



Decline in the Use of Medicalized Yoga Between 2002 and 2012 While the Overall Yoga Use Increased in the United States: A Conundrum

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Abstract

We analyzed the National Health Institute Survey Alternative Medicine supplement yoga data for 2002, 2007, and 2012 to answer the following questions: (1) Do the claims about increase in the use of yoga hold true at the level of specific health problems? (2) Do trends support a proposition that yoga is believed to be helpful in amelioration of disease conditions? (3) Do the prescribing patterns of health care providers correspond with the increasing popularity of yoga? Data were analyzed using SAS software, version 9.4. Response percentages were compared using chi-square test after adjusting for age. Between 2002 and 2012, use of yoga increased but adherence failed to increase, and use for specific health problems and for back pain declined; use of health care providers' referral-driven yoga declined between 2007 and 2012. All results were statistically significant. Our results suggest that the use of medicalized yoga declined between 2002 and 2012.

Keywords

yoga, yoga research, medicalized yoga, adherence, yoga therapy, yoga referrals

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Introduction

Yoga enjoys huge popularity in the United States as well as internationally.¹⁻⁴ Research data and industry surveys confirm this trend.^{5,6} This popularity is probably because of an increased awareness regarding the benefits of yoga in promoting health and ameliorating disease. A large body of scientific literature is now available to show that yoga is useful for health in multiple ways. For example, research shows that yoga helps in improving balance and mobility in older people,⁷ in reducing stress,⁸ in improving athletic performance,⁹ or in improving academic performance in schools.¹⁰ Not only that, work by Ornish et al¹¹ suggests that yoga may have curative value in cancer treatment, probably working at an epigenetic level. Other factors, such as the global tide of chronic diseases,¹² increasing stress in day-to-day life,¹³ and the rising individual financial burden of health care costs¹⁴ might also be contributing to an increase in the use of yoga. The decoupling from its initial religious roots might also be accelerating yoga's popular embrace.¹⁵

Because of the knowledge that yoga has utility in health and disease, and broad evidence that it is safe,¹⁶ a subtle trend has developed, which is pulling yoga out of the realm of complementary medicine and moving it into the body of the mainstream

health care system.¹⁷ The attempt is to leverage yoga as a therapeutic modality in the treatment of disease. Lately, on one side, mainstream medicine is broadening its scope of practice and has created a novel discipline called integrative medicine. While on the other side, complementary and alternative medicine modalities are migrating toward greater assimilation into mainstream medicine. Yoga is still deemed as a complementary and alternative modality and it is nowhere close to being integrated into the corpus of the mainstream medicine. However, the process of "medicalization of yoga" is no longer a mere abstract construct as it probably was about a decade ago when Alter¹⁸ introduced it. Even a book has been written, by a medical doctor, that describes yoga as a type of medicine.¹⁹ Additionally, alternative billing codes have been developed to identify alternative medicine, nursing, and other integrative health care

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services, including unlicensed practices such as yoga.²⁰ The march toward medicalization has definitely begun.

The current research and literature suggest that although the value of yoga as a health promotion tool or a curative modality in some chronic conditions has been reasonably established by evidence, it appears that evidence to support its effectiveness in real-life conditions is still unclear.²¹ While efficacy is a necessary prerequisite for them, in the end outcomes and impact depend on effectiveness.²² Therefore, the topic warrants careful scrutiny, lest a cascade of unintended harmful consequences should undermine yoga's utility. A classic example resides in a lesson associated with the "disease management" movement in the mainstream US health care in 1990s. The principles and theoretical premises of the disease management approach were logically sound. However, the idea was put to use in real life without much thoughtful administrative and operational planning. Exaggerated claims about effectiveness and a non-strategized implementation of principles led to poor outcomes, resulting in the Centers for Medicare and Medicaid Services discarding almost all the disease management initiative.²³ This example underscores how a good useful idea can fail if implemented hastily and incorrectly.

To determine if yoga is indeed useful in treating medical conditions, regardless of what advocates, providers, or scholars purport about yoga's efficacy or effectiveness, the voice that must be considered is of the patients who use yoga, the ultimate arbitrator of yoga's health value.

The National Health Interview Survey (NHIS) is a cross-sectional household interview survey conducted by the Centers for Disease Control and Prevention (CDC). This nationally representative survey has a large sample size and allows annual estimates related to the US civilian non-institutionalized population. The Alternative Medicine (ALT) supplement to NHIS provides data on complementary medicine, including yoga. The prescriptive practices of health care providers combined with the payment patterns and policies of the health insurance companies influence the individual's utilization of health care modalities.^{24,25} However, currently these variables seem not to play a major role in the practice of yoga.²⁶ Therefore, though not specifically designed for the purpose, the NHIS supplement survey asking Americans to self-report their use of yoga can serve to elucidate the utility of yoga in addressing specific health problems in naturalistic context.

A recent article using the NHIS data noted that the use of deep breathing exercises and meditation, both techniques being part of yoga practice and known to be effective in chronic diseases,^{27,28} appears to be declining recently.⁵ Against this background, we conducted analyses on the NHIS yoga data for 2002, 2007 and, 2012 to answer the following questions: (1) Do the general established claims about the increase in the use of yoga hold true at the level of specific health problems? (2) Do overall trends in the use of yoga support a proposition that yoga is believed to be helpful in amelioration of disease? (3) Do the prescribing patterns of health care providers correspond with the increasing popularity of yoga? We note here that yoga has been used extensively for health promotional and preventive reasons but that is beyond the scope of this article.

Materials and Methods

Data Collection

Collection of data and analyses for this paper were done using SAS software, version 9.4 for Linux. We used the NHIS data conducted by the CDC. The ALT supplement to NHIS provided the public domain data on yoga. We conducted retrospective analyses on the 2002, 2007, and 2012 deidentified data in early May 2016. The ALT adult supplement to NHIS survey data were downloaded from the CDC website, and the data were extracted and parsed into responses from 2002, 2007, and 2012, with sample sizes of 31 044, 23 393, and 34 525, respectively. Data were compiled and frequencies, weighted population estimates (accounting for the complex sample design of NHIS), and percentage distributions for responses were calculated and extrapolated to the national population for each given year along with age, sex, and ethnicity demographics. The survey responses (to specific questions in the survey) examined were: "ever (hereafter called lifetime, indicating the use of yoga by a person in their entire life until the current moment) practiced or used yoga," "used or practiced yoga during the past 12 months," "used yoga because it was recommended by a health care provider," and "used yoga for specific health problems" (in general and in certain selected conditions). We realized that in many instances the frequencies were small. We decided to conduct comparative analysis only if the frequency for an attribute was at least 50 across the 3 years. Because previous work suggests yoga is often used for back pain,²⁹ and we also found that use for "back pain" had sample frequencies > 50 for 2002, 2007, and 2012, we conducted comparative analysis on back pain.

Statistical Analysis

ALT supplements questions across the years are mostly unchanged and therefore allow for comparison. Taking into account the complex sample design of NHIS, including the weighing, we estimated age-adjusted prevalence rates using the projected 2000 US population. For this purpose we used the standard population divided into the following 4 age groups: 18 to 24, 25 to 44, 45 to 64, and ≥ 65 years. We calculated population percent distributions using all sample adults for the given year as the denominator.

We also created one compound measure for each year to estimate a yoga adherence rate. This was calculated as follows: A ratio was calculated between the difference in the percent "lifetime use" and "use in the past 12 months" of yoga, and the "lifetime use" of yoga, expressed as a percentage. This provided an estimate of the population that at some point in their life tried yoga but eventually abandoned it (failed to adhere to it in the past 12 months). Subtracting this percentage (attrition rate) from 100 generated the rate of adherence to yoga.

We compared the percentages using the chi square test. We calculated relative standard error (RSE) as a percentage for all comparisons. We have not discussed findings unless: (1) Frequencies were >50, (2) *P* value was <.01, and (3) RSE was <30. These restrictions were necessary because in many health conditions, though data were available, the frequencies were very low. This would have made the statistics unstable. The step of calculating RSE and applying the above threshold added another layer of safety to ensure that our results were meaningful.

Results

Lifetime and in the Past 12 Months Use of Yoga

Between 2002 and 2012, the lifetime use of yoga increased from 7.4% to 13.5%. Between 2007 and 2012, the lifetime use

Table 1. Chi-Square Test to Compare Age-Adjusted Prevalence of Yoga Use, Adherence Rates, Use Because of Health Provider Referrals, and Use for Specific Health Problems: 2002, 2007, and 2012.

	Age-Adjusted ^a Prevalence as Percentage			Degree of Freedom = 1, χ^2 , P Value (Relative Standard Error)	
	2002	2007	2012	2002-2012	2007-2012
Lifetime prevalence of yoga use	7.4	9.7	13.5	656.6, <.0001 (3.8)	195.4, <.0001 (6.9)
12-month prevalence of yoga use	5.0	6.0	9.2	432.8, <.0001 (4.7)	206.1, <.0001 (6.7)
Adherence rate of yoga practice	68.3	61.5	68.3	0.004, .9489 (1820.2)	282.5, <.0001 (6.0)
Use of yoga because recommended by a health provider	0.2	0.4	0.2	0.7, .3966 (170.1)	17.4, <.0001 (24.9)
Use of yoga for specific health problems	0.9	0.8	0.6	21.5, <.0001 (21.5)	9.2, .0024 (33.5)
Use of yoga for back pain	0.3	0.3	0.2	22.3, <.0001 (21.5)	14.6, .0001 (27.6)

^aEstimates were age-adjusted using the projected 2000 US population as the standard population and using 4 age groups: 18 to 24, 25 to 44, 45 to 64, and ≥ 65 years.

of yoga increased from 9.7% to 13.5%. Between 2002 and 2012, the use of yoga in the past 12 months increased from 5.0% to 9.2%. Between 2007 and 2012, the use of yoga in the past 12 months increased from 6.0% to 9.2%. Results were statistically significant. See Table 1 for chi-square, *P*, and RSE values.

Yoga Adherence Rate

The yoga adherence rate was 68.3% for 2002, 61.5% for 2007, and 68.3% for 2012 (Table 1). The difference between the adherence rates from 2002 to 2012 was negligible, not statistically significant, and the RSE was very high. However, the adherence rate increased from 2007 to 2012 by 6.8 percentage points and the difference was statistically significant with a low RSE (see Table 1). The trends suggest that though the adherence to yoga appeared to have improved between 2007 and 2012, over a decade between 2002 and 2012, the adherence rate was constant and did not increase, and that the improvement between 2007 and 2012 only made up for the drop in the adherence that had occurred between 2002 and 2007.

Use of Yoga Because Recommended by a Health Care Provider

The change in the use of yoga secondary to a referral by a health care provider between 2002 and 2012 was negligible and statistically not significant. However, the use of yoga secondary to a referral by a health care provider decreased between 2007 and 2012 by 0.2% and the decrease was statistically significant (see Table 1).

Use of Yoga for Specific Health Problems

The use of yoga for specific health problems declined between 2002 and 2012 by 0.3% and the decrease was statistically significant. The use of yoga for specific health problems also declined between 2007 and 2012 by 0.2%, and the decrease was statistically significant. However, the RSE was marginally higher than our threshold (see Table 1). Trends suggest that at an aggregate level, the use of yoga for specific health problems declined between 2002 and 2012.

Use of yoga for back pain declined between 2002 and 2012 by 0.1% and the decrease was statistically significant. The use of yoga for back pain also declined between 2007 and 2012 by 0.1%, and the decrease was statistically significant (see Table 1).

The frequencies for a few other specific health problems were low for consideration for analyses. Despite the low frequencies, a graph was created to provide a visual demonstration of the declining direction in trend (see Figure 1; also see Supplementary Table S1 in supplemental material).

Discussion

Summary of Evidence

Our results demonstrate that (1) overall adherence to yoga failed to increase between 2002 and 2012, actually worsening in 2007; (2) overall use of yoga for specific health problems declined between 2002 and 2012; and (3) use of yoga recommended by health care providers declined between 2007 and 2012. In brief, our results indicate that the trend toward medicalization of yoga is failing to gain traction or in fact declining; contrary to popular claim.³⁰ This popular claim was misconstrued from a 2011 article related to mind body therapies that did not address yoga exclusively or specifically.³¹

Stationary Long-Term Adherence Rate for Yoga

Since the full benefit of yoga is not gained unless practiced regularly,³² measuring adherence to yoga practice over the course of time is a valuable metric. Although the adherence rate for yoga was not low in our findings, the data does highlight that adherence rates have failed to improve over the last decade. This was in spite of heightened commercial and cultural awareness and increased scholarly research publications. The trends that the overall use of yoga increased but the rate of attrition remained the same or increased suggests that more people were trying out yoga due to the influence of enhanced commercial exposure, but failed to endure in ongoing use. A large majority of yoga users are healthy when starting.²⁹ It is possible that they use yoga only as a supplement to their existing "healthy" routine. In that case, it is possible that they might

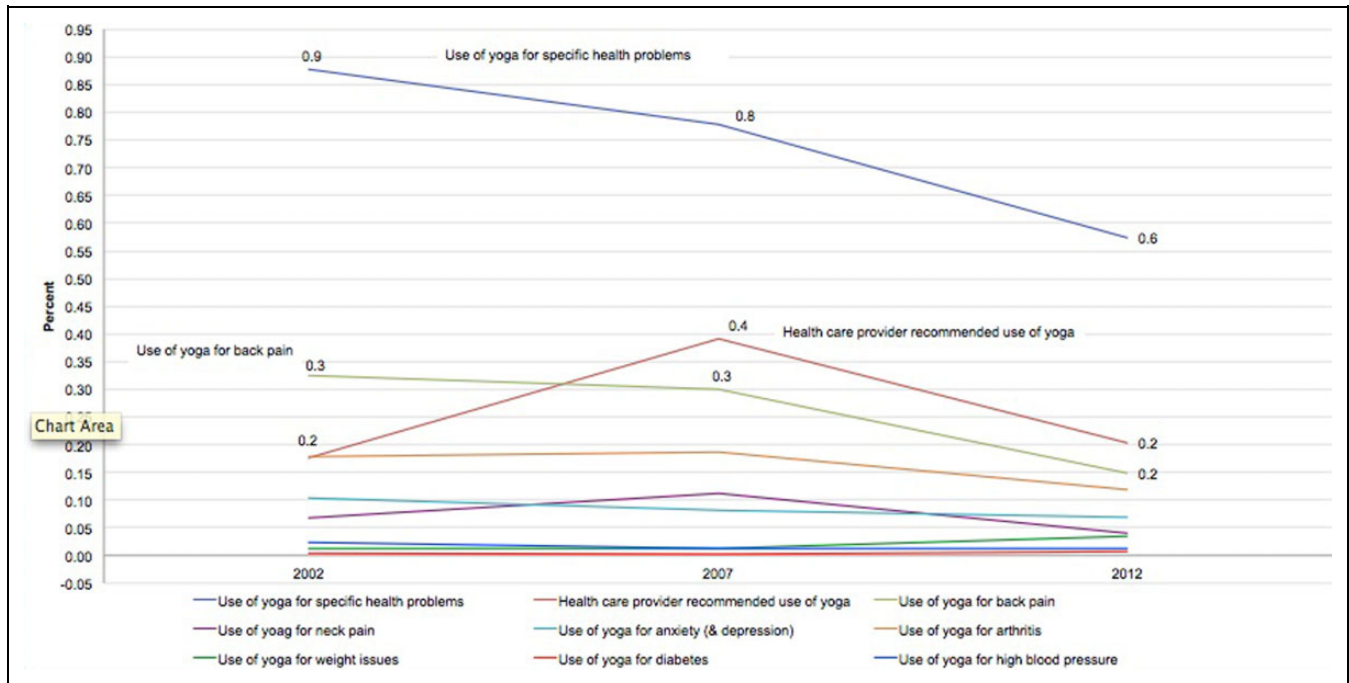


Figure 1. Yoga use prevalence (age-adjusted percentage) trend lines: Specific health problems, overall and selected conditions, and provider referrals: 2002, 2007, and 2012.

have stopped using yoga because they found another alternative. There is a possibility that a major part of the nonadherence could have been emanating from the unhealthy sub-population that tried yoga for specific health problems. Adherence to yoga can be influenced by numerous factors such as (1) affordability, (2) availability of time or modality, (3) motivation, (4) disease progression, (5) accessibility, (7) literacy, or (8) invalidity or ineffectiveness. Perhaps they did not find much benefit in yoga. Currently, it is not possible to determine the nature and extent of these potential influences. Yoga is an out-of-pocket expense. It is suggested that yoga use is low in low-socioeconomic groups.²⁹ It is also known that the same group suffers more from chronic diseases. It is plausible that affordability is causing a failure to adoption or acceptance of yoga. Also known is that those who suffer from chronic diseases may also have psychological problems and suffer from motivational constraints.³³ Additionally, disease progression can interrupt the use of yoga. This could also explain the phenomenon of declining use. Further research is needed to find the answers.

Decline in the Referrals by the Health Care Providers to Use Yoga

Lack of awareness cannot sufficiently explain why provider referrals for yoga have declined. Providers were exposed to the same enhanced advocacy as the lay population. It is difficult to explain this phenomenon without further research. However, we cautiously propose three explanations to support the decline in provider referrals to yoga practice: (1) they did not find the practice of today's yoga to be scientific enough for disease amelioration, (2) feedback from the other patients who had tried

yoga might not have been encouraging to recommend yoga, and (3) they were not convinced by the research evidence.³²

Decline in the Use of Yoga for Specific Health Problems

Exaptation is a phenomenon where traits that evolved to fulfill one function eventually become beneficial for a different purpose, which could be true for yoga. Yoga was not conceived as a health modality; therefore, it is plausible that yoga does convey health benefits, albeit small. Furthermore, physical postures, which is the dominant way yoga is practiced today, has been shown to have minimal direct physical health benefits, even for prevention.³⁴⁻³⁸ Confounders easily mask the lack of usefulness of postures in people who are already healthy. However, those shortcomings might be unraveling in medicalized yoga where expectations and sensitivities are higher. It is also possible that a timid or a negative feedback among patients might have discouraged uptake of yoga for medical conditions. Finally, the circular feedback loop of interdependence between adherence and benefits might have created a vicious cycle to prevent users with specific health problems from adopting yoga.

Limitations

Our study has several limitations. To address the limitation of small sample sizes, we applied 2 safeguards. First, we set the threshold for the sample frequency eligibility for analysis at 50. Second, we calculated the RSE for all our comparisons and made claims only if the RSE was <30%. We believe that small numbers, even when short of the high threshold of statistical

analysis, have meaning in themselves; and as in our case, constancy of smallness of frequencies over the course of a decade itself are data worth reporting. Other limitations applicable to our study are the following: (1) these results are based on a cross-sectional survey, therefore attribution of causality is difficult; (2) generalization is tenuous; and (3) these data are dependent on subjective memory and are prone to faulty recall. Also, the survey data did not include granular details about dosage and types of yoga practice, and it is possible that results might vary with them. Finally, our analysis does not examine the important socioeconomic conditions that heavily influence the causal pathways.

Conclusions

Although this article is not the first to point to the recent decline in the use of yoga in the United States, it is to our knowledge the first to scientifically highlight the findings. The reason for these findings are not well understood, but somewhat perplexing given that yoga has the potential to assist in prevention and treatment of specific disease conditions, including back pain, arthritis, diabetes, hypertension, obesity, and so on. This suggests a current disconnect of the translation of yoga from theory and philosophy to the real-life practice and prescription, which often requires a high strategic multidisciplinary concerted approach.

It is known that socioeconomic conditions influence utilization of a health commodity.³⁹ This might explain the major part of our findings. However, that may not be the only reason why the use is declining. It is possible that the way yoga is practiced also plays a sizable role in this phenomenon. For example, yoga has come to be identified with physical postures whereas yoga is a primarily “meditative exercise.”⁴⁰ As stated before, supporting evidence related to the health utility of postures is weak. Healthy user bias⁴¹ masks the inadequacies of conventionally practiced postures, which currently dominate yoga. There is a possibility that those who sought yoga for specific health problems might have tried the postures and omitted the meditative component that might have led to low benefits. There is a paucity of literature examining how yoga is practiced in the real-life environment. More research is required to examine this aspect of yoga, and more systematic efforts are needed to educate the practitioners and the referring providers about the proper philosophical background and evidence based tools and techniques of yoga.

In current times, a modality like yoga has immense value and potential. However, clarity about what works in yoga and how to make it work will be the best approach to harness it to ameliorate medical conditions. In 2017, NHIS will again collect data on the use of yoga in the United States. Our findings might serve as a benchmark to examine the respective trends since 2012.

Authors' Note

The research presented in this article is that of the authors and does not reflect the official position or policy of their employers.

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Author Contributions

ARP contributed to (1) conceptualization of the study, (2) research design, (3) literature review and (4) writing the manuscript. L(W)L contributed to (1) downloading and cleaning data from CDC, (2) statistical analysis of data, and (3) proofreading.

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Ethical Approval

Ethical approval is not applicable to this study.

Supplemental Material

Supplementary material for this article is available online.

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