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RESEARCH ARTICLE

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# Integrative Medicine in Timor-Leste: A Report of Prevalence and Practice of Timorese Medicine Usage Alongside Conventional Health Care

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## Abstract

**Introduction:** The use of traditional medicine is especially relevant in low- and middle-income countries. In Timor-Leste, treatment options consist of free health care provided by the National Health System, private clinics or pharmacies, self-initiated treatment, and other informal systems such as Traditional Timorese Medicine or religious healing. Health care utilization and associated factors influencing health care decisions need to be investigated further to inform policy and spending decisions.

**Methods:** Using a cross-sectional design, this study screened communities for utilization of Traditional Timorese Medicine and conventional health care using an adapted version of the International-Complementary and Alternative Medicine Questionnaire in Tetum (one of the official languages of Timor-Leste). The data were analyzed using descriptive statistical methods.

**Results:** On average, 73% of those surveyed reported use of Traditional Timorese Medicine, with 44% using it in combination with conventional medical care. Individuals reporting the combined use of both systems were higher than those reporting use of either Traditional Timorese Medicine (29%) or National Health System (13%) alone. Of the treatment modalities surveyed, massage was the most common, with reported use by 50% of Timorese, while patients' "belief in the treatment" was the most commonly reported factor influencing their health care decisions.

**Conclusion:** Overall, a vast majority of Timorese rely on Traditional Timorese Medicine, and a formal model of Integrative health care delivery services is warranted to accommodate treatment preferences in this population.

**Keywords:** alternative health care delivery system; ethnobotany; indigenous medicine; parapsychology; patient preference; rural health services; spiritual therapies; Timor-Leste; traditional medicine

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## Highlights

- Traditional Timorese Medicine is used by 73% of adults
- More Timorese utilize Integrative Medicine than either Traditional Timorese Medicine or Conventional Medicine alone
- Massage is extremely common, with half of Timorese reporting use of this modality

## Introduction

Timor-Leste is a relatively new nation of around 1.3 million, having gained independence from Indonesian occupation in 2001.<sup>1</sup> Located north of Australia on the island of Timor, Timor-Leste occupies the eastern half of the island, while the western half is under Indonesian control. Violent military action and starvation decreased the overall population of Timor-Leste by a third during the Indonesian occupation. Destruction was widespread, including nearly all medical institutions, equipment, supplies, and records.<sup>2</sup> Of the 135 doctors working in Timor-Leste during the occupation, it is estimated that only 20 remained after independence.<sup>3-5</sup>

During that time, Timorese relied on knowledge of plants for food and medicine, as well as traditional healing practices.<sup>6</sup> The initial post-independence period was characterized by the continued resurgence and renewal of ritual practices, as well as customary exchange.<sup>6,7</sup> Over time, the country's conventional health sector started recovering with the help of United Nations (UN) involvement, government programs, and international aid.

During those early years of independence, relief work focused on basic needs and was provided by international Catholic missionary orders, religious groups, nongovernmental organizations, and UN agencies. These organizations' technical, financial, and logistical assistance were key steps in the building of Timor-Leste's National Health System, and the newly formed Ministry of Health adapted a model of universal health coverage. The health care system was structured into four levels of care with the highest level of care, central services, offered only at the Guido Valadares National Referral Hospital in Dili. Currently, district and subdistrict level services include five regional referral hospitals, community health centers, and smaller health posts. The fourth level of care offers community services delivered by SISCa, short for *Servisu Integrado de Saude Comunidade* (Integrated Service of Community Health).<sup>8</sup>

Previous research has shown that the services of the National Health System, which are based on western biomedicine, have low utilization among citizens in Timor-Leste, most notably in rural areas.<sup>9-11</sup> For example, higher maternal/infant morbidity/mortality are associated with home births, yet in 2019 only 67% of births were attended by skilled health personnel.<sup>12</sup> Why are the Timorese so hesitant to engage with conventional medicine? There are significant determining factors that influence individual decisions to seek health care in Timor-Leste which must be understood.

While the Timorese had to rely on Traditional Timorese Medicine when it was the only available option, many have continued to utilize these practices despite the free health care available from National Health System. Traditional care usually has a higher cost to the family, with a few reports describing payments to traditional healers that range from nothing to \$50 to "\$300 plus some animals" (USD is the currency used in Timor-Leste).<sup>13,14</sup> While for some this high price can be a deterrent from seeking care from traditional healers,<sup>15</sup> there are also significant barriers to accessing conventional health care services, including geographical barriers such as physical distance, frequent landslides during the wet season, lack of transportation, and unreliable ambulance services.<sup>6,13,14,16,17</sup>

Multiple health care systems with limited coordination and communication clearly can have public health ramifications. Patients' belief that Traditional Timorese Medicine is an affordable and acceptable substitute to hospital-based care may result in treatment with traditional Timorese healers as a first option,<sup>17</sup> and this can be a major factor that contributes to a delay in seeking appropriate care.<sup>18-21</sup> The standard intake form used by government run health services does not collect information about patient preferences, yet more data about both conventional and traditional health care utilization would be useful for developing an integrative health care system in Timor-Leste.<sup>22</sup> The World Health Organization (WHO) Traditional Medicine Strategy 2014-2023 recommended countries to obtain estimates on: (1) the prevalence of national Traditional, Complementary, and Alternative Medicine (TCAM) use, (2) the prevalence of national herbal medicine use, and (3) the medical determinants of TCAM use.<sup>23</sup>

Following these recommendations, the current study has begun to address the need for data on TCAM use specific to Timor-Leste. This study aims to quantify the prevalence of Traditional Timorese Medicine utilization, conventional medicine utilization, and their combined



utilization in Timor-Leste. Utilization is also compared across rural and urban settings with details of providers, factors motivating health care decisions, treatment modalities used, and medical conditions related to the utilization of Traditional Timorese Medicine. Together this information will more clearly characterize the use of Traditional Timorese Medicine in Timor-Leste.

## Materials and Methods

### Study design

This study was a single phased, cross-sectional, survey-based investigation of Traditional Timorese Medicine use among adults residing in urban and regional Timor-Leste. We developed an adapted version of the International Complementary and Alternative Medicine Questionnaire (I-CAM-Q) in Tetum, an official language in Timor-Leste. This 25 item self-report questionnaire assesses the overall usage of CAM<sup>24</sup> and has been shown to be a valid measure of CAM use internationally. It has been used for studies in over 65 countries, with translations into at least 10 languages.<sup>25</sup> For its use in the current study, the original English survey was translated and back translated into Tetum and adapted to the local context.<sup>26</sup>

We made the following adaptations to the Tetum version of the I-CAM-Q based on recommendations suggested by a focus group for more culturally appropriate response options. For example, one of the standard questions about providers includes response options such as chiropractor, homeopath, acupuncturist, herbalist, and spiritual healer. These were replaced with the options of *Matan-Dook* (diviner/shaman), *Doutor(a) Tradisaunal* (traditional doctor), nurse, midwife, and SISCa volunteer. An additional question was added to inquire about the reason/concern for consulting these providers. We also replaced the self-help treatment options of meditation, yoga, qigong, Thai

Chi, relaxation techniques, and visualization with massage and animal sacrifice. Consistent with previous research on the I-CAM-Q we did not consider Catholic prayer a Traditional Timorese Medicine modality, but we did report on its use.<sup>25</sup> We piloted the questionnaire with six Timorese citizens before finalization to ensure the items were appropriately adapted.

### Setting

Study locations included the rural district of Viqueque (Carau-Balu subdistrict), as well as the capital city of Dili. Site specific information can be found in Table 1, which includes 2019 data published by the General Directorate of Statistics.<sup>12</sup>

### Participants

Individual participant selection incorporated convenience and snowball sampling to identify participants. For snowball sampling we began by reaching out to the *Xefe Succo* (village chief) and the *Xefe Aldea* (community chief) for permission to be in the community; they referred some potential residents we interviewed in their homes. We also recruited participants while traveling in public places such as local markets.

Inclusion criteria required that participants be (1) citizens of and born in Timor-Leste, (2) between 18 and 70 years old, and (3) able to give verbal consent. No compensation was provided to participants. We conducted interviews with the help of a local Timorese Research Assistant and a health care worker to limit the influence of the data collectors in participants reporting a preference for either medical system.

Participants were presented with the questionnaire in Tetum on an iPad. The original protocol for this study was planned for participants to complete the questionnaire by reading and clicking on responses themselves. However, due to illiteracy and expressed

**Table 1. The Demographic, Geographic, Ethnic, Health Care Environment, and Conventional Health Services Locally Accessible in Each Location**

	Dili-urban	Viqueque-rural
Special features	Capital city with National Hospital and central government facilities	Mountainous and rural, about 10 h by bus from Dili
Population	328,666 habitants in 386 sq km, diverse mostly speaking Tetum	78,599 habitants in 1880 sq km, Makasai ethnic group and language
Health services	1 hospital, 6 health centers, 24 health posts, 18 SISCa, 8 private clinics	5 health centers, 43 health posts 47 SISCa, 2 private clinics
Health care personnel	295 physicians, 411 nurses, 170 midwives	59 physicians, 91 nurses, 40 midwives

Data from Timor-Leste em Números.  
 SISCa, Servisu Integrado de Saude Comunidade.



preference, most chose to have the questions read aloud by the research assistant who then entered participants' responses.

### Statistics

Data were analyzed and summarized using descriptive statistics in Stata/BE 17.0 (StataCorp, <https://www.stata.com>). Chi-squared and *t*-tests were used to assess potential demographic differences across sites. To compare utilization of conventional medicine and Traditional Timorese Medicine within each study location, a chi-squared analysis was performed. To be conservative in our estimates, all respondents were included in summary statistics, including those who were not sick and those that reported receiving no care during the previous 6 months.

### Ethics approval

The study was approved by the University of Miami's Institutional Review Board (20190436) and the Timor-Leste Ministry of Health Research Review Board (No Ref: 963/MS-INS/GDE/DEP/VI/2019). It was also conducted in accordance with the principles laid down by the Declaration of Helsinki. Consent was obtained before data collection and recorded on iPads through an offline version of REDCap.

### Results

One hundred fifty-nine Timorese participated in this study. The average age was 32.8 years, and there were 76 (48%) female and 83 (52%) male participants. The vast majority of those interviewed identified their religion as Catholic (97%), with two Protestants and one Buddhist. Geographically, this study included 89 participants from the rural area of Viqueque and 70 from the urban area of Dili (Table 2). There was no significant difference across sites for gender ( $p=0.622$ ) or religion ( $p=0.513$ ), although there was a significant difference in age ( $p<0.001$ ), with respondents in the urban area of Dili being significantly younger.

**Table 2. Sample Composition (n = 159)**

	Dili (n = 70)	Viqueque (n = 89)	Total
Age, mean (SD)	27.2 (10.3)	37.3 (15.4)	32.8 (14.3)
Gender male	35 (50%)	48 (54%)	83 (52%)
Female	35 (50%)	41 (46%)	76 (48%)
Religion catholic	67 (96%)	88 (99%)	155 (97%)
Other	2 (3%)	1 (1%)	3 (2%)

SD, standard deviation.

**Table 3. Reported Use of Only Conventional Medicine, Only Traditional Timorese Medicine, or Both in the Past 6 Months**

	Dili % (n = 70)	Viqueque % (n = 89)	Total % (n = 159)
Conventional	16% (11)	11% (10)	13% (21)
Traditional Timorese	21% (15)	35% (31)	29% (46)
Both	47% (33)	42% (37)	44% (70)
No treatment	16% (11)	12% (11)	14% (22)

In the 6 months before the study, 29% of respondents had used only Traditional Timorese Medicine, 13% only conventional treatment, and 44% had used both (Table 3). This means that 73% of Timorese reported utilizing Traditional Timorese Medicine either alone or in combination. Use of Traditional Timorese Medicine was compared to conventional medicine across geographic locations, and neither the urban nor rural site demonstrated a significant preference for one system over the other (Table 4).

We categorized participant-reported treatments as conventional medicine if they included treatment by a doctor, nurse, midwife, or SISCa volunteer at a range of facilities, including nongovernment organizations, health posts, health centers, hospitals, and pharmacies. Traditional Timorese Medicine included self-administered modalities such as *aimoruk natureza* (natural medicine), *aimoruk Timor* (herbal medicine), massage, animal sacrifice, or attendance at a traditional ceremony, as well as treatments by providers such as a *Liman Badaen* (masseur or traditional midwife), *Ema Aimoruk Timor* (herbalist), *Doutor(a) Tradisaunal* (traditional doctor), or *Matan-Dook* (diviner/shaman/spiritual intermediary). *Matan-Dook* translates literally to "eyes far" and refers to someone who has mystical abilities, often the ability to see the future or connect with the dead. Other reported individuals from whom participants sought care included family members, friends, and Madre Lourdes, a well-known nun in Timor-Leste who uses herbs.

Many individuals utilized methods of self-initiated treatment, the most common being massage (50%). Other self-initiated treatments included the use of

**Table 4. Reported Use of Any Conventional Medicine or Any Traditional Timorese Medicine in the Past 6 Months**

	Conventional	Traditional Timorese	<i>p</i>
Dili (n = 70)	63% (44)	69% (48)	0.132
Viqueque (n = 89)	53% (47)	76% (68)	0.586
Total (n = 159)	57% (91)	73% (116)	



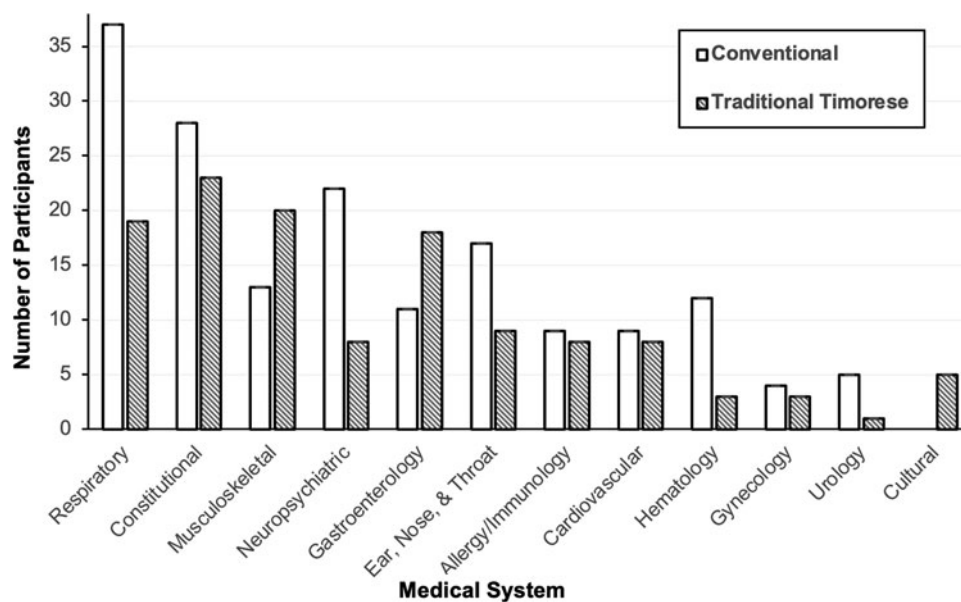
**Table 5. Self-Initiated Treatment Modalities and Patient Satisfaction**

Modality (n)	Very good	Good	Not good	Don't know
Massage (79)	29	46	2	2
Prayer (62)	31	24	0	5
Traditional ceremony (34)	20	13	0	1
Animal sacrifice (15)	7	7	0	1
Other (8)	5	2	0	1

prayer (39%), attending a holy ceremony (22%), and animal sacrifice to help with their condition (9%) (Table 5). Patient treatment satisfaction was also assessed by asking “what do you think about the treatment you received?” A large number of patients reported that they were “very satisfied” with their care from Traditional Timorese Medicine providers. The most common reason for treatment choice was the individual’s “belief in the treatment” rather than other factors such as availability, location, or cost.

In general, the top symptoms causing individuals to seek treatment fell under the respiratory, constitutional, musculoskeletal, neuropsychiatric, and gastroenterology medical systems (Fig. 1). Individuals seemed to prefer treatment from the National Health System when symptoms concerned respiratory, constitutional, or neuropsychiatric issues, while Traditional Timorese Medicine modalities were preferred for issues related to musculoskeletal, gastroenterology, and cultural-related illnesses. The only illness category for which there was an absolute overall treatment preference was cultural related, for which Traditional Timorese Medicine was preferred; however, that sample size was small ( $n=5$ ).

Cultural concepts of distress is a category recognized in the internationally used Diagnostic and Statistical Manual-V and has been previously referred to as Culture-Bound Syndromes.<sup>27</sup> In Timor-Leste, examples include bad blood, possession, spirit problems, and *ema halo*, a curse or spell that is believed to be



**FIG. 1.** Medical system for which individuals sought treatment and type of provider utilized. Respiratory symptoms reported by participants included: tuberculosis, cough, difficulty breathing, coughing blood, smoking addiction, chest pain; constitutional: chills, fever, trembling or shaking, fatigue; musculoskeletal: broken bones, fracture, swollen leg, leg laceration, muscle pain, backache, buttock pain, muscle pain, hand sprain; neuropsychiatry: headache, faint or lightheaded, insomnia; gastroenterology: stomach pain, vomiting, constipation, heartburn; ear, nose, throat: dental caries, toothache, bloody nose, eye pain, dizziness, runny nose, nasal congestion; allergy/immunology: vitiligo, itchiness, allergies, asthma; Cardiovascular: heart disease, hypertension; hematology: malaria, dengue, anemia; gynecology: pregnancy, vaginal discharge, infertility, menstrual cramps; urology: urinary retention; cultural: family conflicts, household problems, witchcraft, curse, or spell caused intentionally by another person.



caused intentionally by another person, potentially resulting in illness or death of another person.

### Discussion

This study found that a vast majority of Timorese relied on Traditional Timorese Medicine (73%), with 44% of individuals reporting of using it in combination with conventional health care. The quantification of the concurrent use of both systems is a novel finding of the current study. A previous study had found a considerable lower rate of Traditional Timorese Medicine use, with only 31% of heads-of-households reporting that they sought treatment from a traditional healer.<sup>28</sup> This study's development and use of a properly adapted version of the I-CAM-Q may have helped gain a clearer and more accurate picture of Traditional Timorese Medicine use in this population.

It is clear from this study's results that participants relied heavily on both Traditional Timorese Medicine and conventional health care, which suggests that the usage of these systems is perceived as complementary. Timorese are not averse to combining traditional healing with biomedicine, which are generally accepted as mutually reinforcing practices. Some traditional providers acknowledge the efficacy of hospital treatment, and *Matan-Dooks* often advise clients to utilize biomedicine.<sup>20,29</sup> Similarly, formally trained clinic and hospital health care workers have also sought help from traditional and religious practitioners.<sup>20</sup>

One Timorese interviewed on the topic said "foromasi ete asa ho larin ete asa, nita aca nehere," meaning "hospital medicine and natural medicine are mutually beneficial".<sup>6</sup> The treatment of postpartum illness in Timor-Leste, believed to be caused by cold entering the body, has often involved making accommodations for both medical systems. During labor at home, a fire is often used to prevent heat loss; when giving birth at the hospital, women are given warm clothes postpartum instead.<sup>30</sup> According to another community level public health intervention, while community members were encouraged to still respect this practice of heating, they were also urged to promote ventilation to avoid inhalation of fumes by the mother and newborn.

The most common reason for choice of treatment in the current study was the individual's belief in the treatment. Personal belief or meaningfulness has been found to influence the neural network and other physiological responses to treatment and may be potentially mediated by the placebo effect.<sup>31</sup> This may, in part, ex-

plain how Timorese bodies are healed through Traditional Timorese Medicine. How illness is perceived reflects individual treatment decisions, especially when it comes to culture-bound syndromes or mental health, and Timor-Leste's traditional healers address physical health, as well as psychosociospiritual needs.<sup>15</sup> Etiological beliefs about mental illness often stem from animist beliefs regarding being punished by ancestral spirits.<sup>32,33</sup> The National Health System adapted when it realized patients primarily sought treatment for epilepsy from mental health services, rather than neurological providers, because individuals were thought to be *bulak* (crazy) and possessed by an angry ancestral spirit.<sup>32</sup>

The substantial percentage of the population using massage was also a noteworthy finding. The use of massage by traditional practitioners has not been well documented previously. Half of the patients interviewed reported the use of massage in the 6 months before the study, making it the most widely used Traditional Timorese Medicine modality in Timor-Leste; reports from neighboring Indonesia demonstrated similar findings.<sup>34</sup> In addition, it is significant that this study found a lack of difference in the preference for medical system between rural and urban areas. This is consistent with another study that reported the use of traditional medicine to be consistent across rural and urban areas.<sup>35</sup> This finding may speak to the importance of traditional beliefs in Timorese culture and was further supported by our finding that the main factor in treatment decisions was "belief in treatment."

It is likely that the current COVID epidemic has impacted conventional health care utilization. A 2020 study found that countrywide 80.1% of study participants reported that they would "go to the hospital" for COVID treatment, with only 24.4% reporting that they would "go to a traditional healer".<sup>36</sup> Surprisingly, the large survey found no individuals who reported seeking treatment for COVID with a *Matan-Dook*. This may represent a successful national health campaign, but it could also reflect hesitancy in participant reporting the use of those services. Moreover, the authors did not discuss cultural adaptations to their questionnaire. One individual suggested that if patients have "been to the hospital already and the issue was not resolved, you will go to the *Matan-Dook*," suggesting not only potentially successful COVID education outreach and awareness but also that the order of treatment should be investigated.



Lack of information about order of treatment was a limitation of the current study as well. Interestingly, a qualitative study in West Timor, the other half of the island belonging to Indonesia, found that culturally Tetum individuals were most likely to initially self-treat for malaria-like symptoms, while also noting that none of the participants reported a hospital-based care to be their initial choice.<sup>21</sup> A previous study in Timor-Leste that inquired about initial provider preference found that only 14 of 4539 of participants (0.3%) had chosen a traditional practitioner as their first option.<sup>13</sup> Another limitation of our study was the lack of information on health resource utilization for the treatment of children, a part of the population that consumes a sizeable portion of health resources.

Among the impressive health gains achieved in Timor-Leste since independence, the Ministry of Health is leading the way in the decentralization of health services with a recent expansion of health facilities and innovative outreach programs such as SISCa.<sup>37</sup> Traditional Birth Attendants, who increase access to reproductive health services, now make up a large part of the health care workforce ( $n = 1647$ ) and are second only to nurses ( $n = 1800$ ).<sup>38</sup> However, there is currently no legislation regarding traditional medicine products nor are any traditional medicine products included on the essential medicine list.<sup>39</sup> Still, in recent years projects have started to test the feasibility of an integrated model; for example, in 2015 a national forum on mental health policy included customary healers.<sup>40</sup>

A recent World Health Organization review of progress reported that Timor-Leste does not yet have a national policy, law, or regulation on TCAM and its practitioners or on herbal medicines.<sup>41</sup> Moving forward, this will likely change soon as a recent government publication included a new objective to “Regulate the use of alternative and complementary medicine and promote Traditional Timorese Medicine”.<sup>42</sup> It would be beneficial to initiate a dialog between those in the formal health system and those without a formally recognized role.

Trained traditional healers, who are familiar with the difficult terrain and understand the local contexts and barriers, could also be used to improve health care delivery to underserved and remote communities. Furthermore, this report suggests that disease prevention with traditional medicine may reduce health care costs and decrease the demand for biomedical interventions.<sup>23</sup> With the continuing appeal of traditional

practices and an integrative model of care, Timor-Leste should embrace medical pluralism and mutual accommodation of both systems.

### Authors' Contributions

B.G. conceived the idea of the project and developed the protocol with input from A.L. and J.C. J.C. played a key role in carrying out the study and addressing cultural considerations. B.G. conducted focus group, analyzed data, summarized findings, and interpreted the results with help from all authors. M.H.v.Z. drafted portions of the article and provided critical edits. All authors discussed the results and contributed to the final article. Authors listed were included due to their significant contribution to this project's design, protocol development, interpretation of results, and article preparation. The article has been reviewed and approved by all the authors; each author acknowledges that the requirements for authorship as stated earlier in this document have been met and believes that the article represents honest work.

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### Author Disclosure Statement

No competing financial interests exist.

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### Abbreviations Used

I-CAM-Q = International Complementary and Alternative Medicine Questionnaire  
SD = standard deviation  
SISCa = Servisu Integrado de Saude Comunitade  
TCAM = Traditional, Complementary, and Alternative Medicine  
UN = United Nations  
WHO = World Health Organization

