. prayer was excluded as a form of CAM).

Findings from this project highlight how spirituality, religion, and beliefs about health may affect patients' health behavior. These conclusions are based on a cross-sectional survey of a quota sample of the urban population in Tegucigalpa, Honduras. This information is important for physicians who serve a diverse patient population, Latino or not, that contains a thriving spiritual or religious culture. I will describe and discuss the areas in which spirituality and religion may affect the utilization of both allopathic and alternative health systems and offer my recommendations on best practices for this or similar populations.

2. Background

Many factors contribute to patients' worldviews surrounding sickness and health, that is, what they feel is causing them to be sick and what they think is the best way to cure the sickness. Where available, allopathic medicine often is accompanied by other medical systems that are used to diagnose and/or treat sickness. Natural medicine can affect health, either positively or negatively, depending on how it is used or combined with allopathic medicines. CAM presents both challenges and opportunities in primary health care, especially when patients attempt to self-treat using CAM and/or forms of unregulated natural medicine.

In Honduras, CAM offers a relatively inexpensive and, at times, effective alternative to allopathic medicine, but little else is known about who uses CAM and why they use it. The lack of resources in the public health system and the high cost of allopathic medical services are often seen as reasons why people use CAM. Family traditions, traditional culture, and the nature of the health condition also appear to be contributing factors to the use of CAM in the primary care setting among low income Hispanics and Native Americans in New Mexico, United States of America (USA) (Sussman, Williams, & Shelley, 2010). Predictors of delaying health care among Latino women in New York, USA include the use of prayer as CAM, seeking advice from family members, the use of other CAM, and chronic diseases (Insaf, Jurkowski, & Alomar, 2010). Personal beliefs about health and the use of CAM appear to be important

for primary care in Tegucigalpa, Honduras. Little is known about how Honduras' spiritually rich culture affects these alternative yet important and widely used health systems.

2.1. Country information on Honduras

2.1.1. Demography

According to the World Health Organization (WHO) Honduras has been one of the lower middle-income countries in the past few years and is still considered "developing" (2010). It has a gross national income of purchasing power parity \$3,420 per capita (WHO, 2010). The capital city, Tegucigalpa, is located in the central mountainous region within Francisco Morazán Department, Honduras, Central America. According to the Pan American Health Organization (PAHO) the population of Honduras was about 7,536,952 in 2007, 52.1% of the population resides in urban areas, and 49% of the population is under the age of 18 (2009). Between the ages of 15-64 the ratio of males to females is about 1.01/1 (CIA World Fact book). According the CIA World Fact book, the dominant religion is Christianity, composed mostly of Catholics and Evangelical Protestants.

2.1.2. Social Determinants of Disease

The social determinants of health in Honduras include poverty and access to care (PAHO, 2009). These estimates are for the entire country of Honduras; access to care is probably higher in urban areas and lower in rural, more isolated areas. Nearly one-third

(60.2%) of the population was below the poverty line in 2007 and 20% of the inhabitants lived on less than one dollar per day in 2007. Illiteracy was 17.5% in 2007; it was 18% higher in rural areas compared to urban areas. Children under five have the most access to health care (61.9%), while 57.4% of persons older than 50 have access to health care, 23.1% of persons 5-14 years of age, and 43% of persons 15-49 years of age. From 1990-2008, 61.2% of persons have access to primary care, characterized as one visit per year, while only 38.8% of persons had access to secondary care (more than one visit per year) (PAHO, 2009).

2.1.3. Burden of disease in Honduras

The epidemiologic profile of Honduras is currently transitioning to a heavier burden of chronic and non-communicable diseases (PAHO, 2009). The majority of the communicable disease burden is still related to potable water and lack of basic sanitation resources. Dengue is also highly endemic; in 2007 there were 24,660 new cases, and incidence has continued to increase in recent years. The incidence (per 100,000 population) of Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) was 21.0 from 2000-2006. For tuberculosis (TB) in 2004 the incidence was 47.1 (PAHO, 2009). HIV/AIDS and TB still present a significant public health problem in Honduras. Hypertension and diabetes are the first and sixth leading causes of specialized care, respectively. Recent PAHO reports claim that chronic diseases are emerging as the leading cause of morbidity and mortality in Honduras.

During the time of this study, Honduras was experiencing a dengue epidemic. By July 26, 2010 the incidence of dengue had increased nine times greater than the previous year-to-date (IFRC, August 27, 2010). There had already been 31 deaths due to hemorrhagic dengue, in Honduras, which increased by over 1,000% from the previous year-to-date. Tegucigalpa, in particular, was one of the most affected areas.

2.1.4. The Honduras medical system

Health care in Honduras happens in three systems: 1) the public system run by the Secretary of Health, which has hospitals and health centers all-around the country, where healthcare is given to all citizens freely or to the cost of a minimum fee; 2) the social security system, which delivers healthcare only to people with formal jobs with the government or private companies (around one fifth of the population), where the person contributes a small fee deducted from his or her salary; and 3) the private health system, with individual clinics and medical centers, available at different costs. Together with these formal systems, traditional medicine is very popular, complex, and varies in cost.

2.2. Research on spirituality, health systems, and adherence

Understanding traditional, complementary and alternative medical systems is a global priority (WHO, 2002a). It will be very important to ensure the appropriate, safe, and effective use of CAM as it is integrated into allopathic and other medical systems (WHO, 2002a). Since CAM is usually transferred from one cultural environment to

another, it may be difficult to transfer the therapies with the same degree of training, skill, and knowledge as was originally present. At present, the Honduran government, through its involvement in the WHO, has begun some initiatives to regulate and register herbal medicines (WHO, 2002a), but little is being done to accomplish this in practice.

Spirituality is a component of Latin American culture that must not be ignored in the discussion about alternative medical system use. According to Campesino, Belyea & Schwartz (2009), who studied Latinos in the USA, Latinos compared to non-Latinos were more likely to be religiously involved (27% vs. 7%), to pray outside of church (38% vs. 19%), to have spiritual discussions with others (35.2% vs. 27.8%), and reported being Catholic (67% vs. 23%). They conclude that Latino spirituality may be influenced by USA acculturation. Furthermore, Latino spirituality is a core cultural value and its influence on health is warranted (Campesino, Belyea & Schwartz, 2009).

2.2.1. Spirituality, religious involvement, and the allopathic and alternative medical systems

The influence that spirituality and religious involvement have on the utilization of the health system, either positive or negative, is not well understood. Prayer, a major component of spirituality and developing a relationship with God, especially among Christians, is also widely used for health reasons (Bell et al., 2005; Eisenberg et al., 1998). Bell et al. (2005) found that 45% of Americans use prayer for health reasons; they also found that there may be a strong relationship between non-prayer CAM use and use of prayer for health reasons in the USA. Religious involvement may even predict the

utilization of preventive health care services. Benjamins and Brown (2004) demonstrated in the USA that religious salience can predict utilization of various preventive health services such as cholesterol screenings, flu shots, pap smears, and prostate screenings among the elderly. Respondents who said religion was “very important” were more likely to have reported a pap smear and prostate screening compared to those who said religion was “not important” (Odd Ratio = 2.04, $p < 0.05$ and Odds Ratio = 1.76, $p < 0.05$). Also, they found that respondents affiliated with a religious denomination were more likely to use some forms of preventive care than those who are unaffiliated. Six percent of their sample was Hispanic. However, Van Ness, Kasl and Jones (2002) found that religious African American women in the USA might be less likely to go for breast cancer screenings, while religious White women might be more likely. These studies demonstrate that prayer, which is a component of one’s spirituality, and religious salience can have variable associations with CAM and allopathic health system use, respectively.

There is an effort in the USA to identify CAM users in the primary health care system among low-income groups of Hispanics and Native Americans in the southwestern United States. In a qualitative study (Sussman, Williams, & Shelley, 2010), the three patient attributes that appeared to most likely correlate with patient use of CAM were: family of origin, identification with traditional culture, and nature of the health condition. They would use traditional medicine for certain sicknesses and allopathic care for others or if the sickness worsened. For some conditions, they would

mix the two. Treatment decisions were more complex for those with chronic and life-threatening conditions. Herbs were commonly used because they were “natural.”

In a Community-Based Participatory Research Study of Puerto Ricans in New York City (Insaf, Jurkowski, & Alomar, 2010), 70% of Latino women reported delaying health care. Risk ratios revealed that women who used prayer and sought family advice delayed health care 1.29 times as much those who did not use prayer or seek family advice (95% CI: 1.03, 1.62). Women who used CAM delayed health care 1.39 times as much as those who did not use CAM (95% CI: 1.19, 1.62). Finally, women with chronic diseases delayed health care 1.31 as much as women who did not have chronic diseases (95% CI: 1.09, 1.56).

People with chronic diseases appear to use CAM often. In a study in New Mexico, USA of 612 primary care clinic patients (44.6% Hispanic) with arthritis, most of the clinic population (90.2%) have ever tried CAM therapies for their arthritis, and 69.2% were currently using one or more CAM therapies at the time of the interview (Herman et al., 2004). Overall, current use of any type of CAM was significantly higher among women ($p = .03$), patients under age 55 ($p = .02$), and those with some college education ($p = .003$). Patients who had ever used CAM rated their various form of CAM therapies as either “somewhat helpful” or “helped a lot” according to the following frequencies: mind-body therapies (90.4%); CAM movement therapies (82.7%); CAM therapists (79.8%); energy therapies (79.4%); herbal topical rubs (77.1%); special diets (64.9%); vitamins and minerals (63.0%); herbs taken orally (61.5%); nutritional supplements

(57.0%); homeopathic remedies (49.6%); and items worn (36.9%). Herman et al. (2004) also collected open-ended responses on reasons for using CAM. Overall, reasons mentioned included the following: to relieve pain (36.1%); to prevent disease progression (14.3%); to feel better (13.7%); to try CAM to see if it would help (13.5%); and because CAM therapies had previously helped them (9.2%). Sources of information about CAM were also similar across the diagnostic groups, and primarily included family or friends (66.1%), and medical doctors (56.1%). In addition, Herman et al. (2004) found that 22.6% of those who had ever used CAM had never mentioned their CAM use to their medical doctor, 66.6% had told their doctor, 8.0% said their doctor had suggested the therapies, and 2.7% were unsure. More CAM users with fibromyalgia (82.8%) told their doctor about their CAM use than did those with rheumatoid arthritis (69.7%; $p < 0.001$) or osteoarthritis (62.0%; $p < 0.001$). Finally, in a study that took place in outpatient hypertension clinics in Birmingham, United Kingdom 43.7% of patients reported CAM use (Gohar et al., 2008). This was reduced to 37.9% when excluding prayer. Only 6.7% reported ever being asked by their doctor about their CAM use.

A study of 620 Hispanic individuals in the USA found that 66.0% of herb use was recommended by their families (Howell, et al., 2006). About one-fourth (26.3%) of the participants indicated that herbs were often used to treat cough, 24.9% stomach pain, 20.3% sore throat, 19.1% menstrual cramps, 8.8% headache, and 7.2% chest pain. Overall, knowledge about herbs was lacking among the participants in the study. When asked about possible interactions that natural medicine could have with prescription

medicines, 35.1% thought herbs could interact, positively or negatively, with prescription medications. Howell et al. (2006) also found that 73.7% of respondents reported that their doctors had not inquired, in particular, about herb use. Nearly three-fourths (71.6%) of the entire sample would tell their doctor if they went to a *curandero* (spiritual healer). Only 15.0%, when asked how much do they reveal about their herb use, would “tell [their] doctor about all the [herbal] remedies that [they] use” and only 41.8% indicated that their doctor would understand their herb use.

Components of spirituality, such as prayer, may influence feeling confused during a visit to the doctor among Latinos. In a nationally representative sample of randomly chosen Latinos ages 18 and older living in the USA, 5.8% had consulted a *curandero*, 59.9% had prayed to be healed, and 69.2% consider spiritual healing as very important (Reyes-Ortiz, Rodriguez, & Markides, 2009). “Feeling confused” when encountering a physician correlated with consulting a *curandero*, praying to be healed, asking others to pray for healing, and considering spiritual healing important (Reyes-Ortiz, Rodriguez, & Markides, 2009). “Feeling frustrated” was correlated only with asking others to pray for healing.

Spirituality influences one’s choice of health care provider and must not be ignored (Petry & Finkel, 2004). In a study of 210 respondents attending five different health care practices in the USA, including CAM practitioners, a medical doctor (MD) and a MD practicing CAM in conjunction with allopathic medicine, researchers used the Spiritual Involvement and Beliefs Scale (SIBS; see Hatch et al., 1998) to determine if

spirituality can affect a patient's choice of health care practitioner (Petry & Finkel, 2004). Eighty percent of the respondents were females and 54% were between the ages of 30 and 49 years. Patients who chose their practitioner based on the practitioner's use of CAM scored higher on the SIBS than those who chose a family practitioner not based on CAM use. Patients who chose their health care practitioner based on his or her practitioner's use of CAM scored higher on questions regarding "spiritual experiences that changed their lives", "joy in their life relating to spirituality", "gratitude", and their self ascribed spirituality. A homeopath seems to be markedly distinguished in their spirituality, which, perhaps, is because of the integration of nature in their search for meaning (Petry & Finkel, 2004). Among those that used a chiropractor, 81% also went to a physician (79% informed their MD); among those who used a naturopath, 75% also went to an MD (68% informed their MD); among those who used a homeopath, 86% also went to an MD (76% informed their MD) (Petry & Finkel, 2004).

2.2.2. Spirituality, religious involvement, and medication adherence

Spirituality and religious involvement can influence adherence (Gohar et al, 2008; Kremer et al, 2006; Ironson et al, 2002; and others). Parsons et al. (2006) found that, among individuals in the southern USA living with HIV, religious practices positively influence adherence. Interestingly, they also found that certain religious beliefs may negatively influence adherence. In another study of people from the southern USA living with HIV/AIDS, more than half of the participants considered their

“spirituality/worldview” in their decisions about taking antiretroviral treatment (ART) (Kremer et al, 2006). Some felt supported by their spiritual beliefs to take ART (e.g., “they felt empowered by their spiritual beliefs to cope with the adverse effects of medication”, or “felt that not taking the best possible treatment was a ‘sin’”), whereas others said their spirituality/worldview gave them a reason not to take ART (e.g., “they felt that God will protect them and that they did not need medication”). The parent study (Ironson et al, 2002) established that “spirituality/religiousness” is associated with longer survival, healthier behaviors, more optimism, less distress, and low blood cortisol levels in people living with HIV.

Beliefs about God’s influence on one’s health and everyday life activities, which are two very important components of spirituality, may affect medication adherence among HIV/AIDS patients in the Florida, USA. Kremer, Ironson, & Porr (2009) interviewed people living with HIV – the sample was 41% African American, 29% Latino, 24% white, 6% other – about how spiritual beliefs and mind-body beliefs intertwine with treatment decision-making and treatment adherence (all patients had been offered ART). Thirty-five percent of their sample had less than high-school education and 53% were living on less than \$10,000 per year. Fifty-four percent said spiritual/mind-body beliefs (44% spiritual/10% mind-body) influenced decisions related to treatment. Participants who believed that God/Higher Power controls health were 4.75 times more likely not to take antiretroviral drugs than those who did not express this control belief ($p=0.032$). Participants who were treatment naive were 6.34 times more

likely than those who were treatment experienced to believe that God/Higher Power was controlling their health. Thirty-eight percent reported spiritual beliefs related to treatment adherence. The presence versus absence of the belief “Spirituality helps coping with side effects” was significantly associated with better adherence (i.e., lower frequency of and fewer reasons for missing doses, $p=0.002$) and fewer symptoms ($p=0.020$) (Kremer, Ironson, & Porr, 2009).

A study of Honduran people with epilepsy showed that the majority of patients with epilepsy used CAM and prayer for health reasons (Durón, et al., 2009). Durón et al. found that 93.7% of the patients were taking drugs for their seizures and 44.2% reported that they had stopped the treatment in the past. Forty-eight percent of patients reported non-adherence due to antiepileptic drugs (AED) unavailability, 16.5% due to AED being unaffordable. About half of the patients (51.5%) reported using CAM and 31.4% were using a variety of CAM and AED at the same time. The most common CAMs were prayer (75.8%), taking herbs (41.1%), and/or using potions (29.1%). That same study included a study of isolated rural Miskito tribesmen in Honduras. Over one-third (34.7%) of them gave names for epilepsy, such as *lasa prukisa* (22%), that were related to actions of or attacks by bad spirits or demons. Epilepsy etiologies suggested by the Miskito included bad spirits (24%), weakness or disease of the blood (12%), lack of sexual activity (10%), worries (10%), high or low blood pressure (10%), being unclean (8%), incomplete nutrition, or food intake (4%). The Miskito would first consult a traditional healer, *sukia*, if they had epilepsy. Thirty percent of the tribespeople said they

knew of an epilepsy treatment of Miskito medicine made of herbs from the community. Herbs mentioned by those interviewed were cotton leaves, *tayuyo*, *araspata* (“king aula” or “sleepy plant”), *kuma sirpi* (small, hot pepper), *mina pauni* (“the plant of the reddish small feet”), and *yutawa* (herb of the “yellow flowers of noon”). Only 6% of the Miskito tribesmen knew about AEDs. Durón and others (2009) provide valuable insight into health system utilization in Honduras, both at a country level and in remote rural areas.

CAM use may mediate the effect of spirituality and religious involvement on medication adherence. As mentioned earlier, there seems to be a strong relationship between CAM use and the use of prayer for health reasons in the USA (Bell et al., 2005). In an aforementioned study, of outpatient hypertension clinics in Birmingham, United Kingdom, 44.8% of CAM users and 60.5% of non-users reported perfect adherence to prescribed medication (Gohar et al., 2008). Gohar et al., 2008 also found that in female CAM users versus female non-users, 35.9% versus 63.9%, respectively, reported perfect adherence ($p=0.02$). Thus, there seems to be a relationship between spirituality, gender, CAM use, and medication non-adherence that deserves further attention.

Conceptual models may help establish culture specific approaches to patient-physician communication regarding spirituality and adherence. Lewis & Ogedegbe (2008) have developed a conceptual model of spirituality for African Americans living with HIV in the USA that may be helpful in understanding the role that spirituality plays in medication adherence. This model is unique to African Americans and may not be generalizable to other populations. The findings of Crane and others (2000) support

this model. In their study of HIV-positive women in the southern USA, who were mainly middle aged African Americans, 92% reported that prayer was an important source for HIV medication decision-making, and 59% considered prayer more important than the physician, which created a sense of conflict (Crane et al, 2000). Sixty percent of women said that the direction they received from prayer was different than the direction they received from their physician. Fifty-nine percent of the women wished that the physician knew more about the role of prayer in their decision-making, but only 62% even considered initiating such conversation with their physician. Factors that impeded such conversation included: unsuccessful experiences in the past and unsupportive behavior by the physician. Only 6% of the women said the physician knows about the role of prayer in their decision-making and that they had received a bearable response.

Understanding the relationship between spirituality, religious involvement, health systems use, and adherence, will be important for Honduran health policy makers because of the country's thriving spiritual and religious culture, widespread use of CAM, and relatively poor population health. At present, there are at least two hospitals in Honduras that integrate spirituality into medical care, Adventist Hospital in Valley of the Angels and Evangelical Hospital in Siguatepeque. There are also many health clinics run by Christian non-governmental organizations. Many of the aforementioned studies are from "developed" countries, such as the USA and UK. At the turn of the 21st century, over one-third (36.9%) of the documented foreign-born immigrants in the USA were from Central America (U.S. Census Bureau, 2004), and,

although many of the researchers previously cited have attempted to sample low-income Hispanic minority populations in the USA and UK, there is still a need for global data that represents the countries of origin. I will present empirical data on spirituality, religious involvement, health system use, and adherence from Tegucigalpa, the capital city of Honduras, Central America.

3. Materials and Methods

The ethical standards, questionnaire, and study protocol were approved by the bioethics committee of the National Autonomous University of Honduras (UNAH) and by the Duke University Institutional Review Board for the Protection of Human Subjects. Surveys were administered during July and August, 2010.

3.1. Questionnaire Development

The questionnaire examined the relationship between spirituality and health system use. It obtained cross-sectional data from the general urban population in Tegucigalpa, Honduras. The original questionnaire was written and administered in Spanish by the student researcher (M.P.C.), the in-country advisor and her assistant (R.M.D. and J.F.N., respectively) and translated into English for this paper. My primary objective was to better understand the impact of spirituality and religious involvement on allopathic and alternative health system use and adherence to medicine. We stratified health system use into preventive care and curative care in order to better understand any association they may have with spirituality and religious involvement. Finally, we collected data on the burden of selected diseases in order to get an idea of the general population health.

The questionnaire was piloted to patients' and their families at Centro Medico Lucas, an urban health care clinic founded by R.M.D. and her colleagues. Following this pilot, minor clarifications and revisions were made. The Honduran Bioethics Committee

at UNAH and the Duke University IRB approved all changes made to the original survey. The final Spanish version and English translation of the survey are included in Appendix A and Appendix B, respectively.

3.2. Measures

3.2.1. Demographics, population health, and beliefs

The questionnaire collected data on population demographics, health beliefs, and disease burden in the previous 12 months before the study. Demographic variables were age, gender, domicile classification, education, income last month, and employment.

3.2.2. Spirituality and religious involvement

The questionnaire asked questions about spirituality and religious involvement. It asked about religious affiliation, church attendance, private devotion time, and self-rated spirituality. We also asked about the importance ascribed to God and evil spirits in causing and curing sickness, but this component of spirituality is not thoroughly analyzed here. Access to churches should not have been a source of bias because there are many churches accessible within urban Tegucigalpa. Illiteracy should not have been a source of bias either because prayer, which is a spiritual activity not reliant on literacy, and reading were combined in the same question to measure private devotional time.

Spirituality and religious involvement variables were dichotomized differently for different analyses. The categories for self-rated spirituality, religious affiliation, church attendance, private devotion time, and health beliefs variables (Table 12,

Appendix D), did change across, but were held constant within, an analysis. The motivation behind this method, in the case of the health systems use analyses, was to determine if any spirituality or religious involvement had associations with utilization; therefore, spirituality and religious involvement variables were dichotomized (Yes/No) to reflect these two groups. The motivation of this method, in the case of relative adherence, was to test the possible association between one's own spirituality or religious involvement and the risk of non-adherence to medicine; therefore, the self-rated spirituality variable was dichotomized to isolate those who saw themselves as "very spiritual." The religious involvement variables were dichotomized to reflect faithfulness to frequent church attendance (at least weekly) and daily devotional time (at least daily).

3.2.3. General health system utilization

In order to determine general health system utilization within the urban population in Tegucigalpa, we examined the use of the allopathic medical system as well as alternative medical system. Each medical system was separated into hypothetical and actual use.

3.2.4. Hypothetical health system utilization

Dichotomous variables were created for hypothetical first choices of medical system. A list of health problems was presented to the respondent along with the following question: "What would you do first if you were to have each of the following

health problems?" Respondents could answer: I would "go to the physician," "use natural medicine," or "combine the two." If respondents would not do any of the three, the surveyors wrote either "nothing" or another treatment the respondent would use. (These were mainly medicines from a local pharmacy.) Then I generated a hypothetical physician use score (0=low, 10=high) as a sum of individual responses for each disease (Did they chose the physician? 0= no, 1=yes), a hypothetical natural medicine use score (0=low, 10=high) as sum individual responses for each disease (0= no, 1=yes), and a hypothetical combination use score (0=low, 10=high) as a sum of individual responses for each disease (0= no, 1=yes). I dichotomized hypothetical use scores for the use of the physician, natural medicine, and a combination at their medians.

3.2.5. Actual health system utilization

We estimated allopathic medical system use. The actual use of health system in the previous 12 months was either "for prevention" or "for curative" reasons ("sick use"). The following question was used to estimate the use of preventive care: "Did you visit a physician for routine check-up in the last year?" Physician consult indicated the use of the allopathic medical system (Yes/No). If the respondent received medicine from any physician in the previous year, they were said to have accessed the allopathic medical system for curative purposes.

We estimated the utilization of CAM. After consultation with R.M.D. and other Honduran colleagues, a succinct list of widely used local alternative treatments was

determined. The list included the following alternative treatments: “herbs/teas,” “pills with natural ingredients,” “acupuncture,” “*sabada*,” a traditional massage with oils, “prayer to God,” “prayer to saints,” “consult with a *curandero*,” a traditional spiritual healer, and “consult with a *naturista*,” someone who specializes in herbal remedies. The respondents were asked to indicate whether or not they had used any of these treatments in the previous year “to prevent” (Yes/No) or “to cure” (Yes/No) sickness. CAM users were those who used one or more CAM modality. We also collected data on “other” alternative treatments used, if they were not listed already. The use of prayer was excluded as a possible CAM for all outcome variables.

3.2.6. Relative adherence to medication

In order to measure relative adherence, I used the Medication Adherence Report Scale (MARS) (Horne and Weinman, 2002). This method has been validated in a previous study (Kravitz et al., 1993). If the respondent had received any form of medicine from a physician for any reason within the previous 12 months, I calculated an adherence score. The questions used for the MARS were adopted from Horne and Weinman (2002). The possible responses were simplified to Yes/No instead of a range from never to always (0-5, respectively). The nine questions used by Horne and Weinman (2002) were translated to Spanish by R.M.D. and piloted in order to identify the six most common reasons for non-adherence. These six were then used in the final survey. The final MARS scale ranged from zero to six. The number of “yes” responses

equaled their score. The score represented the relative risk of non-adherent behavior, with zero representing adherent behavior, and six representing a high risk of non-adherent behavior.

The MARS variable was also dichotomized at median (two); a MARS of zero to two indicated a low risk of non-adherent behavior and a MARS score of three to six indicated a high risk of non-adherent behavior

3.3. Sampling

A single survey was administered to 731 people, 18 years of age and older, within the general population of urban Tegucigalpa, Honduras. My Honduran colleagues selected various neighborhoods and “high traffic” areas within the city. These neighborhoods represented areas of the low, middle, and some upper classes. When administering surveys in the neighborhoods, the survey team went door-to-door; if no one answered, surveyors would continue on the next household. All surveys were administered during the day on Monday thru Saturday. We did not return to households we skipped nor did we survey each neighborhood in its entirety. For high “traffic areas”, such as local plazas and malls, I obtained permission from local authorities if such permission was required.

My aim was to obtain a quota sample of the urban population in Tegucigalpa. Only about 10-15% of the urban population enrolls in a university (Fundacion para la Education Ricardo Ernesto Maduro Andreu, 2005), and 39% of our sample had enrolled

in a university. We determined that we would eliminate the surveys administered at a local university (UNAH), which was oversampled, and added university enrollment to the exclusion criteria. No information was collected on those who refused to take the survey.

3.4. Survey team and survey administration

The survey team consisted mostly of medical students from the UNAH and some trained persons working on other projects with R.M.D. To avoid predisposition on the population surveyed, neither the medical students nor the other members of the survey team wore work or medical uniforms. R.M.D and her assistant J.F.N. administered some surveys themselves and helped organize and supervise the fieldwork. Safety issues for the survey team were also accounted for when going out to the survey locations. Details regarding the administration of the survey were discussed in detail before each outing to maintain consistency and address any issues from the previous day. The students were divided into groups of no more than four, and one supervisor was assigned to each group. Each supervisor had prior experience administering surveys from a recent similar pilot study on religion and health behavior in June 2010. The supervisors did not administer surveys themselves. He or she evaluated the surveys once completed and reported any problems back to the primary investigator (M.P.C.).

3.4.1. Ethics and verbal consent

Survey team members conducted themselves with the utmost respect when approaching prospective respondents, administering the survey, and when answering any follow-up questions. When approaching a prospective respondent, surveyors obtained verbal consent by following the general outline of the script in Appendix C, which has been translated from the original Spanish into English for this paper.

3.5. Limitations

There are limitations to our method and sample approach. By eliminating the surveys from UNAH, the average amount of education within our sample is less yet more similar to the general urban population. In addition, our results may differ from those found in rural Honduras or more remote cultures. Our survey does not obtain utilization data on all possible forms of health care one could receive nor does it obtain actual utilization data from local hospitals. We specifically asked about physicians, which exclude consultations with nurses or other health personnel that play a large role in the allopathic health care system. When estimating CAM use, although we tried to narrow down the list of possible CAMs to those most common in Tegucigalpa, there are many home-remedies or CAMs that people use that they may not consider “medicine.” Finally, since spirituality can be very complex to measure, we chose to look only at a few components of spirituality, namely self-rated spirituality and the beliefs about supernatural influences on health. Therefore, although we are measuring some

components of spirituality, we cannot say that our measure accurately measures one's spirituality in its entirety.

4. Data Analysis

The survey data was entered and stored in EpiInfo™ (Atlanta, Georgia) by M.P.C. Data were transferred to Microsoft Excel 2007 (Redmond, Oregon) for further checking and cleaning. Upon independent consultation with R.M.D. and K.R.H., missing or inconsistent data were clarified using the original surveys as a reference. Data were analyzed using STATA version 11 (College Station, Texas). For all stratified analyses, I ran chi-square tests of association or fisher exact tests if the chi-square test was significant but any cell size was less than ten. Only p-values of less than 0.05 were accepted as significant.

5. Results

5.1. Description of the study population

A total of 731 individuals completed the IRB approved survey. However, after excluding 131 surveys, 600 surveys were included in the study. The entire sample from UNAH was excluded from the final sample. These 117 surveys were excluded due to a previous oversampling of students; the initial percentage of students in our sample showed that this sub-group was markedly over-represented. Fourteen surveys were excluded because they were missing key demographic, spirituality, or religious involvement variables. Within the final sample, 50.0% of individuals surveyed were male and 50.0% were female. Nearly all (90.7%) respondents lived in the urban area. Respondents from rural areas may have been working or living in the city temporarily. The mean age was 40.8 (+/- 16.4) years old. See Table 1 for the description of the study population by standard demographics.

The respondents were spiritual and highly involved in their religion across all variables (Table 2). The majority identified with a religion (85.5%). Almost half (44.8%) of the total sample was Evangelical, 34.2% was Catholic, 1.2% Mormon, 1.2% Jehovah's Witness, and 3.2% was "other". The majority of the sample (56.5%) attended church at least weekly, and 53.8% of the sample prayed, read the Bible, or read other spiritual books daily. Only 6.3% of respondents rated themselves as not spiritual. Nearly all respondents (93.2%) believed that prayer to God was "very important" in curing

sickness (Table 12, Appendix D). Interestingly, 40.7% believed that evil spirits influence health by causing disease (Table 12, Appendix D).

Table 1: Sample characteristics (N=600).

Variable	n	%
Gender		
Male	300	50.0%
Female	300	50.0%
Domicile		
Urban	544	90.7%
Rural	52	8.7%
Did not respond	4	0.7%
Education		
Did not study	37	6.2%
Some primary	15	2.5%
Primary complete	210	35.0%
Secondary complete	184	30.7%
Some college	111	18.5%
College complete	43	7.2%
Income last month		
< \$53	26	4.3%
\$53-\$158	60	10.0%
\$159-\$264	71	11.8%
\$265-\$370	100	16.7%
\$371-\$475	72	12.0%
\$475+	162	27.0%
Did not know / want to respond	109	18.2%
Employment		
Unemployed	273	45.5%
Employed	317	52.8%
Did not respond	10	1.7%
Unemployed in the formal workforce	196	32.7%
Employed in the formal workforce	300	50.0%
Student	49	8.2%
Other ¹	45	7.5%
Did not respond	10	1.7%

¹ Other included: housewife, retired, and self-employed.

Table 2: Sample characteristics continued (N=600).

Variable	n	%
Religion		
Catholic	205	34.2%
Evangelical	269	44.8%
Jehovah's Witness	7	1.2%
Mormon	7	1.2%
None	93	15.5%
Other	19	3.2%
Church attendance		
Daily or almost daily	113	18.8%
Weekly	226	37.7%
Twice a month	37	6.2%
Monthly	90	15.0%
Never	134	22.3%
Private devotion time		
Daily	323	53.8%
Multiple times per week	90	15.0%
Weekly	61	10.2%
Monthly	64	10.7%
Never	62	10.3%
Self-rated spirituality		
Not spiritual	38	6.3%
Some spiritual	369	61.5%
Very spiritual	193	32.2%

The burden of disease within the study population in the previous year is described in Table 3. The most prevalent health problems were flu (58.7%), depression and anxiety (28.3%), respiratory problems (23.2%), and high blood pressure (20.8%). Skin disease contributed the highest number of sick days on average (81.1 days), which was skewed by respondents with seemingly chronic skin disease (indicated by the presence of skin disease 365 days a year). Respondents were bothered most by their arthritis (bother score, 2.32) and least bothered by their diabetes (bother score, 1.71).

Table 3: Health characteristics of the study population (N=600).

		Prevalence		Total sick days ¹		Bother score ²	
		n	%	Mean	SD	1-3	SD
Flu	Yes	352	58.7%	31.8	64.3	2.02	0.86
Fever	Yes	174	29.0%	7.4	17.8	2.21	0.88
Diarrhea	Yes	103	17.2%	14.7	52.5	2.03	0.89
Respiratory problem	Yes	139	23.2%	64.2	114.9	2.22	0.84
Skin disease	Yes	79	13.2%	81.1	121.0	2.03	0.93
Depression, anxiety	Yes	170	28.3%	61.0	108.4	2.16	0.82
Arthritis	Yes	85	14.2%	Frequency and duration data were not collected for chronic diseases.		2.32	0.80
Diabetes	Yes	33	5.5%			1.71	0.82
High blood pressure	Yes	125	20.8%			1.85	0.85

1 Total sick days = Frequency (# of episodes last year) x Duration (average duration of each episode)

2 Bother score (1=It bothered me a little, 2=It bothered me some 3=It bothered me much)

5.1.1. Description of hypothetical use of health systems

When faced with a wide range of health problems, the respondents said they would go to a physician the majority of the time. The only noticeable trend in natural medicine use was for a sore throat, stomach pain, and diarrhea. Overall, about 10% responded that they would combine natural medicine with a visit to the physician. This response was consistent across all health problems. Interestingly, respondents reported that they would go to the physician first for dengue more than any other health problem (88.4%). This study took place in the middle of a dengue epidemic in Honduras. The

national media drew attention to the seriousness of dengue fever and the risk of death associated with improper management of the disease. It is also worth noting that for headache and diarrhea, 19% and 10.4%, respectively, of respondents indicated that they would do something other than go to a physician or use natural medicine (Table 13, Appendix D). Although the “other” category was not specifically analyzed, many, if not all, of “other” responses were over the counter medicine from the pharmacy, such as acetaminophen or an anti-diarrheal.

5.1.2. Description of the actual use of health systems

According to my estimates, respondents used at least one of several alternative health systems examined more than the allopathic health system (96.0% vs. 83.2%, respectively, Table 4). However, when prayer is excluded, more people used the allopathic health system (83.2% vs. 72.0%, respectively). Details about the actual use of preventive and curative health systems, by allopathic and alternative services, are described in Table 5 and Table 6.

5.1.3. Description of the actual use of preventive health services

Nearly three-fourths (74.7%) of the respondents used some form of non-prayer preventive treatment – allopathic, alternative, or both (Table 5). Most of the respondents had visited a physician for a routine check-up in the previous year (62.7%). Among those that went for a routine check-up 36.4% went to a private clinic. Prayer to God for health was the most common alternative treatment used for prevention of sickness

(93.9%), and the next most common CAM was herbs or teas (25.5% of CAM users). In all 38.6% of respondents used at least one non-prayer CAM to prevent sickness in the previous year. Only 12.8% of the respondents went to a CAM practitioner in the previous year. In addition, only 1.7% (10/600) of respondents said they had used an alternative treatment other than one of the treatments we presented. Please see Table 5 for more details on the use of preventive health services.

Table 4: Actual use of all health systems in the previous year.

Variable	N¹	n	%
Used the allopathic health system*	600	499	83.2%
Used an alternative health system*	600	576	96.0%
Excluding prayer	597	430	72.0%

* May have used multiple services

¹ This displays the sample size for outcome variables less missing values

Table 5: Actual use of preventive health systems in the previous year.

Variable	N ¹	n	%
Used preventive health services*	600	567	94.5%
Excluding prayer		448	74.7%
Had a routine check-up with an allopathic doctor	597	374	62.7%
IHSS ²		87	23.3%
Public		166	44.4%
Private		136	36.4%
Used CAM	598	541	90.5%
Herbs/ teas*		138	25.5%
Pills*		94	17.4%
Prayer to God*		508	93.9%
Prayer to saints*		84	15.5%
Used non-prayer CAM	597	230	38.6%
Used a CAM Practitioner	600	77	12.8%
Acupuncture*		8	10.4%
Massage (<i>sobada</i>)*		51	66.2%
Consult <i>curandero</i> *		6	7.8%
Consult <i>naturista</i> *		28	36.4%

* May have used multiple services

1 This displays the sample size for outcome variables less missing values

2 Hospital of the Social Security Institute of Honduras

5.1.4. Description of the actual use of curative health services

Almost all of the people surveyed (92.0%) had accessed a non-prayer curative health service in the previous year (Table 6). Over three-fourths (78.2%) of respondents had received medicine from a physician in the previous year and 63.1% had used a non-prayer CAM. Prayer was the most common CAM used (93.3% of respondents used prayer to God for curative health reasons in the previous year and 16.1% used prayer to saints). The most common non-prayer CAM was herbs and teas (283/552, 51.3%). CAM practitioners were used by 30.0% of the respondents for curative health reasons and a

traditional massage (*sobada*) was the most commonly received service (87.2% of curative CAM practitioner use), which means 26.2% of the entire sample received a *sobada* in the previous year. Only 1.5% (9/600) of respondents said they had used an alternative treatment other than one of the ones we presented.

5.1.5. Description of relative adherence to medication

The majority of the people (81.1%) who had received medicine in the previous year reported at least some non-adherent behavior (Table 6). On average, respondents who received medication from a physician in the previous year reported two to three of the following non-adherent behaviors: “altered the dose,” “forgot to take the medicine,” “stopped taking it for a while,” “only used it when [they] felt sick,” “decided to miss a dose here and there,” or “tried not take the medicine if possible” (Please see Table 6 for more details).

Table 6: Actual use of curative health systems in the previous year.

Variable	N	n	%
Used curative health services*	598	586	98.0%
Excluding prayer	597	549	92.0%
Received medicine from a physician	596	466	78.2%
		2.41 (+/- 1.8)	
MARS ¹ mean (SD)			
Reported perfectly adherent behavior		88	18.9%
Reported non-adherent behavior		378	81.1%
Alter the dose		80	21.2%
Forget to take it		76	20.1%
Stop taking it for a while		85	22.5%
Only use it when I feel sick		66	17.5%
Decide to miss a dose here and there		50	13.2%
Not take it if I don't have to		21	5.6%
High reported adherence ²		244	52.4%
Low reported adherence ³		222	47.6%
Used CAM	597	552	92.5%
Herbs/ teas*		283	51.3%
Pills*		78	14.1%
Prayer to God*		515	93.3%
Prayer to saints*		89	16.1%
Used non-prayer CAM	596	376	63.1%
Used a CAM Practitioner	599	180	30.0%
Acupuncture*		11	6.1%
Massage (<i>sobada</i>)*		157	87.2%
Consulted <i>curandero</i> *		7	3.9%
Consulted <i>naturista</i> *		34	18.9%

* May have used multiple services

1 Medication Adherence Report Score (0-6)

2 MARS score of 0-2 (i.e. reported 0-2 of the above behaviors)

3 MARS score of 3-6 (i.e. reported 3-6 of the above behaviors)

5.2. Associations between demographics, health beliefs, disease and health system use

5.3.1. Hypothetical use of health systems

Demographic variables had significant associations with hypothetical health system use. Respondents were significantly more likely to say they would choose the physician first if they were older than 25, were from an urban area, had less than secondary education, not a student, believed that physicians are important to cure sickness, believed that natural medicine is not important to cure sickness, knew that natural medicine has harmful side effects, and knew natural medicine can interfere with medicine from a physician (Tables 15 and 16, Appendix E). Respondents were significantly more likely to use a combination first¹ if they were 18-24 years old, had at least a secondary education, were unemployed, were students, believed that natural medicine is important to cure sickness, and thought natural medicine does not interfere with medicine from the physician (Table 14 and 16, Appendix E).

5.3.2. Actual use of preventive health systems

Demographic variables had significant associations with actual use of preventive health system use. Respondents who were older than 25 years and female were also significantly more likely to have had a routine check-up in the previous year (Tables 17 and 18, Appendix F) ($p < 0.001$). In addition, having skin disease, arthritis, diabetes, or

¹ Hypothetical uses of natural medicine and combination treatment were dichotomized at their medians, zero for both, of the corresponding hypothetical use score from 0-10; the majority of respondents chose said they would choose a physician first, which is why this score is skewed and the median is zero.

high blood pressure also significantly increased the likelihood of also going for a routine check-up (Table 18, Appendix F). Respondents who were older than 25, employed, and believed natural medicine was an important cure for sickness were more likely to have used non-prayer CAM in the previous year (Tables 17 and 18, Appendix F). Depression and arthritis were also significantly associated with non-prayer CAM use in the previous year (Table 18, Appendix F). Finally, respondents who were male, employed, believed evil spirits cause sickness, and believed physicians are not important in curing sickness, were significantly more likely to use a CAM practitioner (Tables 17, 18, and 19, Appendix F).

5.3.3. Actual use of curative health systems

Demographic variables had significant associations with the use of curative health systems. Respondents who were older than 25 years and female were more likely to have received medicines last year ($p < 0.05$, Tables 20 and 21, Appendix G). All health problems except fever were significantly associated with receiving medicine (Table 21, Appendix G). Having the flu and/or depression and anxiety was associated with the use of a CAM practitioner (Table 21, Appendix G). The beliefs that evil spirits are important in causing sickness, physicians are not important, and that natural medicine is important were significantly associated with non-prayer CAM use for curative purposes (Tables 20 and 21, Appendix G). Those who thought prayer to God was very important in curing sickness were more likely to have used non-prayer CAM in the previous year compared

to those who believed prayer to God is not or only of some importance (64.1% vs. 47.5% respectively, $p < 0.05$). In addition, having had diarrhea or a respiratory problem in the previous year was also significantly associated with non-prayer CAM use (Table 21, Appendix G). Respondents who were men, employed, believed that evil spirits cause sickness, and believed physicians are not important in curing sickness were more likely to use a CAM practitioner (Tables 20 and 21, Appendix G).

5.3.4. Adherence to medicine received from a physician

Respondents who were older than 25 were more likely to report high adherence to medicine received in the previous year (Table 22, Appendix H). Finally, those who believed natural medicine is very important in curing sickness were less likely to report high adherence (Table 23, Appendix H). Self-reported health problems had significant associations with adherence (Table 24, Appendix H). Respondents who had the flu, a fever, diabetes, or high blood pressure in the previous year were more likely to report high adherence.

5.3.5. Respondents' comfort disclosing CAM use to a physician

Those who did not want to respond to our question about income or did not know their income last month were more likely to not feel comfortable disclosing their CAM use to their physician compared to others (Table 25, Appendix I). In addition, those who believed that natural medicine is very important in curing sickness were

more likely to feel comfortable disclosing their CAM use to a physician compared to those who thought natural medicine is not or some important (Table 26, Appendix I).

5.3. Crude associations between spirituality, religious involvement and health system use

5.3.1. Hypothetical use of health systems

There were no associations between any spirituality or religious involvement variables and hypothetical health system use (Table 7). Those who attended church were more likely than those who did not to say they would choose to go to a physician first² when faced with various health problems (55.4% vs. 47.0%, respectively), but this was not significant. Those who had a private devotion time were less likely to say they would combine a visit to the physician with natural medicine (32.5% vs. 43.6%, respectively) but this was also not significant.

5.3.2. Actual use of preventive health systems

Spirituality and religious involvement variables had significant crude associations with going for routine check-ups with an allopathic doctor in the previous year (Table 8). Respondents were significantly more likely to have had a routine check-up if they identified with a religion, attended church at least monthly, and committed time to private devotion ($p < 0.001$). In addition, those who identified themselves as at

² Hypothetical use of the physician was dichotomized at the median, seven, of the hypothetical use score, which ranged from 0-10.

least “some spiritual” were more likely to have gone for a routine check-up in the previous year ($p<0.05$).

5.3.3. Actual use of curative health systems

Spirituality and religious involvement variables had significant crude associations with use of the curative health system, estimated by the receipt of medicine from a physician in the previous year (Table 9). Respondents who identified with a religion and attended church at least monthly were significantly more likely to have received medicine from an allopathic doctor ($p<0.001$). Those committed to a private devotion time were more likely to have received medicine was well (78.6% vs. 69.4%) but this crude association was not significant. Catholics were more likely to have used a CAM practitioner compared to Evangelicals³ (36.1% vs. 26.8%, respectively, $p<0.05$). Those self-rated as spiritual were more likely to use non-prayer CAM (63.5% vs. 50.0%) but this association was not significant.

³ Analysis not shown here

Table 7: Crude associations of spirituality variables with the hypothetic use of health systems.

Variable	N	Physician ¹			Natural Medicine ¹			Combination ¹		
		n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Religion										
No	93	52	55.9%	0.612	41	44.1%	0.495	28	30.1%	0.429
Yes	507	269	53.1%		243	47.9%		174	34.3%	
Church attendance										
No	134	63	47.0%	0.088	72	53.7%	0.092	47	35.1%	0.696
Yes	466	258	55.4%		212	45.5%		155	33.3%	
Private devotion time										
No	62	33	53.5%	0.964	25	40.3%	0.243	27	43.6%	0.082
Yes	538	288	53.5%		259	48.1%		175	32.5%	
Self-rated spirituality										
Not Spiritual	38	20	52.6%	0.912	14	36.8%	0.181	13	34.2%	0.942
Some/Very spiritual	562	301	53.6%		270	48.0%		189	33.7%	

1 Dichotomized at the median

2 Pearson chi-square (2-sided)

Table 8: Crude associations of spirituality variables with the use of preventive health systems in the previous year.

Variable	N	Had routine care			Used non-prayer CAM ¹			Used CAM Practitioner		
		n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Religion										
No	93	40	43.0%	0.000	31	33.3%	0.281	14	15.1%	0.486
Yes	507	334	65.9%		199	39.3%		63	12.4%	
Church attendance										
No	134	59	44.0%	0.000	46	34.3%	0.279	18	13.4%	0.814
Yes	466	315	67.6%		184	39.5%		59	12.7%	
Private devotion time										
No	62	25	40.3	0.000	24	38.7%	0.949	6	9.7%	0.433
Yes	538	349	64.9%		206	38.3%		71	13.2%	
Self-rated spirituality										
Not Spiritual	38	18	47.4%	0.049	9	23.7%	0.037 \$	5	13.2%	0.951
Some/Very spiritual	562	356	63.3%		221	39.3%		72	12.8%	

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

\$ Fisher exact (2-sided) due to small cell size

Table 9: Crude associations of spirituality variables with the use of curative health systems in the previous year.

Variable	N	Received Medicine from Physician			Used non-prayer CAM ¹			Used CAM Practitioner		
		n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Religion										
No	93	57	61.3%	0.000	58	62.4%	0.948	26	28.0%	0.640
Yes	507	409	80.7%		318	62.7%		154	30.4%	
Church attendance										
No	134	84	62.7%	0.000	80	59.7%	0.421	39	29.1%	0.797
Yes	466	382	82.0%		296	63.5%		141	30.3%	
Private devotion time										
No	62	43	69.4%	0.097	37	59.7%	0.607	13	21.0%	0.101
Yes	538	423	78.6%		339	63.0%		167	31.0%	
Self-rated spirituality										
Not Spiritual	38	29	76.3%	0.836	19	50.0%	0.095	10	26.3%	0.609
Some/Very spiritual	562	437	77.7%		357	63.5%		170	30.3%	

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

5.3.4. Adherence to medicine received from a physician

Spirituality and religious involvement variables had significant associations with self-reported relative risk of non-adherent behavior to medicine received from a physician in the previous year (Table 10). Catholics were significantly more likely to report adherent behavior when compared to Evangelical⁴ (57.9% vs. 47.5%, respectively, $p < 0.05$). In addition, those who had daily private devotion time were more likely to report highly adherent behavior when compared with those who had less than daily private devotion time (58.9% vs. 44.2%, respectively, $p < 0.01$).

⁴ Analysis not shown here

Table 10: The association of spirituality variables with adherence to medicine received from a physician in the previous year.

		Relative Adherence ¹				
		Low		High		
Variable		n	%	n	%	P-value ²
Religion						
	No	28	49.1%	29	50.9%	0.460
	Yes	194	47.4%	215	52.6%	
Church attendance						
	< Weekly	96	52.5%	87	47.5%	0.094
	≥ Weekly	126	44.5%	157	55.5%	
Private devotion time						
	< Daily	115	55.8%	91	44.2%	0.002
	≥ Daily	107	41.2%	153	58.9%	
Self-rated spirituality						
	Not/Some Spiritual	149	48.7%	157	51.3%	0.592
	Very spiritual	73	45.6%	87	54.4%	

1 From MARS. (Adherence was not based on actual adherence, but is the relative risk of adherent behavior.)

2 Pearson chi-square (2-sided)

5.3.5. Respondents' comfort disclosing CAM use to a physician

Spirituality and religious involvement variables had significant associations with whether or not the respondent felt comfortable disclosing their use of CAM to a physician (Table 11). Those who had a private devotion more than once per week were significantly more likely to say that they would disclose their CAM use to physician when compared to those who had private devotion time weekly or less than weekly (91.3% vs. 85.3%, respectively, $p < 0.05$). In addition, those self-rated as spiritual were more likely to feel comfortable when compared who said they were not spiritual (90.0% vs. 75.8%, respectively, $p < 0.01$). Without a doubt, these patients are eager to be healthy. But, are their physicians as eager to offer best practices? Figure 1 shows the percentage of respondents who had ever been asked if they were using natural or CAM.

Table 11: The association of spirituality variables with the respondent's comfort telling a physician about their CAM use.

Variable	Feels Comfortable Telling a Physician About CAM Use ¹				P-value ²
	No		Yes		
	n	%	n	%	
Religion					
No	7	8.3%	77	91.7%	0.466
Yes	51	11.0%	413	89.0%	
Church attendance					
< Weekly	25	10.4%	215	89.6%	0.911
≥ Weekly	33	10.7%	275	89.3%	
Private devotion time					
≤ Weekly	25	14.7%	145	85.3%	0.035
> Weekly	33	8.7%	345	91.3%	
Self-rated spirituality					
Not Spiritual	8	24.2%	25	75.8%	0.009
Some/Very spiritual	50	9.7%	465	90.3%	

¹ Respondents could respond "Does not apply"

² Pearson chi-square (2-sided)

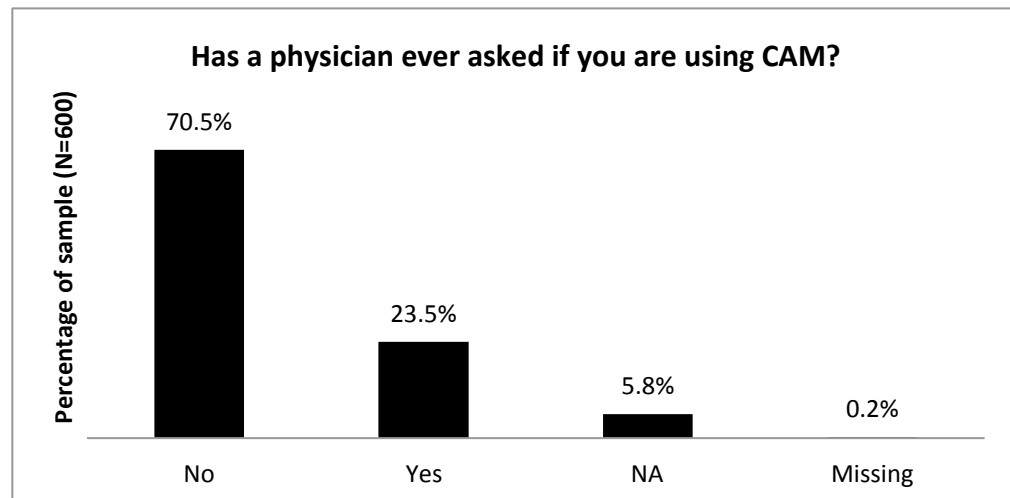


Figure 1: Percentage of respondents who had ever been asked if they were using CAM by a physician⁵.

⁵ Not applicable - respondents answered "NA" if they had never seen a physician.

6. Discussion

The data we have obtained on adult spirituality, religious involvement, and health system utilization from the developing country of Honduras suggest that spirituality and religious involvement may have a significant positive association with health behavior. Spirituality and religious involvement were shown to have some crude associations with positive utilization of the allopathic medical system and medication adherence. These factors, equally, have a place in health care from start to finish, not just in end-of-life care, and physicians and health policy makers should consider promoting a holistic view of health care. This may 1) lower the financial burden of health systems by increasing the use of preventive services, 2) make people healthier by influencing their health-seeking behavior, and 3) improve patient-physician communication about CAM use. Finally, the widespread use of CAM makes scientific research on CAM even more important to ensure that it is used appropriately, safely, and effectively as it is integrated into allopathic and other medical systems (WHO, 2002a).

6.1. Increasing the use of preventive services

Increasing the use of preventive health services will be highly beneficial (WHO, 2002b). Chronic diseases in particular pose a threat from both a health and economic standpoint; the most disabling conditions are cardiovascular diseases, cancer, diabetes, and chronic respiratory disease, which are share preventable risk factors (WHO, 2002b). Our sample reported a number of chronic diseases (Table 3), including arthritis (14.2%),

diabetes (5.5%), high blood pressure (20.8%). How can we increase the use of promote healthy behavior? The WHO says it best: “To promote prevention in health care, awareness raising is crucial to promote a change in thinking and to stimulate the commitment and action of patients and families, health care teams, communities, and policy-makers,” and one of essential elements will be to “support a paradigm shift towards integrated, preventive health care” (2002b).

Religious or spiritual practices may influence proactive health behavior within the urban population of Tegucigalpa, Honduras. Spirituality and religious involvement variables had significant associations with going for routine check-ups with an allopathic doctor in the previous year. Respondents were significantly more likely to have had a routine check-up if they identified with a religion, attended church at least monthly, and/or committed time to private devotion. In addition, those who self-rated themselves as spiritual were more likely to have gone for a routine check-up in the previous year. This supports other findings that religion can positively influence the use of preventive health services (Benjamins & Brown, 2004). However, since the correlation between self-rated spirituality is weak, it is likely that only the spiritual/religious practices that include such activities as church attendance and private devotion time are strong predictors of routine allopathic care compared to self-rated spiritual/religious beliefs. This supports the findings of Parsons et al. (2006) that religious practices have a positive influence on adherence. I conclude that, in order to promote preventive health,

it will be important to understand the influence that spirituality and religious involvement have on proactive health behavior.

6.2. Promoting healthy behavior through local churches

Spirituality and religious involvement variables were shown to have significant associations with the use of curative health systems. Respondents who identified with a religion and attended church at least monthly were significantly more likely to have received medicine from an allopathic doctor. Churches often host medical mission teams from other countries, namely the United States, which would weaken the accuracy of our indicator used to estimate the “sick” use of the allopathic medical system since those who go to church will be more likely to receive medicine from a physician. However, the presence of medical mission teams in Tegucigalpa should not be discounted as an avenue for the provision of health services. The promotion of these mission-based clinics often brings in those who are seeking medication, not necessarily those seeking health care due to specific ailments. It appears from my observation that it is not uncommon for patients to arrive at a mission-based clinic with a myriad of illnesses that are really more a sum of the last year’s health problems, even if they are currently not experiencing any of these issues. This problem is likely also present in the use of public hospitals as well and eliminating this measurement error may not be possible. Therefore, although some spiritual practices may delay seeking health care (Insaf, Jurkowski, & Alomar, 2010), those who associate with a religion and are actively involved in that

religion by going to church are more aware of the health system and how to access it when they are sick. I conclude that, where religious involvement is already common, such as within the urban population in Tegucigalpa, it would be wise for physicians and health policy makers to consider the church as an avenue to promote proactive health behaviors.

6.3. Patient-physician communication

If we are ever going to ensure that CAM is used appropriately, safely, and effectively as it is integrated into allopathic and other medical systems (WHO, 2002a), it will be important to ensure that patients and physicians are communicating well regarding CAM use. Spirituality and religious involvement variables were shown to have significant associations with whether or not the respondent felt comfortable disclosing their use of CAM to a physician. Those who had a private devotion more than once per week were more likely to say that they would disclose their CAM use to a physician when compared to those who had private devotion time weekly or less than weekly. In addition, those self-rated as spiritual were more likely to feel comfortable disclosing their CAM use to a physician when compared who said they were not spiritual.

The patient population in urban Tegucigalpa, Honduras is highly spiritual, and very active in living out their faith. I have shown that these characteristics are positively influencing their health behavior. Potential patients, like those presented in this study,

are limited in their abilities to provide sufficient health services for themselves. Many of these services are only provided through the allopathic medical system. In addition, many of these health services may be affected by their use of alternative or natural medicines. It is true that CAMs can benefit one's health, but more research needs to be done in order to be sure of its safety and efficacy. At worst, the CAM can hinder, disrupt, or interact with the medicine prescribed by a physician, causing harm to the patient. Both clinician initiation and patient knowledge about the safety and effectiveness of the CAM is important to patient-physician communication (Shelley et al., 2009). In this case, it is vitally important that the physician knows the status of their patient with regard to their use of alternative health systems. It appears that physicians can solve the problem by simply asking, "Do you use alternative or natural medicine?," and then making necessary adjustments in their patient care.

6.4. Religious involvement and adherence

Spirituality and religious involvement variables were shown to have significant associations with self-reported relative risk of non-adherent behavior to medicine received from a physician in the previous year. Catholics were more likely to report adherent behavior when compared to Evangelicals. In addition, those who had daily private devotion time were more likely to report adherent behavior when compared with those who had less than daily private devotion time.

Non-adherence can be detrimental to one's health (Herman et al, 2003; Paterson et al, 2000) and place a larger economic burden on the allopathic health system (Davis, Candrilli, Edin, 2008). Please consider the following medical patient scenario as an example. A young adult female has just been diagnosed with HIV, a disease that requires strong adherence to antiretroviral therapy (ART). I have suggested that, when giving her the prescription for the ART, the physician should ask, "Do you spend some time each day praying and/or reading the spiritual or religious books?" If she says "No, I am not very spiritual," the physician could respond, "Look, I really want you to live a long and healthy life, which is possible given the efficacy of the therapy I am prescribing for you, but, in order for that to happen, it is really important that you take your medicine every day. In fact, I am going to have the nurse call you and make sure you are taking the medicine as prescribed." A simple dialogue, as noted above, could make a major difference in patient management and prognosis. It is important, however, that physicians are careful not to be too judgmental when inquiring about spiritual beliefs and religious involvement (Cohen, Wheeler, & Scott, 2001). Some patients may not want their physicians to ask about their spiritual and religious lives. In a sample of US adult patients visiting a pulmonary faculty office practice, 16% said they would not want such questions in a medical history (Ehman, Ott, Short, Ciampa, & Hansen-Flaschen, 1999). Therefore, inquiring about patients' spiritual beliefs and religious involvement may have a positive influence on their care, but it is important to know what the patient prefers before inquiring into this area of their life.

Appendix A

Universidad de Duke: Encuesta de Salud, Honduras

Una meta importante de este estudio es entender mejor la salud y la cultura en Honduras. Por favor, responda honestamente y lo mejor que pueda a cada pregunta, pues sus respuestas son importantes. RELLENE su respuesta así ●, no use ✓ o ✕

1. ¿Durante el último año, ha tenido Ud. algunos de los siguientes problemas de salud? (Conteste cada inciso)

¿Lo tenía Ud?	¿Cuántas veces?	¿La duración en días?	¿Cuánto le molestó?
A. Dolor	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
B. Gripe	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
C. Fiebre	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
D. Diarrea	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
E. Problema respiratorio	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
F. Enfermedad de la piel	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
G. Depresión, ansiedad	<input type="radio"/> No <input type="radio"/> Sí veces _____	duración (en días) _____	<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
H. Artritis crónica	<input type="radio"/> No <input type="radio"/> Sí		<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
I. Diabetes crónica	<input type="radio"/> No <input type="radio"/> Sí		<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho
J. Presión alta crónica	<input type="radio"/> No <input type="radio"/> Sí		<input type="radio"/> Poco <input type="radio"/> Algo <input type="radio"/> Mucho

2. ¿Visitó Ud. algún médico por rutina o chequeo el año pasado?

Sí No

3. Si Ud. contestó “Sí”, díganos ¿qué tipo de clínica visitó?

IHSS Pública Privada

4. Generalmente la gente toma sus medicinas de manera que siente le funciona mejor. Si Ud. ha recibido medicina del médico durante el último año, ¿alguna vez Ud. ha hecho alguna de las siguientes cosas con la medicina?

A. Cambiar la dosis	<input type="radio"/> Sí <input type="radio"/> No
B. Olvidó tomar la medicina	<input type="radio"/> Sí <input type="radio"/> No
C. Dejó de tomar la medicina por un tiempo	<input type="radio"/> Sí <input type="radio"/> No
D. Solo la usa cuando se siente mal	<input type="radio"/> Sí <input type="radio"/> No
E. Decidió solo tomar algunas dosis	<input type="radio"/> Sí <input type="radio"/> No
F. Trata de no usarla si puede	<input type="radio"/> Sí <input type="radio"/> No

5. Durante el último año, ¿cuáles de los siguientes tratamientos alternativos o naturales ha usado Ud. para PREVENIR y/o CURAR sus enfermedades? (Conteste cada inciso y cada columna)

	¿Lo usa para PREVENIR las enfermedades? <input type="radio"/> Sí (especifique las hierbas) <input type="radio"/> No	¿Lo usa para CURAR las enfermedades? <input type="radio"/> Sí (especifique las hierbas) <input type="radio"/> No
A. Hierbas o plantas medicinales (incluidos los tés)	1. _____ 2. _____ 3. _____	1. _____ 2. _____ 3. _____
B. Pastillas con ingredientes naturales	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
C. Acupuntura	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
D. Sobada (masajes con esencias)	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
E. Oración a Dios	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
F. Oración a santos	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
G. Consulta con curandero	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
H. Consulta con naturista	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No
I. Otro (especifique aquí)	<input type="radio"/> Sí <input type="radio"/> No	<input type="radio"/> Sí <input type="radio"/> No

6. ¿Alguna vez un médico le ha preguntado si está Ud. usando medicina alternativa o natural? Sí No No se aplica

7. ¿Se siente Ud. en confianza de decir al médico que Ud. usa alguna medicina alternativa o natural? Sí No No se aplica

8. ¿Cree Ud. que la medicina natural puede interferir o estorbar la medicina recetada por médico? Sí No No sé

9. ¿Cree Ud. que la medicina natural puede tener efectos secundarios malos? Sí (cuales son los efectos) No No sé

1. _____
2. _____
3. _____

10. ¿Por qué Ud. usa o no usa medicina natural?

Por favor, pase a la siguiente pagina →

11. En su opinión, ¿cuán importante es cada uno de los siguientes para *CAUSAR* enfermedades? (Conteste cada inciso)

	Muy Importante	Algo Importante	No Importante
A. Bacterias, virus y parásitos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Agua sin cloro o que no está hervida	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Descuidos personales	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Castigos de Dios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Espíritus malos (incluyendo al diablo)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Fumar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Comida con mucha grasa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Bebidas alcohólicas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. En su opinión, ¿cuán importante es cada uno de los siguientes para *CURAR* enfermedades? (Conteste cada inciso)

	Muy Importante	Algo Importante	No Importante
A. Médicos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Medicina natural	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Oración a Dios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Una alimentación saludable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. ¿Que haría Ud. primero para curar cada uno de los siguientes problemas? (Conteste cada inciso)

	Usaría medicina natural	Iría a un Médico	Combinaría los dos
A. Presión arterial alta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Depresión, ansiedad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Dolor de garganta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Dolor de articulaciones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Dolor de estómago o intestino	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Dolor de cabeza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Diarrea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Enfermedades de la piel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I. Fiebre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J. Dengue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. ¿A cuál iglesia o religión pertenece Ud?

<input type="radio"/> Católica	<input type="radio"/> Evangélica
<input type="radio"/> Testigo de Jehová	<input type="radio"/> Ninguna
<input type="radio"/> Mormona	<input type="radio"/> Otro (especifique aquí) _____

15. En promedio, ¿qué tan seguido va Ud. a la iglesia?

<input type="radio"/> Diario o casi diario	<input type="radio"/> Semanal	<input type="radio"/> Quincenal
<input type="radio"/> Mensual	<input type="radio"/> Nunca	

16. En promedio, ¿qué tan seguido ora, lee la Biblia o libros sobre cosas espirituales?

<input type="radio"/> Diario	<input type="radio"/> Varias veces a la semana	<input type="radio"/> Una vez a la semana
<input type="radio"/> Mensual	<input type="radio"/> Nunca	

17. ¿Qué tan espiritual diría que es Ud?

<input type="radio"/> No espiritual	<input type="radio"/> Algo espiritual	<input type="radio"/> Muy espiritual
-------------------------------------	---------------------------------------	--------------------------------------

18. En su opinión, ¿si un enfermo ora a Dios para que lo sane, cree que debería seguir usando la medicina que le recetó el médico?

<input type="radio"/> Nunca	<input type="radio"/> A veces	<input type="radio"/> Frecuentemente	<input type="radio"/> Siempre
-----------------------------	-------------------------------	--------------------------------------	-------------------------------

19. En su opinión, ¿si un enfermo ora a Dios para que lo sane, cree que debería seguir usando la medicina natural?

<input type="radio"/> Nunca	<input type="radio"/> A veces	<input type="radio"/> Frecuentemente	<input type="radio"/> Siempre
-----------------------------	-------------------------------	--------------------------------------	-------------------------------

20. ¿Aproximadamente cuánto dinero ganó su familia en el mes pasado?(en Lempiras)

<input type="radio"/> Menos de 1,000
<input type="radio"/> 1,000 a 2,999
<input type="radio"/> 3,000 a 4,999
<input type="radio"/> 5,000 a 6,999
<input type="radio"/> 7,000 a 8,999
<input type="radio"/> 9,000 o más
<input type="radio"/> No quiso responder

21. ¿Hasta dónde llegaron sus estudios?

<input type="radio"/> No estudió
<input type="radio"/> 1° a 6° grado
<input type="radio"/> Secundaria completa
<input type="radio"/> Algunas clases de la universidad
<input type="radio"/> Graduado de la universidad

22. Género: Masculino Femenino

23. ¿Cuál es su edad? _____ años

24. Está Ud: Empleado/a Desempleado/a?

25. Clasificación domicilio: Urbano Rural

Por favor, asegúrese que Ud. contestó cada pregunta completamente.
Gracias por su tiempo

Figure 2: The questionnaire as it was administered in Spanish

Appendix B

Duke University: Health Survey, Honduras

An important goal of this study is to understand health and culture in Honduras. Please respond honestly and the best you can to each question because your responses are important. FILL IN your answers like this ●, do not use ✓ or ✗

1. During the last year, have you had any of the following sicknesses or do you have them now? (Answer each line)

Did you have it?	How many times?	The duration in days?	How much did it bother you?
A. Flu	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
B. Pain	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
C. Fever	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
D. Diarrhea	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
E. Respiratory problem	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
F. Skin disease	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
G. Depression, anxiety	<input type="radio"/> No <input type="radio"/> Yes times _____	duration (in days) _____	<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
H. Chronic arthritis	<input type="radio"/> No <input type="radio"/> Yes		<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
I. Chronic diabetes	<input type="radio"/> No <input type="radio"/> Yes		<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot
J. Chronic high blood pressure	<input type="radio"/> No <input type="radio"/> Yes		<input type="radio"/> Little <input type="radio"/> Some <input type="radio"/> A lot

2. In the last year did you visit a physician for a routine check-up?

Yes No

3. If you answered yes, what kind of clinic did you visit?

IHSS Public Private

4. At times people take medicine the way that fits their lifestyle. If you have received medicine from a physician in the last year, have you ever done any of the following?

- | | |
|---|--|
| A. Alter the dose | <input type="radio"/> Yes <input type="radio"/> No |
| B. Forget to take it | <input type="radio"/> Yes <input type="radio"/> No |
| C. Stop taking it for a while | <input type="radio"/> Yes <input type="radio"/> No |
| D. Only use it when I feel sick | <input type="radio"/> Yes <input type="radio"/> No |
| E. Decide to miss a dose here and there | <input type="radio"/> Yes <input type="radio"/> No |
| F. Not take it if I don't have to | <input type="radio"/> Yes <input type="radio"/> No |

5. During the last year, which of the following alternative or natural treatments have you used to PREVENT or CURE your sicknesses? (Answer each line and each column)

	Do you use it to PREVENT sicknesses?	Do you use it to CURE sicknesses?
A. Herbs or medicine plants (including teas)	<input type="radio"/> Yes (specify the herbs) <input type="radio"/> No	<input type="radio"/> Yes (specify the herbs) <input type="radio"/> No
	1. _____	1. _____
	2. _____	2. _____
	3. _____	3. _____
B. Pills with natural ingredients	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
C. Acupuncture	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
D. Massages with oils	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
E. Prayer to God	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
F. Prayer to saints	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
G. Consult with curandero	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
H. Consult with naturalist/herbalist	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
I. Other (specify here)	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No

6. Has a physician ever asked you if you are using alternative or natural medicine?

Yes No Does not apply

7. Do you feel comfortable telling a physician that you are using alternative or natural medicine?

Yes No Does not apply

8. Do you believe that natural medicine can interfere with medicine prescribed by the physician?

Yes No I don't know

9. Do you believe that natural medicine has negative side affects?

Yes (what are the effects) No I don't know

1. _____
2. _____
3. _____

10. Why do you use or do you not use natural medicine?

Please turn to the next page →

11. In your opinion, how important is each of the following in CAUSING sicknesses? (Answer each line)

	Very Important	Some Important	Not Important
A. Bacteria, viruses, parasites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Unchlorinated, unboiled water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Human actions (neglect)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Punishment from God	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Bad spirits (including the devil)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Smoking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Food high in fat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Alcoholic drinks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. In your opinion, how important is each of the following in CURING sicknesses? (Answer each line)

	Very Important	Some Important	Not Important
A. Physicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Natural medicine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Prayer to God	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Eating healthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. What would be the first thing you would do to cure the following problems? (Answer each line)

	Use natural medicine	Go to the physician	Combine the two
A. High blood pressure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Depression, anxiety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Sore throat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Joint pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Stomach pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Headache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Diarrhea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Skin disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I. Fever	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J. Dengue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. What church or religion pertains to you?
 Catholic Evangelical Jehova's Witness
 Mormon None
 Other (specify here) _____

15. On average, how often do you go to church?
 Daily or almost daily Weekly Bimonthly
 Monthly Never

16. On average, how often do you pray, read the Bible or spiritual books?
 Daily A few of times per week
 Once a week Monthly Never

17. How spiritual are you?
 Not spiritual Some spiritual Very spiritual

18. In your opinion, if a sick person prays to God and asks God to heal them, how often should they continue using medicine prescribed by the physician?
 Never Sometimes Frequently Always

19. In your opinion, if a sick person prays to God and asks God to heal them, how often should they continue using natural medicine?
 Never Sometimes Frequently Always

20. How much money did your family earn last month? (In Lempiras)
 Less than L. 1, 000
 1, 000 to L. 2, 999
 3, 000 to L. 4, 999
 5, 000 to L. 6, 999
 7, 000 to L. 8, 999
 L. 9, 000 or more
 Did not want to respond _____

21. What is the highest level of education you have?
 Did not study
 1st to 6th grade
 Secondary
 Some clases at the university
 University graduate

22. Gender: Male Female

23. What is your age? _____ years

24. Are you: Employed Unemployed?

25. Domicile classification: Urban Rural

**Please make sure you answered every question to the best of your ability.
Thank you for your time.**

Figure 3: The questionnaire translated into English

Appendix C

Format for verbal consent

Good day Sir/Ma'am! Do you have a little time to complete a survey? We are students with Duke University and are studying ways to better understand the health and culture in Tegucigalpa, Honduras.

The study should last less than 15 minutes. Follow-up is only needed if we need to clarify responses. We will read you the survey and right down your response to each question.

It is completely your choice to participate or not. If you are uncomfortable answering any of the questions in the survey you do not have to answer them. You will not be withdrawn from the study if you do not answer some of the questions.

Taking part in the study will not benefit you personally, but as a result of this study new recommendations could be developed in the future that will help people to understand the steps that they can take to improve their health.

There are no risks from being involved in this study. We will not collect your name or other identifying information.

You are encouraged to ask questions about this study. We hope that you will ask questions now and at any time before, during or after the study. We want you to have all the information you need so that you can decide whether to participate

Appendix D

Table 12: Health beliefs of the study population.

Variable	n	%
Punishment from God causes sickness		
Very Important	130	21.7%
Some Important	54	9.0%
Not Important	416	69.3%
Bad spirits cause sickness		
Very Important	148	24.7%
Some Important	96	16.0%
Not Important	351	58.5%
Did not respond	5	0.8%
Physicians as cures for sickness		
Very Important	483	80.5%
Some Important	102	17.0%
Not Important	15	2.5%
Natural Medicine as a cure for sickness		
Very Important	277	46.2%
Some Important	263	43.8%
Not Important	59	9.8%
Did not respond	1	0.2%
Natural Medicine side effects¹		
Yes	105	17.5%
No	421	70.2%
Does not know	73	12.2%
Did not respond	1	0.2%
Natural Medicine can interfere²		
Yes	147	24.5%
No	377	62.8%
Does not know	72	12.0%
Did not respond	4	0.7%
Prayer to God as a cure for sickness		
Very Important	559	93.2%
Some Important	26	4.3%
Not Important	14	2.3%
Did not respond	1	0.2%

1 Natural Medicine has side effects

2 Natural Medicine can interfere with medicine from the physician

Table 13: Complete tables showing hypothetical use of health systems within the study population, including use of “other” and “nothing” for certain health problems.

Variable	N	Physician		Natural Medicine		Combination		Other		Nothing	
		n	%	n	%	n	%	n	%	n	%
High blood pressure	600	474	79.0%	38	6.3%	83	13.8%	5	0.8%	0	0.0%
Depression, anxiety	597	437	73.2%	53	8.9%	65	10.9%	30	5.0%	12	2.0%
Sore throat	600	363	60.5%	142	23.7%	63	10.5%	26	4.3%	6	1.0%
Joint pain	600	444	74.0%	64	10.7%	64	10.7%	20	3.3%	8	1.3%
Stomach pain	597	358	60.0%	156	26.1%	59	9.9%	20	3.4%	4	0.7%
Headache	599	332	55.4%	93	15.5%	53	8.8%	114	19.0%	7	1.2%
Diarrhea	599	358	59.8%	115	19.2%	60	10.0%	62	10.4%	4	0.7%
Skin disease	598	502	83.9%	32	5.4%	56	9.4%	4	0.7%	4	0.7%
Fever	599	461	77.0%	52	8.7%	57	9.5%	27	4.5%	2	0.3%
Dengue	600	527	87.8%	21	3.5%	48	8.0%	2	0.3%	2	0.3%

Variable	N	Mean	SD
Hypothetical Physician use (0-10)	600	7.1	3.0
Hypothetical Natural Medicine use (0-10)	600	1.3	2.0
Hypothetical Combination use (0-10)	600	1.0	2.1

Appendix E

Table 13: The associations of demographic variables with the hypothetical use of health systems.

Variable	Physician ¹			Natural Medicine ¹			Combination ¹		
	n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Age									
18-24	53	41.7%	0.003	66	52.0%	0.239	60	47.2%	0.000
25+	268	56.7%		218	46.1%		142	30.0%	
Gender									
Male	162	54.0%	0.806	141	47.0%	0.870	94	31.3%	0.226
Female	159	53.0%		143	47.7%		108	36.0%	
Domicile									
Urban	298	54.8%	0.024	252	46.3%	0.067	252	46.3%	0.067
Rural	20	38.5%		31	59.6%		31	59.6%	
Education									
< Secondary	154	58.8%	0.022	110	42.0%	0.021	72	27.5%	0.005
≥ Secondary or more	167	49.4%		174	51.5%		130	38.5%	
Income last month									
Non respondent	57	52.3%	0.780	57	46.2%	0.252	35	32.1%	0.704
Respondent	264	53.8%		227	46.2%		167	34.0%	
	< \$370	137	53.3%	113	44.0%	0.292	94	36.6%	0.209
	≥ \$370	127	54.3%	114	48.2%		73	31.0%	
Employment									
Unemployed	153	27.3%	0.261	119	43.6%	0.150	104	38.1%	0.030
Employed	163	31.7%		157	49.5%		94	29.7%	
Student	17	34.7%	0.006	26	53.1%	0.357	27	55.1%	0.001
Other	299	55.3%		250	46.2%		171	31.6%	

¹ Dichotomized at the median

² Pearson chi-square (2-sided)

Table 14: The associations of health beliefs with the hypothetical use of health systems.

Variable	Physician ¹			Natural Medicine ¹			Combination ¹		
	n	%	P-value ²	n	%	P-value	n	%	P-value
Punishment from God causes sickness									
Not Important	228	54.8%	0.334	190	45.7%	0.221	133	32.0%	0.186
Some/Very Important	93	50.5%		94	51.3%		69	37.5%	
Bad Spirits cause sickness									
Not Important	198	56.4%	0.101	161	45.9%	0.426	122	34.8%	0.546
Some/Very Important	121	49.6%		120	49.2%		79	32.4%	
Physicians as cures for sickness									
Not Important	4	26.7%	0.035	11	73.3%	0.041	4	26.7%	0.561
Some/Very Important	317	54.2%		273	46.7%		198	33.9%	
Natural Medicine as a cure for sickness									
Not Important	47	79.7%	0.000	9	15.3%	0.000	4	6.8%	0.000
Some/Very Important	273	50.6%		275	50.4%		198	36.7%	
Natural medicine side effects⁴									
No	210	49.9%	0.011 ³	219	52.0%	0.017 ³	142	33.7%	0.914
Yes	67	63.8%		41	39.1%		36	34.3%	
Natural Medicine interference⁵									
No	181	48.0%	0.001 ³	201	53.3%	0.022 ³	139	36.9%	0.036 ³
Yes	94	64.0%		62	42.2%		40	27.2%	
Prayer to God as a cure for sickness									
Not Important	7	50.0%	0.795	7	50.0%	0.844	7	50.0%	0.192
Some/Very Important	313	53.5%		277	47.4%		195	33.3%	

\$ Fisher exact 1 sided

1 Dichotomized at the median

2 Pearson chi-square (2-sided)

3 Still significant if dichotomized No vs. Yes/I don't know

4 Natural Medicine has side effects

5 Natural Medicine can interfere with medicine from the physician

Appendix F

Table 15: The associations of demographic variables with the use of preventive health systems in the previous year.

Variable	Routine Allopathic use			Used non-prayer CAM ¹			Used CAM Practitioner		
	n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Age									
18-24	58	46.4%	0.000	31	24.6%	0.000	13	10.2%	0.324
25+	316	67.0%		199	42.3%		64	13.5%	
Gender									
Male	163	54.9%	0.000	116	38.8%	0.918	50	16.7%	0.005
Female	211	70.3%		114	38.4%		27	9.0%	
Domicile									
Urban	342	63.2%	0.289	205	38.0%	0.375	65	12.0%	0.057
Rural	29	55.8%		23	44.2%		11	21.2%	
Education									
< Secondary	169	64.5%	0.407	102	39.1%	0.828	31	11.8%	0.519
≥ Secondary or more	205	61.2%		128	38.2%		46	13.6%	
Income last month									
Non respondent	64	58.7%	0.348	41	38.3%	0.949	15	13.8%	0.749
Respondent	310	63.5%		189	38.7%		62	12.6%	
< \$370	161	63.4%	0.947	91	35.4%	0.121	30	11.7%	0.505
≥ \$370	149	63.7%		98	42.2%		32	13.7%	
Employment									
Unemployed	176	64.9%	0.230	90	33.1%	0.017	26	9.5%	0.024
Employed	190	60.1%		134	42.7%		50	15.8%	
Student	28	58.3%	0.549	9	18.4%	0.003	3	6.1%	0.140
Other	338	62.7%		215	40.0%		73	13.5%	

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

Table 16: The associations of health beliefs with the use of preventive health systems in the previous year.

Variable	Routine Allopathic use			Used non-prayer CAM ¹			Used CAM Practitioner		
	n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Punishment from God causes sickness									
Not Important	263	63.5%	0.504	156	37.9%	0.586	52	12.5%	0.714
Some/Very Important	111	60.7%		74	40.2%		25	13.6%	
Bad Spirits cause sickness									
Not Important	217	62.4%	0.851	125	35.9%	0.197	34	9.7%	0.007
Some/Very Important	154	63.1%		100	41.2%		42	17.2%	
Physicians as cures									
Not Important	6	40.0%	0.066	9	60.0%	0.085	7	46.7%	0.001 \$
Some/Very Important	368	63.2%		221	38.0%		70	12.0%	
Natural Medicine as a cure									
Not Important	37	62.7%	0.995	12	20.3%	0.003	8	13.6%	0.832
Some/Very Important	337	62.8%		217	40.5%		68	12.6%	
Natural Medicine side effects³									
No	263	62.8%	0.140	167	40.1%	0.852	54	12.8%	0.515
Yes	74	70.5%		41	39.1%		16	15.2%	
Natural Medicine can interfere⁴									
No	232	62.0%	0.685	155	41.6%	0.195	45	11.9%	0.256
Yes	94	64.0%		52	35.4%		23	15.7%	
Prayer to God as a cure									
Not Important	7	50.0%	0.325	7	50.0%	0.378	2	14.3%	0.871
Some/Very Important	366	62.9%		223	38.4%		75	12.8%	

\$ Fisher exact 1 sided due to small cell size (Pearson chi-square p=0.000)

1 Non-prayer CAM included CAM practitioners

2 Pearson chi-square (2-sided)

3 Natural Medicine has side effects

4 Natural Medicine can interfere with medicine from the physician

Table 17: The associations of certain health problems or specific ailments in the previous year with the use of preventive health systems in the previous year.

Variable		Routine Allopathic use			Used non-prayer CAM ¹			Used CAM Practitioner		
		n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Flu	No	155	63.0%	0.858	91	36.8%	0.487	32	13.0%	0.951
	Yes	218	62.3%		138	39.7%		45	12.8%	
Fever	No	255	61.3%	0.236	156	37.6%	0.602	46	11.0%	0.059
	Yes	115	66.5%		69	39.9%		29	16.7%	
Diarrhea	No	304	61.5%	0.220	183	37.0%	0.088	61	12.3%	0.368
	Yes	70	68.0%		47	46.1%		16	15.5%	
Respiratory problem	No	277	60.8%	0.117	171	37.6%	0.526	55	12.0%	0.337
	Yes	94	68.1%		56	40.6%		21	15.1%	
Skin disease	No	311	60.9%	0.032	196	38.4%	0.725	67	13.0%	0.926
	Yes	58	73.4%		32	40.5%		10	12.7%	
Depression, anxiety	No	259	60.7%	0.093	151	35.5%	0.011	50	11.7%	0.163
	Yes	115	68.1%		79	46.8%		27	15.9%	
Arthritis	No	306	60.1%	0.004	187	36.8%	0.027	62	12.1%	0.264
	Yes	65	76.5%		42	49.4%		14	16.5%	
Diabetes	No	340	60.6%	0.000	219	39.1%	0.313	70	12.4%	0.143
	Yes	32	97.0%		10	30.3%		7	21.2%	
High blood pressure	No	269	57.1%	0.000	176	37.5%	0.312	61	12.9%	0.984
	Yes	104	83.2%		53	42.4%		16	12.8%	

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

Appendix G

Table 18: The associations of demographic variables with the use of curative health services in the previous year.

Variable	Received Medicine from Physician			Used non-prayer CAM ¹			Used CAM Practitioner		
	n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Age									
18-24	90	70.9%	0.024	86	68.3%	0.176	45	35.4%	0.136
25+	376	80.2%		290	61.7%		135	28.6%	
Gender									
Male	216	73.0%	0.002	178	59.9%	0.112	98	32.78%	0.146
Female	250	83.3%		198	66.2%		82	27.3%	
Domicile									
Urban	421	78.0%	0.640	339	62.8%	0.710	161	29.7%	0.456
Rural	42	80.8%		34	65.4%		18	34.6%	
Education									
< Secondary	196	75.4%	0.145	160	61.3%	0.426	70	26.7%	0.117
≥ Secondary or more	270	80.4%		216	64.5%		110	32.6%	
Income last month									
Non respondent	82	75.9%	0.529	64	59.3%	0.362	30	27.5%	0.525
Respondent	384	78.7%		312	63.9%		150	30.6%	
< \$370	197	77.3%	0.418	170	66.4%	0.232	78	30.5%	0.943
≥ \$370	187	80.3%		142	61.2%		72	30.8%	
Employment									
Unemployed	218	80.2%	0.240	181	66.8%	0.053	76	27.9%	0.301
Employed	239	76.1%		186	59.1%		101	31.9%	
Student	39	79.6%	0.777	35	71.4%	0.183	19	38.8%	0.164
Other	418	78.0%		332	61.8%		158	29.3%	

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

Table 19: The associations of health beliefs with the use of curative health systems in the previous year.

Variable	Received Medicine from Physician			Used non-prayer CAM ¹			Used CAM Practitioner		
	n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Punishment from God causes sickness									
Not Important	320	77.7%	0.647	253	61.3%	0.165	117	28.2%	0.136
Some/Very Important	146	79.4%		123	67.2%		63	34.2%	
Bad Spirits cause sickness									
Not Important	268	77.0%	0.414	206	59.0%	0.018	101	28.7%	0.480
Some/Very Important	194	79.8%		166	68.6%		77	31.6%	
Physicians as cures									
Not Important	9	64.3%	0.202	12	92.3%	0.027	6	42.9%	0.290
Some/Very Important	457	78.5%		364	62.4%		174	29.7%	
Natural Medicine as a cure									
Not Important	40	70.2%	0.117	18	30.5%	0.000	9	15.3%	0.005
Some/Very Important	426	79.2%		358	66.8%		171	31.7%	
Natural Medicine side effects³									
No	329	78.7%	0.346	278	66.4%	0.067	130	31.0%	0.776
Yes	87	82.9%		59	56.7%		31	29.5%	
Natural Medicine can interfere⁴									
No	298	79.7%	0.845	244	65.2%	0.178	115	30.6%	0.545
Yes	116	78.9%		86	58.9%		41	27.9%	
Prayer to God as a cure									
Not Important	10	76.9%	0.902	6	42.9%	0.114 ⁵	2	14.3%	0.196
Some/Very Important	456	78.4%		369	63.5%		177	30.3%	

\$ Fisher exact (1-sided) due to cell size less than 10

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

3 Natural Medicine has side effects

4 Natural Medicine can interfere with medicine from the physician

5 Those who said "Very important" used non-prayer CAM more often than those who said it was "Not/Some Important" (64.1% vs. 47.5%, p = 0.035)

Table 20: The associations of health problems or specific ailments in the previous year with the use of curative health systems in the previous year.

Variable	Received Medicine from Physician			Used non-prayer CAM ¹			Used CAM Practitioner		
	n	%	P-value ²	n	%	P-value ²	n	%	P-value ²
Flu									
No	182	74.6%	0.080	146	59.8%	0.179	61	24.8%	0.022
Yes	283	80.6%		229	65.2%		118	33.5%	
Fever									
No	319	76.7%	0.157	257	61.9%	0.364	120	28.7%	0.306
Yes	141	82.0%		114	65.9%		57	33.0%	
Diarrhea									
No	378	76.5%	0.030	302	61.1%	0.030	144	29.0%	0.233
Yes	88	86.3%		74	72.6%		36	35.0%	
Respiratory problem									
No	343	75.6%	0.007	275	60.6%	0.015	130	28.5%	0.125
Yes	120	86.3%		100	71.9%		49	35.3%	
Skin disease									
No	386	75.7%	0.001	314	61.6%	0.070	151	29.4%	0.279
Yes	73	92.4%		57	72.2%		28	35.4%	
Depression, anxiety									
No	323	75.8%	0.029	260	61.2%	0.140	118	27.6%	0.045
Yes	142	84.0%		115	67.7%		61	35.9%	
Arthritis									
No	389	76.6%	0.031	318	62.6%	0.561	145	28.4%	0.051
Yes	74	87.1%		56	65.9%		33	38.8%	
Diabetes									
No	432	77.0%	0.008	355	65.3%	0.929	174	30.9%	0.068
Yes	31	96.9%		20	62.5%		5	15.6%	
High blood pressure									
No	350	74.5%	0.000	292	62.1%	0.379	138	29.2%	0.431
Yes	115	92.0%		83	66.4%		41	32.8%	

1 Non-prayer CAM includes CAM practitioners

2 Pearson chi-square (2-sided)

Appendix H

Table 21: The associations of demographic variables with the reported adherence to medicine received from a physician in the previous year.

Variable	Relative Adherence ¹				P-value ²
	n	Low %	n	High %	
Age					
18-24	57	63.3%	33	36.7%	0.001
25+	165	43.9%	211	56.1%	
Gender					
Male	100	46.3%	116	53.7%	0.328
Female	122	48.8%	128	51.2%	
Domicile					
Urban	196	46.6%	225	53.4%	0.058
Rural	26	61.9%	16	38.1%	
Education					
< Secondary	103	52.6%	93	47.5%	0.070
≥ Secondary or more	119	44.1%	151	55.9%	
Income last month					
Non respondent	41	50.0%	41	50.0%	0.637
Respondent	181	47.1%	203	52.9%	
< \$370	101	51.3%	96	48.7%	0.096
≥ \$370	80	42.0%	107	57.2%	
Employment					
Unemployed	99	45.4%	119	54.6%	0.154
Employed	121	50.6%	118	49.4%	
Student	23	59.0%	16	41.0%	0.106
Other	197	47.1%	221	52.9%	

1 From MARS.

2 Pearson chi-square (2-sided)

Table 22: The associations of health beliefs with reported adherence to medicine received from a physician in the previous year.

Variable	n	Relative Adherence ¹		P-value ²	
		Low %	High %		
Punishment from God causes sickness					
Not/Some Important	174	47.9%	189	52.1%	0.811
Very Important	48	46.6%	55	53.4%	
Bad Spirits cause sickness					
Not/Some Important	167	48.3%	179	51.7%	0.749
Very Important	54	46.6%	62	53.5%	
Physicians as cures for sickness					
Not/Some Important	36	42.4%	49	57.7%	0.280
Very Important	186	48.8%	195	51.2%	
Natural Medicine as a cure for sickness					
Not/Some Important	107	43.0%	142	57.0%	0.031
Very Important	115	53.0%	102	47.0%	
Natural Medicine side effects³					
No	155	47.1%	174	52.9%	0.565
Yes	44	50.6%	43	49.4%	
Natural Medicine can interfere⁴					
No	144	48.3%	154	51.7%	0.993
Yes	56	48.3%	60	51.7%	
Prayer to God as a cure for sickness					
Not/Some Important	15	51.7%	14	48.3%	0.649
Very Important	207	47.4%	230	52.6%	

1 From MARS.

2 Pearson chi-square (2-sided)

3 Natural Medicine has side effects

4 Natural Medicine can interfere with medicine from the physician

Table 23: The associations of health problems or specific ailments with adherence to medicine received from a physician in the previous year.

Variable	n	Relative Adherence ¹		n	%	P-value ²
		Low %	High %			
Flu						
No	69	37.9%		113	62.1%	0.001
Yes	153	54.1%		130	45.9%	
Fever						
No	128	40.1%		191	59.9%	0.000
Yes	91	64.5%		50	35.5%	
Diarrhea						
No	179	47.4%		199	52.7%	0.798
Yes	43	48.9%		45	51.1%	
Respiratory problem						
No	155	45.2%		188	54.8%	0.090
Yes	65	54.2%		55	45.8%	
Skin disease						
No	179	46.4%		207	53.6%	0.269
Yes	39	53.4%		34	46.6%	
Depression, anxiety						
No	146	45.2%		177	54.8%	0.130
Yes	75	52.8%		67	47.2%	
Arthritis						
No	186	47.8%		203	52.2%	0.768
Yes	34	46.0%		40	54.1%	
Diabetes						
No	216	50.0%		216	50.0%	0.000 \$
Yes	3	9.7%		28	90.3%	
High blood pressure						
No	181	51.7%		169	48.3%	0.002
Yes	40	34.8%		75	65.2%	

\$ Fisher exact (1 sided) due to small cell size

1 From MARS.

2 Pearson chi-square (2-sided)

Appendix I

Table 24: The associations of demographic variables with the respondents' comfort disclosing information about complementary and CAM use to a physician.

Variable	Feels Comfortable Telling a Physician About CAM Use ¹				P-value ²	
	n	No %	n	Yes %		
Age						
18-24	12	10.7%	100	89.3%	0.960	
25+	46	10.6%	390	89.5%		
Gender						
Male	34	12.4%	241	87.6%	0.174	
Female	24	8.8%	249	91.2%		
Domicile						
Urban	53	10.7%	444	89.3%	0.585	
Rural	4	8.2%	45	91.8%		
Education						
< Secondary	25	10.6%	212	89.5%	0.981	
≥ Secondary or more	33	10.6%	278	89.4%		
Income last month						
Non respondent	17	17.4%	81	82.7%	0.016	
Respondent	41	9.1%	409	90.9%		
	< \$370	20	8.8%	207	91.2%	0.823
	≥ \$370	21	9.4%	202	90.6%	
Employment						
Unemployed	28	11.3%	219	88.7%	0.702	
Employed	30	10.3%	261	89.7%		
Student	3	6.4%	44	93.6%	0.309	
Other	55	11.2%	436	88.8%		

¹ Respondents could respond, "Does not apply"

² Pearson chi-square (2-sided)

Table 25: The associations of health beliefs with the respondents comfort in disclosing information about complementary and CAM use to a physician.

Variable	Feels Comfortable Telling a Physician About CAM Use ¹				P-value ²
	n	Low %	n	High %	
Punishment from God causes sickness					
Not/Some Important	45	10.4%	388	89.6%	0.778
Very Important	13	11.3%	102	88.7%	
Bad Spirits cause sickness					
Not/Some Important	44	10.7%	366	89.3%	0.754
Very Important	13	9.8%	120	90.2%	
Physicians as cures for sickness					
Not/Some Important	13	12.4%	92	87.6%	0.506
Very Important	45	10.2%	398	89.8%	
Natural Medicine as a cure for sickness					
Not/Some Important	42	14.5%	248	85.5%	0.002
Very Important	16	6.2%	242	93.8%	
Natural Medicine side effects ³					
No	35	8.9%	359	91.1%	0.978
Yes	8	8.8%	83	91.2%	
Natural Medicine can interfere ⁴					
No	32	9.1%	320	90.9%	0.402
Yes	16	11.6%	122	88.4%	
Prayer to God as a cure for sickness					
Not/Some Important	6	16.2%	31	83.8%	0.232
Very Important	51	10.0%	459	90.0%	

1 Respondents could respond, "Does not apply"

2 Pearson chi-square (2-sided)

3 Natural Medicine has side effects

4 Natural Medicine can interfere with medicine from the physician

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