Prevalence, Patterns, and Predictors of *T'ai Chi* and *Qigong* Use in the United States: Results of a Nationally Representative Survey

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Abstract

**Objective:** This study examined the prevalence, patterns, and predictors of *t'ai chi* and *qigong* use in the U.S. general population.

**Design:** Cross-sectional survey.

**Methods:** Data from the 2012 National Health Interview Survey (n = 34,525). Weighted frequencies were used to analyze lifetime and 12-month prevalence and patterns of use. Independent predictors of practice were analyzed by using logistic regression models. Analyzes were conducted in 2015.

**Results:** The lifetime and 12-month prevalence of *t'ai chi/qigong* practice were 3.1% and 1.2%, respectively. The 12-month prevalence was associated with age older than 30 years; being African American, Asian, or other ethnic origin; living in the West; being college educated and single; and being a light to heavy alcohol consumer. Almost 39% of users attended formal classes. *T'ai chi/qigong* was practiced for wellness/disease prevention and to improve energy, immune function, athletic performance, or memory/concentration. Stress, arthritis, and joint problems were the most frequent specific health problems for practice.

**Conclusions:** Despite an only marginal increase of *t'ai chi/qigong* practice in the United States over the past 10 years, the proportion of minorities among practitioners has increased significantly. Gaps between clinical application and research are discussed.

Introduction

*T'ai chi* is a low-impact, mind–body exercise originating in China that has become increasingly popular in the West.

*T'ai chi* integrates musculoskeletal training (e.g., strength, flexibility, and coordination), breath training, and a variety of cognitive skills (e.g., body awareness, focused mental attention, and relaxation). A large and growing body of evidence supports *t'ai chi*’s potential efficacy and safety for a range of health conditions, including cardiovascular disease, balance and neuromuscular conditions, cognition, and emotional well-being. In the United States, this research has prompted national organizations, such as the Centers for Disease Control and Prevention (www.cdc.gov/Features/OlderAmericans/), the American Heart Association (http://heartinsight.heart.org/August-2014/The-Benefits-of-Tai-Chi-Healthy-Body-Strong-Heart/), and the National Parkinson Foundation (www.parkinson.org/Parkinson-s-Disease/Treatment/Exercise/Exercise-Tips.aspx) to endorse *t'ai chi* for health maintenance and rehabilitation. It is likely responsible for a growing number of *t'ai chi* training programs offered in both academic medical centers and community adult programs. *Qigong* is another mind–body practice originating in China sharing many of the principles of *t'ai chi* but typically limits movements to more simplistic and repetitive choreographed movement routines. Research on the health benefits of *qigong* is underway, but compared with *t'ai chi*, far fewer studies have been conducted.

Data on the prevalence of *t'ai chi* and *qigong* use in the West are very limited. A 2002 survey estimated that approximately 2.8 million people in the United States practiced *t'ai chi/qigong*; many of them would practice both. The study also found that Asian, higher-educated, and Midwestern residents and that patients with musculoskeletal disorders, severe sprains, or asthma were significantly more likely to practice than the remaining population.

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The current report updates these findings on the use of t’ai chi/qigong based on the 2012 National Health Interview Survey (NHIS) survey. This report examined the lifetime and 12-month prevalence of t’ai chi/qigong practice in the U.S. general population; its predictors and patterns of use; and reasons for use, sources of information, and observed subjective changes in health and well-being. Findings are discussed in the context of how changes in prevalence and patterns of use of t’ai chi/qigong track changes in research evidence and the extent to which data from clinical trials are relevant to the specific populations practicing t’ai chi/qigong, the health conditions t’ai chi/qigong is being practiced for, and the modalities through which it is being learned (e.g., classes vs. DVDs).

Methods

Data sources

Data were collected from the NHIS in 2012. This nationally representative survey monitors the health of the U.S. population. More information on the sampling strategy can be found online (http://www.cdc.gov/nchs/nhis/about_nhis.htm). All analyses were conducted in 2015.

The Sample Adult Core collected data on sociodemographic characteristics, such as age, sex, ethnicity, region, marital status, education, employment status, and annual household income. It also includes questions on general health status, health behavior, and medical conditions.

The Adult Complementary and Alternative Medicine questionnaire gathered data on the use of complementary and alternative medicine therapies, including t’ai chi and qigong. T’ai chi and qigong practices were collected separately but by otherwise identical questions. Lifetime prevalence of t’ai chi practice was queried with the question: “Have you ever practiced t’ai chi?” Those who indicated prior use were presented with an additional question on t’ai chi practice during the past 12 months: “During the past 12 months, did you practice t’ai chi for yourself?” Those who had practiced t’ai chi in the past 12 months then were presented with further questions regarding details of t’ai chi use, formal training or class attendance, and costs of classes and learning material. Further questions concerned reasons for t’ai chi practice, including medical conditions, and perceived health-related effects.

A total of 42,366 households were eligible and 34,525 adults provided data (response rate, 79.7%). Population-based estimates were calculated by using weights calibrated to the 2010 census-based population estimates for age, sex, and ethnicity of the U.S. civilian noninstitutionalized population.

Statistical analysis

Lifetime and 12-month prevalence rates of t’ai chi/qigong use were analyzed descriptively, as were information on practice (such as practice format and cost of practice), reasons for practice, and outcomes. Results were reported as weighted frequencies and distributions. For the purpose of the following analyses, t’ai chi and qigong were combined into one category, thus including all persons who had practiced t’ai chi or qigong or both.

Sociodemographic characteristics were compared between those who had practiced t’ai chi/qigong ever in their life/within the prior 12 months and those who had not by using chi-square tests. Independent predictors of t’ai chi/qigong use in a lifetime/in the prior 12 months were identified by using multiple logistic regression analysis. The following sociodemographic predictors were considered: age (categories: 18–29, 30–39, 40–49, 50–64, and ≥65 years), sex (categories: female or male), ethnicity (categories: non-Hispanic white, Hispanic, African American, Asian, and other), region (categories: West, Northeast, Midwest, South), marital status (categories: not in relationship or in relationship), education (categories: less than college or some college or more), and annual household income (categories: <$20,000, $20,000–$34,999, $35,000–$64,999, ≥$65,000). Additionally, health-related factors, such as general health status (categories: poor or fair; good, very good, excellent); body–mass index (BMI; categories: <18.5, 18.5–25, 25–30, ≥30 kg/m²); medical conditions; and health behaviors, including smoking (categories: nonsmoker or smoker), alcohol consumption (categories: alcohol abstainer, light drinker, regular or heavy drinker), and exercise behaviors (categories: sedentary, moderate exercisers [at least 150 minutes of moderate exercise or 75 minutes of vigorous exercise during the week], high-level exercisers [at least 300 minutes of moderate exercise or 150 minutes of vigorous exercise weekly]), were used as potential predictors.

A backward stepwise procedure with a likelihood ratio (LR) statistic p-value of 0.05 or less was chosen, and adjusted odds ratios with 95% confidence intervals were calculated. Only those associated with t’ai chi/qigong use at a p-value of 0.10 or less (chi-square test) were included in the regression analyses. Statistical analysis was performed using the Statistical Package for Social Sciences software (IBM SPSS Statistics for Windows, release 22.0, Armonk, NY).

Results

Prevalence of t’ai chi/qigong use

The lifetime prevalence of t’ai chi use was 2.9%, indicating that 6.90 million U.S. adults have practiced t’ai chi. Qigong was used by 0.7% of the population, representing 1.60 million U.S. adults. Most qigong users also practiced t’ai chi, resulting in a total of 7.38 million U.S. adults (3.1%) practicing t’ai chi or qigong or both.

Twelve-month prevalence of t’ai chi/qigong use

The 12-month prevalence rates of t’ai chi and qigong were 1.1% (2.6 million) and 0.3% (0.79 million), respectively. The combined 12-month prevalence indicated 2.88 million users within the prior 12 months (1.2%).

Predictors of t’ai chi/qigong use

Significant differences for lifetime prevalence of t’ai chi/qigong were found for age, sex, ethnicity, region, education, employment, BMI, several medical conditions, and smoking or alcohol consumption. For 12-month use, age, ethnicity, region, education, employment, marital status, BMI, several medical conditions, and alcohol consumption were significantly different between users and nonusers.

Regression analysis showed that the following factors were predictive of lifetime t’ai chi/qigong practice: Being older than 30 years of age, being female, living in western regions, having higher education level, being employed, and...
experiencing medical conditions (other heart disease, spinal pain, arthritis and rheumatoid arthritis, fibromyalgia, other joint problems, headache, other mental health disorders, neurologic diseases, asthma). Light to heavy alcohol consumption and moderate- to high-level exercise were associated with higher likelihood of practice, while being Hispanic or non-Hispanic white was associated with decreased likelihood (Table 1). The explained variance was $r^2 = 0.068$.

The following predictors were identified as being associated with having practiced t’ai chi/qigong within the prior 12 months: being older than 30 years of age; being African American, Asian, or of other ethnic origin; having a higher education level; living in western regions; not being in a relationship; not being abstinent from alcohol consumption; and moderate- to high-level exercise behavior (Table 2). The explained variance was $r^2 = 0.113$.

### Patterns of t’ai chi/qigong use

Among individuals who had practiced t’ai chi/qigong in the past 12 months, 38.6% attended formal classes or received other formal training. The average number of attended formal classes in the past 12 months was $19.9 \pm 19.1$ (range, 1–52; median, 10), at an average cost per unit of $24.20 \pm $24.70 (range, $0–$60; median, $14.90$).

Many participants retrieved information about t’ai chi/qigong from sources such as DVDs and CDs (27.8%); the Internet (25.8%); and books, magazines, or newspapers (22.2%) (Fig. 1A). Scientific articles, on the other hand,

### Table 1. Predictors Independently Associated with Lifetime Use of T’ai Chi/Qigong Among U.S. Adults

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adjusted Odds Ratio (95% Confidence Interval)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–29 yr</td>
<td>1.00 (Reference)</td>
<td>0.015</td>
</tr>
<tr>
<td>30–39 yr</td>
<td>1.34 (1.06–1.68)</td>
<td>0.006</td>
</tr>
<tr>
<td>40–49 yr</td>
<td>1.38 (1.09–1.74)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>50–64 yr</td>
<td>1.76 (1.42–2.17)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≥65 yr</td>
<td>2.62 (2.04–3.37)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.00 (Reference)</td>
<td>0.028</td>
</tr>
<tr>
<td>Female</td>
<td>1.16 (1.02–1.33)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>1.00 (Reference)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.59 (0.45–0.76)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>African American</td>
<td>0.99 (0.78–1.25)</td>
<td>0.921</td>
</tr>
<tr>
<td>Asian</td>
<td>1.39 (1.07–1.81)</td>
<td>0.013</td>
</tr>
<tr>
<td>Other</td>
<td>1.34 (0.72–2.52)</td>
<td>0.356</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>1.00 (Reference)</td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>0.62 (0.51–0.72)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Midwest</td>
<td>0.51 (0.43–0.62)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>South</td>
<td>0.52 (0.44–0.61)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than college</td>
<td>1.00 (Reference)</td>
<td></td>
</tr>
<tr>
<td>Some college or more</td>
<td>2.69 (2.25–3.22)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
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<tr>
<td>Not employed</td>
<td>1.00 (Reference)</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>1.40 (1.18–1.67)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Medical conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other heart disease</td>
<td>1.50 (1.15–1.95)</td>
<td>0.003</td>
</tr>
<tr>
<td>Spinal pain</td>
<td>1.50 (1.30–1.72)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Arthritis</td>
<td>1.38 (1.17–1.63)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>1.79 (1.28–2.50)</td>
<td>0.001</td>
</tr>
<tr>
<td>Fibromyalgia syndrome</td>
<td>1.78 (1.24–2.55)</td>
<td>0.002</td>
</tr>
<tr>
<td>Other joint problems</td>
<td>1.83 (1.26–2.67)</td>
<td>0.002</td>
</tr>
<tr>
<td>Headache</td>
<td>1.32 (1.11–1.58)</td>
<td>0.002</td>
</tr>
<tr>
<td>Other mental health disorders</td>
<td>1.80 (1.32–2.45)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neurologic diseases</td>
<td>1.44 (1.09–1.91)</td>
<td>0.010</td>
</tr>
<tr>
<td>Asthma</td>
<td>1.36 (1.11–1.66)</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Health behavior</strong></td>
<td></td>
<td></td>
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<tr>
<td>Alcohol consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abstain</td>
<td>1.00 (Reference)</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>1.51 (1.28–1.78)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Moderate to heavy</td>
<td>1.49 (1.22–1.81)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Exercise behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedentary</td>
<td>1.00 (Reference)</td>
<td></td>
</tr>
<tr>
<td>Moderate exercisers</td>
<td>2.41 (1.99–2.92)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High level exercisers</td>
<td>2.64 (2.25–3.09)</td>
<td>&lt;0.001</td>
</tr>
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</table>
Most participants reported positive outcomes due to their practice, such as reduced levels of stress (83.2%), improved overall health and wellbeing (74.1%), emotional status (74.2%), and sleep (67.0%) (Fig. 1C).

T’ai chi/qigong practice was disclosed to the personal health care provider by 42% of practitioners. Those who did not disclose their practice did so because the provider did not explicitly ask about it (63.3%) or they did not think they needed to know (38.8%). Negative concerns or recommendation not to use t’ai chi/qigong were anticipated by 13.8% each; 12.7% of respondents had already received negative comments regarding the use of t’ai chi/qigong by their health care providers.

Discussion

Summary of findings

In 2012, 2.6 million adults practiced t’ai chi and 0.8 million practiced qigong (2.9 million combined). Compared with...
nonusers, users were more likely to be older than 30 years of age; African American, Asian, or other ethnic origin; single; highly educated; living in the West; and not abstinent from alcohol. Lifetime prevalence of t’ai chi/qigong practice was further associated with female sex, not being Hispanic, and having a severe medical condition (such as rheumatic diseases, musculoskeletal and neurological diseases, mental health disorders, and asthma). T’ai chi/qigong users were also more likely to be physically active, as moderate- to high-level exercises were important predictors of use.

About two in five practitioners had attended classes or received formal training, the average number of classes being around 20 in 2012. Most users paid the classes out of their own pocket; with average costs per class of $24. Most important reasons for practice were wellness and disease prevention and exercising; other reasons included health problems, such as stress and arthritic problems.

**Prevalence of t’ai chi/qigong practice**

The prevalence of t’ai chi/qigong use in a U.S. adult sample has been analyzed before, referring to the 2002 NHIS survey data. The present survey, which was conducted 10 years later, showed that the 12-month prevalence only slightly increased, by 0.1 million users (increase of 4%). Interestingly, prevalence of use of another mind–body exercise, yoga, increased significantly, from 5.1% (10.4 million) to 9.5% (21.0 million) from 2002 to 2012.

There is likely no single explanation for the markedly lower rates of increase in prevalence of t’ai chi versus yoga use. One possible explanation is that yoga has been publicly advertised much more aggressively in the press. This is supported by the number of published books and articles in newspapers and magazines in the past 10 years. Recent bibliographic analyses of the scientific literature for yoga and t’ai chi also reveal several distinct differences regarding the targeted demographics and content of published trials. For yoga, most trials have been conducted on relatively younger healthy participants across India and the United States, while for t’ai chi/qigong most trials have been conducted with relatively older ill people in China and the United States. And while yoga research focused on stress and musculoskeletal pain, t’ai chi has largely been promoted for patients with hypertension, arthritis, and osteoporosis and for fall prevention. Research supporting the benefits of t’ai chi for age-related conditions might explain increasing prevalence with age in the current sample.

Of note, the magnitude of growth in the prevalence of use of t’ai chi does not track the growth in the evidence base for t’ai chi. This may be explained by the fact that only a minority of practitioners retrieve information about t’ai chi/qigong from the scientific literature, reflecting limited translation of science into practice.

**Predictors of use**

Predictors of lifetime prevalence had not been reported in an earlier publication; however, 12-month prevalence was. Several differences have been found compared with the survey from 2002. In the present analysis, not only Asians but also African American and other ethnic groups were more likely to have practiced t’ai chi/qigong in the prior 12 months compared with non-Hispanic whites. Since t’ai chi/qigong originated in Asia, its use in the Asian community might be expected. This was also reported in the former analysis. However, the current analysis found that the use of t’ai chi/qigong is now also associated with being African American or a member of other ethnic groups, which is surprising given that African Americans are frequently reported to be less physically active than whites. This might point at changes in health care utilization. For example, minorities have been targeted for several health care interventions in the past decade. There are limited data available on promotion of t’ai chi programs for minorities or economically disadvantaged people, but according to the current survey findings, not all t’ai chi/qigong classes were for fee and thus may have been accessible. Further studies are warranted to determine whether and how the use of t’ai chi is changing, in order to provide the basis for future clinical research of high relevance.

Interestingly, none of the diseases had any predictive value for the use of t’ai chi/qigong. A possible explanation for the latter might be that diseases were not combined to categories as in the prior analysis. The authors considered the possibility at first; however, because disease categories were inquired about differently at each survey, they decided to determine the influence of each disease separately. A condition that has been frequently targeted in clinical trials of t’ai chi/qigong is falls in older people. T’ai chi increases balance in older people, and it seems likely that improving balance and reducing the risk for falls might have been a main reason in older people to use t’ai chi. However, balance or falls prevention was not included as a possible reason for using t’ai chi/qigong in the NHIS. Although open questions were additionally asked, no participant named balance or falls prevention as a reason for using t’ai chi/qigong.

For health behaviors, results seem inconclusive. While no association with smoking was found, respondents who drank alcohol were more likely to use t’ai chi/qigong than were abstainers. On the other hand, those who at least moderately exercise were also more likely to practice t’ai chi/qigong, possibly because t’ai chi itself can be considered some form of physical exercise.

**Method of t’ai chi training**

Regarding the patterns of use, several findings should be considered for future research. First, more than half of the practitioners did not attend classes or receive a formal training in the past 12 months. While those might include participants who had received training before the 12-month survey, it might also indicate that some practitioners will never receive formal training. They might instead have gotten their information from CDs and DVDs, books, or the Internet. Even though t’ai chi has been considered safe by a recent review, such unsupervised practice may decrease its efficacy or be associated with different profiles of adverse events. Researchers should design studies to specifically determine the comparative efficacy and safety of informal DVD- or book-based learning compared with in-person group based learning.

**Clinical use of t’ai chi/qigong**

There are significant discrepancies between the health reasons people report using t’ai chi for and the current
Evidence base for t'ai chi, revealing important gaps in research knowledge. Most practitioners reported use of t'ai chi/qigong for general wellness and disease prevention. In contrast, most clinical trials to date focus on clinical topics, such as fall prevention and age-related disease management. It must be emphasized that traditionally t'ai chi was not developed or practiced to cure specific diseases or to treat specific medical symptoms. Rather, t'ai chi was developed as martial arts and holistic exercise, with benefits that translated to healthy aging. Yet today, t'ai chi is mainly investigated in clinical areas, and even despite its original intent, there is growing evidence for clinical efficacy. For example, the Center for Disease Control and Prevention (http://www.cdc.gov/Features/OlderAmericans) announced that on the basis of current evidence, t'ai chi was highly cost-effective for preventing falls, and t'ai chi also seems to be effective in rheumatic disorders, such as osteoarthritis of the knee, fibromyalgia, or rheumatoid arthritis, or in cancer treatment–related arthralgia.

Evidence related to primary disease prevention and healthy aging have not been researched extensively for several possible reasons. Clinical trials on prevention require long periods of observation and are cost-intensive, and for studies of prevention of specific conditions, many other (lifestyle) factors have to be controlled. However, this is exactly the kind of research necessary given that people use t'ai chi/qigong primarily for prevention. Although biased, well-designed cross-sectional observational studies comparing long-term t'ai chi/qigong experts to matched t'ai chi naive controls can contribute to this knowledge, as large-scale epidemiological cohort studies that include data on the effect of t'ai chi on mortality.

Limitations

The data are part of a cross-sectional survey; therefore, the results can indicate only correlations, not causal effects. The interpretations that can be drawn from the findings are strengthened, however, by the regression analysis, which controls for confounding variables. The survey relies on self-report and as such is at risk of recall bias. This might be especially relevant for t'ai chi/qigong, which is used by older adults in particular. Finally, combining t'ai chi and qigong may increase the statistical power of the comparisons; however, despite their similarities it might be worthy analyzing them separately.

Conclusion

This survey found that the 12-month prevalence of t'ai chi and qigong use did only marginally increase over the past 10 years; however, the characteristics of practitioners have changed. Not only Asians but also African Americans and those of other ethnic origins were now more likely to practice t'ai chi/qigong. Given that minorities are less likely to participate in health-promoting activities, t'ai chi and qigong might be specifically attractive in this population. The analysis also highlighted gaps between clinic and research in areas of balance and fall prevention, and primary prevention, where research does not seem to match utilization patterns.

Author Disclosure Statement

Peter Wayne is the founder and sole owner of the Tree of Life Tai Chi Center. Peter Wayne’s interests were reviewed and managed by the Brigham and Women’s Hospital and Partner’s HealthCare in accordance with their conflict of interest policies.

References


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