Title:

Is Traditional Chinese Medicine Use Associated with Worse Patient-Reported Outcomes Among Chinese-American Rheumatology Patients?

Running Head:

TCM and Patient-Reported Outcomes

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Abstract

Objective: Chinese-Americans are a fast growing immigrant group with more severe rheumatic disease manifestations than Caucasians and often a strong cultural preference for Traditional Chinese Medicine (TCM). We aimed to examine TCM use patterns and association with patient-reported outcomes (PROs) among Chinese-American rheumatology patients.

Methods: Chinese-Americans actively treated for systemic rheumatic diseases were recruited from urban Chinatown rheumatology clinics. Data on sociodemographics, acculturation, clinical factors, and TCM use (11 modalities) were gathered. Self-reported health status was assessed using Patient-Reported Outcome Measurement Information System (PROMIS®) short forms. TCM users and non-users were compared. Factors independently associated with TCM use were identified using multivariable logistic regression.

Results: Among 230 participants, median age was 55 (range 20-97), 65% were female, 71% had ≤ high school education, 70% were on Medicaid, 47% lived in the US for ≥20 years, and 22% spoke English fluently. Half used TCM in the past year; these participants had worse self-reported anxiety, depression, fatigue, and ability to participate in social roles and activities compared with non-users. In multivariable analysis, TCM use was associated with belief in TCM, female gender, ≥20 years' US residency, reporting western medicine as ineffective, and shorter rheumatic disease duration.

Conclusion: Among these Chinese-American rheumatology patients, TCM users had worse PROs in many physical and mental health domains. TCM use may be a proxy for unmet therapeutic needs. Asking about TCM use could help providers identify patients with suboptimal health-related quality of life who may benefit from targeted interventions.

Introduction

Chinese-Americans are one of the fastest growing immigrant populations in the US (1) and are known to have worse outcomes in systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA) compared to Caucasians (2) (3) (4). Among Chinese-American patients with chronic diseases, the use of Traditional Chinese Medicine (TCM) alongside conventional western treatment is common (5). Health beliefs and attitudes influence the use of TCM, which in turn may impact health and illness self-management strategies (6) (7) (8) and thus health-related quality of life. However, there are no data on the patterns of TCM use by Chinese-American rheumatology patients, and the relationship between TCM use and patient-reported outcomes is unknown. In particular, data are lacking among Chinese immigrant populations who are often hard to engage due to low acculturation and limited English language proficiency. Our study aimed to examine patterns of TCM use among Chinese-American rheumatology patients who seek care in an urban Chinatown healthcare setting, and we used the Patient-Reported Outcome Measurement Information System (PROMIS®) domains (9) (10) to examine differences in self-reported health status between TCM users and non-users.

Patients and Methods

Study setting and population. In this cross-sectional cohort study, consecutive eligible patients were recruited from two rheumatology practices in New York City's Chinatown, both of which serve a predominantly immigrant Chinese-American population. All participating rheumatologists were Chinese-American and were fluent in Mandarin Chinese. Patients were included if they were of Chinese ethnicity, age 18 or above, able to communicate in English or Mandarin Chinese, and actively followed for a systemic rheumatic disease for which their rheumatologist prescribed at least one scheduled non-

intravenous western medication. Patients were excluded if they were pregnant or nursing, followed for <6 months in the practice for a newly diagnosed rheumatic disease or <3 months for a previously diagnosed rheumatic disease, had significant cognitive impairment, or were being treated for primary fibromyalgia, mechanical neck or back pain, soft tissue diseases, or osteoporosis. All instruments were administered by an English/Mandarin bilingual researcher and were available in both English and Chinese. Additional clinical data were obtained through chart review. All participants provided written informed consent. This study was approved by the institutional review board at Hospital for Special Surgery (# 2015-385).

Data Collection.

Demographic and Clinical Factors

Participants were asked about perceived efficacy and side-effects of western rheumatic disease medications prescribed by their rheumatologist. They were asked on a 5-point Likert scale "How effective is western medicine prescribed by your rheumatologist?", and "Have you had any side effects from western medications prescribed by your rheumatologist?" Primary rheumatologic diagnosis, disease duration, all prescribed medications (including both rheumatic and non-rheumatic disease medications), and comorbidities were extracted from medical record review. Charlson Comorbidity Index was derived (11), and a medication regimen complexity index was calculated using standard methodology based on method of administration and frequency of use of each medication (12).

TCM Use

Patterns of TCM use were elicited using an adapted instrument originally developed for Chinese-American oncology patients (15). Annual utilization patterns of eleven TCM modalities were

assessed, including oral and topical Chinese herbs, acupuncture (insertion of needles into strategic points in the body based on TCM theory), acupressure (application of pressure on acupuncture points without skin penetration), moxibustion (application of heat by burning herbs over acupuncture points), *tuina* (Chinese therapeutic massage), cupping (application of suction to the skin using heated cups), *guasha* (application of pressure using a smooth-edged instrument to produce light bruising over skin), food therapy, *taichi* (a form of martial art exercise using slow controlled movements), *qigong* (gentle exercise based on posture, breathing, and meditation), or other. Reasons for TCM use were ascertained through multiple choice questions which included an open ended option. Among TCM users, perceived effectiveness of their TCM regimen was assessed on a 3-point Likert scale. Additionally, TCM users reported source of recommendations for TCM and whether TCM use was discussed with their rheumatologist. Overall belief in TCM was assessed among both users and non-users on a 5-point Likert scale with the question "In general do you believe that TCM works?"

Acculturation

Acculturation, the degree immigrant populations assimilate to mainstream American culture, was assessed using the Marin and Marin Acculturation Scale (13). This scale has 12 items on a 5-point Likert scale measuring three domains, including language use, media use, and ethnic social relations. Scores range from 12 to 60, with higher scores indicate greater degrees of acculturation. This scale was originally developed for the Hispanic population and has been translated to Chinese and validated in Chinese-Americans (14).

Patient-Reported Health Status Measures

Patient-reported outcomes in 9 domains were measured using PROMIS® short forms (16) (17). These included ability to participate in social roles and activities (v2.0, 10-item), instrumental

support (v2.0, 2-item) (i.e. functional aspects of supportive interpersonal relationships), cognitive general concerns (v1.0, 4-item) (i.e. abilities with respect to cognitive tasks such as memory and thinking), anxiety (v1.0, 7-item), depression (v1.0, 8-item), fatigue (v1.0, 7-item), sleep disturbance (v1.0, 4-item), pain interference (v1.1, 6-item), and physical function (v1.2, 10-item). All domains inquire about the past 7 days except for ability to participate in social roles and activities and physical function, which do not have a time frame in the prompt. All domains were assessed using English or linguistically validated Chinese versions of PROMIS® short forms depending on participants' language preference (17). Raw scores from short forms were uploaded to the HealthMeasures Assessment Center Scoring Service (18) to be converted into T-scores. A T-score of 50 corresponds to the U.S. population mean. Higher scores denote more of the domain being evaluated. A difference in T-score of 5, equivalent to a half standard deviation, is considered clinically significant (19) (20).

Statistical analysis. Categorical variables were described with percentages, and continuous variables were summarized with either mean (standard deviation) or median [quartiles: Q1-Q3], depending upon distribution, as assessed by the Shapiro-Wilk test. Categorical variables were compared using chi-squared tests, and continuous variables were compared using t-tests or Wilcoxon rank-sum tests, as appropriate. PROMIS® scores were compared between TCM users and non-users in bivariate analysis as well as using generalized linear models controlling for demographic and clinical variables significantly different between the two groups in bivariate analysis. In addition, differences in PROMIS® scores were explored between herb- vs. non-herb TCM users, those who did and did not disclose TCM use to their rheumatologists, those who used TCM to treat an underlying rheumatologic disease vs. users of TCM for other reasons, and among users based on frequency of use. Multivariable logistic regression was used to generate

odds ratios of variables independently associated with TCM use. We included all variables other than PROMIS measures that were statistically significantly different between TCM users and nonusers in bivariate analysis. We performed all analyses using both non-normally distributed variables as well as log-transformed values of them and yielded similar results. Only non-transformed data are presented for ease of interpretation. We performed the Hosmer-Lemeshow test to assess overall fit of the model. Bivariate analyses were performed with STATA (version 14.2 College Station, TX), and multivariable analyses were performed with SAS (version 9.4 Cary, NC).

Results

Sociodemographic and Clinical Characteristics

We approached 262 eligible patients, and 230 (88%) agreed to participate. Median age was 55 years (range 20-97), 65% were female, 71% had high school or less education, and 70% were on Medicaid. Majority (96%) were born outside of the US, with 47% having lived in the US for 20 or more years. Only 22% reported fluency in English. Median Marin and Marin acculturation score was 15 (range 12-54), with lower score indicate being less acculturated. The 3 most common rheumatologic diagnoses were RA (41%), SLE (17%), and seronegative spondyloarthropathies (15%), with a median disease duration of 4 years (range 0.2-52). Eighty-three percent of participants were prescribed disease modifying agents, 26% biologics, and 27% steroids (Table 1).

Patterns of TCM Use and Characteristics of TCM Users

Fifty percent reported using TCM in the past 12 months, with the most frequently used modalities being *tuina* massage (47%), acupuncture (45%), and herbs by mouth (37%) (Table 2).

Seventy percent used 2 or more modalities, and 35% used 3 or more modalities. Recommendations for TCM came most commonly from the patient's own interest (43%) or family and friends (40%) (Table 2). The most common reasons for TCM use were treating underlying rheumatic disease (60%), followed by treating symptoms unrelated to rheumatic diseases (48%), and improving overall wellbeing (37%). Seventy percent of TCM users reported using TCM at least several times a month. The majority of TCM users reported the modality they use as very (11%) or somewhat (67%) helpful. Only 30% of TCM users had ever discussed TCM use with their rheumatologist, most reporting that they did not see any reason to talk about it with their rheumatologist. Among TCM users and non-users, 81.7% and 64.4% respectively reported belief that TCM works.

Comparisons of demographic and clinical characteristics of TCM users and non-users are shown in Table 3. Compared to non-users, TCM users were statistically significantly older, more likely to be female, retired or a homemaker, have lived in the US for 20 or more years, have a shorter rheumatic disease duration, take a more complex medication regimen, report western medicine to be ineffective and causes side effects, and believe TCM works.

Differences in Patient-Reported Outcomes

TCM users had statistically significantly worse T-scores in PROMIS® anxiety (median 52.9 vs. 42.9, $p<0.001$), depression (median 51.3 vs. 43.1, $p<0.001$), pain interference (median 59.7 vs. 56.1, $p=0.002$), fatigue (mean 53.9 vs. 49.3, $p<0.001$), function (median 42.2 vs. 45.9, $p=0.002$), and ability to participate in social roles and activities (median 56.4 vs. 60.7, $p=0.003$) (Table 3). The differences in median T-scores for anxiety and depression were 10 and 8.2 respectively, which are clinically meaningful. In the generalized linear models controlling for demographic and clinical factors, anxiety, depression, ability to participate in social roles and activities, and

fatigue T-scores remained significantly different between TCM user and non-users, with anxiety T-scores remaining clinically meaningfully different between the two groups (Table 4). There were no significant differences in any PROMIS® T-scores between herb and non-herb TCM users, or between TCM users who did and did not disclose to their rheumatologists (data not shown). Patients using TCM to treat rheumatic disease compared to those reporting other reasons for TCM use had worse scores in pain interference (median 61.2 vs. 58.4, p= 0.03) and physical function (median 41 vs. 54.2, p= 0.01), with the difference in physical function scores being clinically meaningful. Also, patients reporting TCM use at least several times a month compared to less frequent users had worse pain interference (median 61.2 vs. 56.9, p= 0.03) and physical function (median 41 vs. 44.4, p= 0.045).

Factors Independently Associated with TCM Use

In multivariable logistic regression, TCM use was independently associated with belief in TCM (OR 3.9, 95% CI 1.9-8.2), female gender (OR 2.5, 95% CI 1.3-4.8), living in the US for 20 or more years (OR 2.3, 95% CI 1.2-4.7), reporting western medicine to be ineffective (OR 1.5, 95% CI 1.1-2.0), and shorter disease duration (OR 0.9 for each additional year since diagnosis, 95% CI 0.9-0.99) (Table 5).

Discussion

This is the first study to specifically examine patterns of TCM use as well as the relationship of TCM use with patient-reported health status among Chinese-American rheumatology patients. Our cohort is representative of a population which is particularly challenging to engage by dominant-culture healthcare workers, as despite having resided in the US an average of 19 years, only 22% of patients spoke fluent English, and most were extremely poorly acculturated; the

median score of 15 was at the floor of the 12-60 scale. The overarching belief in TCM found in this study, even among the majority of non-users, is consistent with other research demonstrating a deeply ingrained positive attitude about TCM among Chinese patients (21) (22). Women in our cohort are more likely to be TCM users, which is similar to the greater use of complementary and alternative medicine by women among the US general population (23). We also found that belief in the efficacy of TCM was associated with a statistically significant 3.9 increased odds of TCM use. Interestingly, those who have lived in the US for >20 years were more likely to use TCM. While this may seem counterintuitive, it not only highlights the durability of these cultural beliefs, but also underscores the fact that immigrants who choose to seek health care in ethnic enclaves after decades of living in the US are likely to maintain health care beliefs concordant with their countries of origin. Understanding and acknowledging the strength of these beliefs could be helpful to physicians in creating treatment plans for patients with low levels of acculturation.

While most TCM users utilized only non-herbal modalities, more than 1/3 took Chinese herbs. Moreover, even though treatment of their underlying rheumatic disease was the most common reason for TCM use, only 30% discussed TCM use with their rheumatologist. This number could conceivably be even smaller among Chinese patients in other settings cared for by providers from different cultural backgrounds. Existing research has shown that, in general, Asian Americans are more likely to use complementary therapies but less likely to report their use to health providers than Caucasians (24). This lack of open communication is important, as undisclosed herb use may be a concern for potential herb-drug interactions with rheumatic medications. Patient education about TCM use, particularly safety of herbal remedies, may also facilitate open discussions with health professionals.

Patients could also be using certain TCM modalities in place of prescribed western medications (25). In fact, our data showed that perceived lack of efficacy of western medications was independently associated with a 1.5 increased odds of using TCM. Further, patients with a shorter duration of rheumatologic disease diagnosis were *more* likely to use TCM. This is consistent with patients initially choosing therapies more familiar to them and only making the effort to undertake western treatment, with its attendant cultural, linguistic, financial, and logistical barriers, in cases where the disease symptoms are not resolved expeditiously and continue to require treatment. Future studies should investigate whether TCM use during the initial onset of rheumatologic disease may be replacing effective early interventions during this crucial "window of opportunity," where long term outcomes can be affected.

This is also the first study to examine PROMIS® domains among Chinese rheumatology patients. We found that TCM users had worse PROMIS® scores in anxiety, depression, ability to participate in social roles and activities, and fatigue, with the absolute difference for anxiety and depression T-scores exceeding 5 (half standard deviation), the commonly accepted threshold for a clinically meaningful difference. Further, these differences remained statistically significant for anxiety, depression, ability to participate in social roles and activities, and fatigue even after controlling for potential demographic and clinical confounders.

These findings suggest that TCM use may serve as a useful and easily ascertained proxy for Chinese-American patients who have worse mental health, and may help providers identify those with unmet therapeutic needs. This could have particular clinical significance in this population, given the well documented reticence of Asian Americans, particularly first- and second-generation immigrants, in reporting symptoms of anxiety, depression, and other mental health issues (26) (27). Future studies should explore whether undiagnosed or inadequately treated

comorbid mental health issues contribute to the known disproportionately worse outcomes in Chinese rheumatic disease patients. In addition, those who use TCM to treat underlying rheumatic disease, as well as more frequent TCM users, had worse self-reported pain and function, both of which are crucial rheumatic disease outcomes. Whether patients' use of TCM is a self-management strategy driven by inadequately treated pain and poor function, or whether TCM is replacing more effective long term conventional western therapies, needs further study. Valid and responsive instruments such as PROMIS® should be included in future studies of complementary and alternative medicine use and patient self-management, as they provide important insights into patients' experiences of symptoms and functioning.

There are limitations to this observational study. First, this population is not representative of all Chinese-Americans, and our findings may not be generalizable to those who seek care outside of ethnic-centered urban enclaves like New York City's Chinatown. Second, TCM use was evaluated by patient self-report, and patients may have underreported actual use. However, all questions were conducted in a nonthreatening environment, and thirty percent who had not discussed TCM use with their rheumatologist did disclose to the researcher. Third, because TCM use in the past 12 months was assessed, we are unable to ascertain whether a more remote history of TCM use affected current patient-reported health status. Lastly, as this is a cross-sectional study, we are unable to infer causality between TCM use and PROMIS® outcomes.

This study has several strengths. New York City has one of the largest Chinese-American immigrant communities in the US. Both the researcher and treating physicians were ethnically and linguistically concordant with the study participants, which minimized language and cultural barriers, and facilitated the recruitment of a vulnerable, hard to reach immigrant population. We also utilized instruments with existing linguistically validated Chinese translations.

In conclusion, this is the first study to describe characteristics of TCM users and the association of TCM use with a wide range of clinically relevant patient-reported outcomes among Chinese-American rheumatology patients. Our findings underscore the importance of rheumatologists proactively inquiring about their Chinese-American patients' use of TCM. TCM use is associated with worse scores in a number of patient-reported outcomes, and thus may be a flag for providers to consider opening a dialog to specifically inquire into potential mental health issues, understanding that Asian American populations are more reluctant to proactively report such issues. Doing so in a way that displays culturally understanding can encourage patients to engage in appropriate mental health services (25), and may significantly impact health-related quality of life.

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Tables

Table 1. Characteristics of 230 participants enrolled.

Table 2. Types of Traditional Chinese Medicine (TCM) modalities and sources of TCM recommendations reported by TCM users (n=115).

Table 3. Comparing demographics, clinical characteristics, and patient-reported outcomes between Traditional Chinese Medicine (TCM) users and non-users.

Table 4. Adjusted patient-reported health outcomes of Traditional Chinese Medicine (TCM) users and non-users.

Table 5. Multivariable logistic regression to examine factors independently associated with Traditional Chinese Medicine (TCM) use.

Table 1. Characteristics of 230 participants enrolled.

Patient Characteristics	**Values**
Age, years, median [Q1-Q3]	57 [44-66]
Female, n (%)	149 (65)
≤ High school education, n (%)	164 (71)
Medicaid, n (%)	161 (70)
Married/live with a partner, n (%)	163 (71)
Born outside of the US, n (%)	220 (96)
Speak English, n (%)	51 (22)
Marin and Marin acculturation score, median [Q1-Q3]	15 [14-22]
Rheumatologic diagnosis, n (%)	
Rheumatoid arthritis	95 (41)
Systemic Lupus Erythematosus	40 (17)
Spondyloarthropathies	34 (15)
Sjogren's syndrome	27 (12)
Gout/Pseudogout	13 (6)
Other*	21 (9)
Rheumatic medications, n (%)	
Disease modifying agents	191 (83)
Biologics	60 (26)
Steroids	62 (27)
Charlson Comorbidity Index, median [Q1-Q3]	1 [1-1]

Q = quartile; SD = standard deviation; *Other diagnoses included myositis (5), systemic sclerosis (3), undifferentiated connective tissue disease (3), inflammatory osteoarthritis (2), palindromic rheumatism (2), juvenile idiopathic arthritis (2), polymyalgia rheumatic (1), relapsing polychondritis (1), iritis (1), panniculitis (1)

Table 2. Types of Traditional Chinese Medicine (TCM) modalities and sources of TCM recommendations reported by TCM users (n=115).

TCM Modalities	**N (%)**
Tuina Massage	54 (47)
Acupuncture	52 (45)
Herbs by mouth	43 (37)
Cupping	37 (32)
Food therapy	22 (19)
Acupressure	17 (15)
Topical herbs	15 (13)
Guasha	9 (8)
Taichi	7 (6)
Moxibustion	3 (3)
Qigong	3 (3)
Other*	6 (5)
Sources of TCM Recommendations	
My own preference	49 (43)
Family/friends	46 (40)
Doctor/nurse	21 (18)
Newspaper	8 (7)
Ads/commercial	7 (6)
Books	3(30
Internet	2 (2)
Other^	6 (5)

*2 took supplements, 1 each used foot massage, Buddhist meditation, knee percussion, and electroacupuncture

^1 each from: podiatrist, walking by a TCM place, TCM doctor, TV, insurance company

Table 3. Comparing demographics, clinical characteristics, and patient-reported outcomes between Traditional Chinese Medicine (TCM) users and non-users.

Patient Characteristics	**TCM users (n=115)**	**Non-users (n=115)**	**p-value**
Sociodemographic Factors			
Age, years, median [Q1-Q3]	60 [50-68]	53 [39-63]	<0.01
Female, n (%)	84 (73)	65 (57)	0.01
≤ High school education, n (%)	75 (65)	88 (77)	0.06
Employment			0.04
Employed or student, n (%)	43 (37)	62 (54)	
Unemployed, n (%)	13 (11)	12 (10)	
Retired or homemaker, n (%)	59 (51)	41 (36)	
≥20 years living in the US, n (%)	65 (57)	42 (37)	<0.01
Clinical Factors			
Length of diagnosis, years, median [Q1-Q3]	3 [2-7]	5 [3-10]	<0.01
Medication Regimen Complexity Index, median [Q1-Q3]	12 [9-18]	11 [6-15]	0.03
Report western medicine ineffective*, n (%)	26 (23)	8 (7)	<0.01
Report western medicine side effects†, n (%)	50 (44)	36 (30)	0.04
Believe TCM works^, n (%)	94 (82)	74 (64)	<0.01

PROMIS® T-scores			
Sleep Disturbance, median [Q1-Q3]	53 [46-57]	50 [44-55]	0.07
Cognitive Concerns, median [Q1-Q3]	36 [30-40]	35 [26-39]	0.40
Anxiety, median [Q1-Q3]	53 [43-58]	43 [36-54]	<0.01
Depression, median [Q1-Q3]	51 [37-58]	43 [37-54]	0.01
Pain Interference, median [Q1-Q3]	60 [54-65]	56 [49-62]	<0.01
Fatigue, mean (SD)	53.9 (10)	49.3 (9)	<0.01
Physical Function, median [Q1-Q3]	42 [37-49]	46 [40-54]	<0.01
Instrumental Support, median [Q1-Q3]	49 [45-51]	49 [45-53]	0.70
Ability to Participate in social roles and activities, median [Q1-Q3]	56 [49-66]	61 [55-66]	<0.01

Q = quartile; SD = standard deviation; PROMIS = Patient Reported Outcome Measurement Information System; TCM = Traditional Chinese Medicine

*Answering “not at all, a little, or don’t know” vs. “somewhat, quite a bit, or a lot” to “how effective is western medicine prescribed by your rheumatologist?”

†Answering “Not at all or don’t know” vs. “a little, somewhat, or quite a bit” to “have you had any side effects from western medications prescribed by your rheumatologist?”

^Answering “a little, somewhat, quite a bit, or a lot” vs. “not at all or don’t know” to “in general do you believe TCM works?”

There is overall <1% missing data except for the variable PROMIS® instrumental support, which has 39% missing value because it was added to the survey at a later in time.

Table 4. Adjusted† patient-reported health outcomes of Traditional Chinese Medicine (TCM) users and non-users.

PROMIS domain	TCM users	Non-users	p-value
Sleep Disturbance, mean (95% CI)	50 (48 - 53)	49 (47 - 52)	0.55
Anxiety, mean (95% CI)	50 (48 - 53)	46 (43 - 49)	<0.01
Depression, mean (95% CI)	51 (48 - 54)	47 (44 - 50)	0.01
Pain Interference, mean (95% CI)	59 (56 - 61)	57 (54 - 59)	0.17
Fatigue, mean (95% CI)	54 (51 - 56)	51 (48 - 54)	<0.01
Physical Function, mean (95% CI)	43 (40 - 45)	45 (42 - 47)	0.13
Ability to Participate in social roles and activities, mean (95% CI)	55 (53 - 58)	59 (56 - 61)	0.01

CI = Confidence Interval; PROMIS = Patient Reported Outcome Measurement Information System; TCM = Traditional Chinese Medicine;

† Using generalized linear model with each PROMIS® domain as the outcome and TCM user status as the predictor, PROMIS® T-scores were adjusted for variables significantly different between TCM users and non-users in bivariate analysis, including age, sex, employment status, years lived in the US, years since rheumatic disease diagnosis, medication regimen complexity index, reporting western medications to be effective, reporting side effects from western medications, and believing that TCM works.

Table 5. Multivariable logistic regression to examine factors independently associated with TCM use.

Variables	**Odds ratio (95% CI)**	**p-value**
Age (years), per 1 year increase	1.0 (0.98 – 1.04)	0.4
Female Gender	2.5 (1.3 – 4.8)	0.007
Employed	1.6 (0.7 – 3.4)	0.2
≥ 20 Years Living in the US	2.3 (1.2 – 4.7)	0.02
Length of Diagnosis (years), per 1 year increase	0.9 (0.9 – 0.99)	0.02
Medication Regimen Complexity Index, per 1 point increase	1.05 (1.0 – 1.1)	0.07
Report Western Medicine Ineffective*	1.5 (1.1 – 2.0)	0.01
Report Western Medicine Side Effects†	0.9 (0.7 – 1.2)	0.6
Believe TCM works^	3.9 (1.9 – 8.2)	<0.001

CI = confidence interval; TCM = Traditional Chinese Medicine

*Answering "not at all, a little, or don't know" vs. "somewhat, quite a bit, or a lot" to "how effective is western medicine prescribed by your rheumatologist?"

†Answering "Not at all or don't know" vs. "a little, somewhat, or quite a bit" to "have you had any side effects from western medications prescribed by your rheumatologist?"

^Answering "a little, somewhat, quite a bit, or a lot" vs. "not at all or don't know" to "in general do you believe TCM works?"