

ORIGINAL RESEARCH

Yoga in the Real World: Perceptions, Motivators, Barriers, and Patterns of Use

现实生活中的瑜伽：理念、促进因素、阻碍因素和运用方式

Yoga en el mundo real: percepciones, motivadores, barreras y pautas de uso

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Disclosure

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest. Richard Goldstein disclosed employment with Yoga Yoga, Inc, Austin, Texas. Sat Bir S. Khalsa, PhD, disclosed consultancy with the International Association of Yoga Therapists, Kundalini Research Institute, and Kripalu Center for Yoga and Health.

Key Words

Yoga, patterns of use, motivations, exercise, spirituality, wellness, stress, mental health, sleep, back pain, quality of life

ABSTRACT

Background: Yoga is a mind-body exercise practiced by nearly 16 million US adults. Clinical yoga research has yielded promising findings in physical and mental health outcomes. However, research in non-patient populations is limited. The purpose of this study is to survey a non-clinical population to better understand yoga use in a real-world setting.

Methods: This study used a pre-post test design in a convenience sample of adults registered for a 4-week beginner yoga program within a network of five yoga studios in Austin, Texas. Students were linked via e-mail to baseline and endpoint surveys. Analyses were descriptive.

Results: Six hundred four students completed the baseline survey, and 290 (48%) completed the 4-week endpoint survey. Baseline demographics were similar to those in national surveys, with respondents being primarily female (86%), white (88%), and college educated (78%). The primary barrier to practice was time (55%). Respondents perceived yoga primarily as an exercise activity (92%), spiritual activity (73%), or a way to manage or treat a health condition (50%). Main reasons for taking yoga were general wellness (81%), physical exercise (80%), and stress management (73%). Ninety-eight percent believed yoga would improve their health, with 28% taking yoga to alleviate a health condition. On average, respondents practiced 3 to 4 hours/week in and out of class.

Conclusions: Respondent demographics were consistent with national survey data. Data show that yoga is

perceived several ways. Information on practice patterns provides new information, which may improve understanding of how non-clinical populations incorporate yoga into daily life for health management.

背景

背景：瑜伽是一种身心锻炼，近1,600万美国成年人在进行此种锻炼。临床瑜伽研究揭示了多项瑜伽有利于身心健康的发现。但，就未患病群体进行的研究却十分有限。本研究旨在针对非临床人群展开调查，以期更好地了解瑜伽在现实世界中的用途。

方法：本研究基于德克萨斯州奥斯汀的5个瑜伽工作室网络，以登记参加一项4周瑜伽初学者课程的成年人作为方便样本，并采用一项测试前后设计进行。学员们是通过电邮进行基线和终点调查的。分析采用说明的方式进行。

结果：六百零四名学员完成了基线调查，其中290名(48%)完成了4周的终点调查。基线人口统计学与多项全国性调查相似，其中受访者主要为女性(86%)、白人(88%)和大学毕业生(78%)。锻炼的主要困难是时间(55%)。受访者将瑜伽主要视作一项锻炼活动(92%)、精神活动(73%)或一种管理或治疗健康问题(50%)。练习瑜伽的主要原因为整体健康(81%)、体育锻炼(80%)和压力管理(73%)。百分之九十八的人认为瑜伽会改善其健康状况，而28%的人则为缓解健康状况而练习瑜伽。平均起来，受访者每周在课堂内外的练习时间为3至4小时。

结论：受访者人口统计学与全国性调查数据一致。数据表明，人们对瑜伽有多种理解。练习模式的相关信息提供了新的信息，而该等信息

可能会使公众更好地了解非临床人群是如何将瑜伽整合进日常生活来进行健康管理的。

SINOPSIS

Fundamentación: El yoga es un ejercicio de cuerpo y mente que practican casi 16 millones de adultos estadounidenses. La investigación clínica sobre el yoga ha obtenido resultados prometedores en los resultados de la salud física y mental. Sin embargo, la investigación en poblaciones de gente sana es limitada. El propósito de este estudio consiste en encuestar a una población no clínica con el fin de entender mejor el uso del yoga en el marco del mundo real.

Métodos: Este estudio empleó un diseño de prueba anterior y posterior en una muestra de conveniencia de adultos inscritos en un programa de yoga para principiantes de 4 semanas en una red de cinco gimnasios de yoga de Austin (Texas, Estados Unidos). Los estudiantes se conectaron por correo electrónico a una encuesta inicial y final. Los análisis fueron descriptivos.

Resultados: Seiscientos cuatro estudiantes cumplieron la encuesta inicial y 290 (el 48 %) cumplieron la encuesta final a las 4 semanas. Los datos demográficos iniciales fueron similares a los de las encuestas nacionales; las personas que respondían eran principalmente mujeres (86 %), de raza blanca (88 %) y con educación universitaria (78 %). La principal barrera para la práctica era el tiempo (55 %). Los encuestados percibían el yoga principalmente como una actividad de ejercicio (92 %), actividad espiritual (73 %) o un

modo de gestionar o tratar un trastorno de salud (50 %). Las principales razones para practicar el yoga eran el bienestar para general (81 %), el ejercicio físico (80 %) y la gestión de la tensión nerviosa (73 %). El noventa y ocho por ciento creía que el yoga mejoraría su salud y el 28 % practicaba yoga

para aliviar un trastorno médico. En promedio, los encuestados practicaban entre 3 y 4 horas por semana, tanto en clase como fuera de clase.

Conclusiones: Los datos demográficos de los encuestados coincidían con los datos de la encuesta a nivel nacional. Los datos muestran que el

yoga se percibe de varios modos. La información sobre las pautas relativas a la práctica del yoga ofrece datos nuevos que pueden mejorar la comprensión de cómo las poblaciones no clínicas incorporan el yoga en su vida diaria para la gestión de la salud.

INTRODUCTION

Originating in India, yoga has been a traditional contemplative practice for thousands of years and came into use as a therapeutic intervention and a health maintenance practice in the early 20th century. Yoga experienced its first wave of popularity in the United States during the 1950s, followed by its notable presence in the 1970s¹ to its continued use today. The scientific community actively studies the effects of yoga, with a growing number of Medline-indexed articles reporting promising results from clinical trials across a wide range of physical and mental health outcomes,²⁻⁴ including back pain,⁵⁻⁷ sleep quality,^{8,9} and quality of life.^{10,11}

In 2002 and 2007, the National Center for Health Statistics (NCHS) conducted the National Health Interview Survey (NHIS), including a complementary and alternative medicine (CAM) supplement.^{12,13} The 2007 NHIS reported yoga was a top-10 most commonly used CAM therapy tried by more than 13 million US adults.¹³ Furthermore, the 2007 NHIS data found that yoga use experienced one of the largest increases among CAM therapies from the year 2002 (5.1%) to 2007 (6.1%).¹³ This study was followed by the 2008 *Yoga Journal* survey, which found that 15.8 million (6.9%) US adults had tried yoga.¹⁴

The 2007 NHIS also found that US adults spent \$4.1 billion in 2007 on mind-body classes (eg, yoga, tai chi, qigong).¹³ Additionally, the *Yoga Journal* study reported “Americans spend \$5.7 billion a year on yoga classes and products, including equipment, clothing, vacations, and media (DVDs, videos, books, and magazines).”¹⁴ While yoga’s popularity and the consumer support of yoga is growing, research has been limited to primarily observational studies with few longitudinal studies and randomized controlled trials (RCTs) among non-patient, community-dwelling populations. Identifying these limitations, the 2011-2015 strategic plan for the National Institutes of Health’s National Center for Complementary and Alternative Medicine (NCCAM) calls for increased “understanding of ‘real-world’ patterns and outcomes of CAM use.”¹⁵ Through this study, we aim to understand why individuals begin or return to yoga class, their perceptions of yoga, how they practice (eg, frequency, duration, location, and practice aides), and barriers to practice. To our knowledge, this is the first study on yoga in a community-based, non-clinical instructional environment.

METHODS

Sample

This study consists of a convenience sample of adults aged 18 years or older enrolled in a 4-week beginner yoga program (BYP) offered by a network of five private yoga studios in Austin, Texas (Yoga Yoga, LLC) from January 2008 to January 2009. The BYP emphasized two weekly 75-minute classes in one of three yoga styles (ie, hatha, kundalini, and ashtanga). During the data-collection period, a link to the survey was sent via email every 4 weeks to any student who enrolled in the beginner program at any of the five studios. Given the program schedule of Yoga Yoga, a total of 11 BYPs, or cohorts, participated in the study.

Survey Development and Design

We developed baseline and endpoint surveys based on study aims as motivated by the existing literature. Question content included demographics, religious affiliation, yoga experiences, motivators and barriers to practice, and patterns of yoga use. We asked respondents their perceived health status using the first item of the validated Short-Form Health Survey (SF-36, Rand Corporation, Santa Monica, California). Most questions allowed for subject narrative via an “other” response option, whereby we reviewed written text and grouped responses by theme. Most questions allowed respondents to select multiple responses per question, and there were no forced response questions.

Motivators

At baseline and endpoint, respondents were asked about their perception of yoga, ie, “In your opinion, do you consider yoga to be (1) an exercise activity, (2) a spiritual activity, or (3) a way to manage or treat a health condition?” To determine motivators for engaging in yoga, we asked, “Why have you started or returned to yoga?” and gave fixed response categories. When the response to this question was “a way to manage or treat a health condition,” we asked the follow-up question “for which condition(s)?” We also asked respondents to indicate the extent of their agreement or disagreement on a 5-point Likert scale with the statement “Doing yoga will improve my health” with the following choices: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree.

Barriers

To assess barriers to yoga practice, we asked baseline respondents, “If you tried yoga previously, why

Table 1 Baseline Respondent Demographics (N=604)

Demographics	% Responded (N)
Age, y	
<30	24 (142)
30-39	35 (206)
40-49	19 (115)
50-64	21 (122)
65+	1 (8)
Sex	
Male	14 (81)
Female	86 (518)
Education	
Associate degree/Some college or less	22 (128)
Undergraduate degree	45 (270)
Graduate degree	33 (200)
Race	
White	88 (511)
Black/African American	1 (9)
American Indian/Alaskan Native	1 (5)
Asian	4 (21)
More than one race	6 (34)
Ethnicity	
Hispanic	11 (63)
Non-Hispanic	89 (490)
Self-reported Health Status	
Excellent	11 (69)
Very good	40 (240)
Good	39 (237)
Fair	9 (52)
Poor	1 (4)
Religion	
None	32 (183)
Protestant	26 (149)
Other	19 (109)
Catholic	15 (90)
Buddhist	4 (25)
Jewish	3 (17)
Hindu	1 (6)
Annual Household Income	
<\$20 000	7 (39)
\$20 000-\$34 999	15 (82)
\$35 000-\$54 999	17 (97)
\$55 000-\$74 999	16 (92)
\$75 000 or more	45 (255)

did you stop?” and gave five categories of response. At endpoint, we asked with reference to their current BYP, “If you stopped attending class, or missed more than half the classes, what were the reasons?” and “Will you continue to do yoga?”

Patterns of Use

At endpoint, we asked respondents, “How many times each week did you do yoga in class?”; “How many times each week did you do yoga outside of

class?”; “How many total hours of yoga did you do in a week (include any time in or out of class)?” and “If you did yoga outside of class, how much time, on average, did you spend doing yoga each time?”; and offered a range of response times provided for each question. Finally, we asked, “If you did yoga outside of your class, did you use a video/DVD, book, or other form of instruction?”

Data Collection and Management

Upon program registration and conclusion of the BYP, the studio emailed students a link to the study survey. Students had 1 week from email receipt to complete the baseline survey and 1 week after the BYP completion to complete the endpoint survey. The studio emailed one reminder per survey period. There was no follow-up with students concerning the receipt of the survey emails. Additionally, some of the enrolled students may not have provided email addresses. Remuneration consisted of entry into a drawing for 1 month of free yoga classes for each completed survey. Surveys were administered via the online survey management tool Survey Monkey (www.surveymonkey.com) and took approximately 10 minutes to complete. At the conclusion of each cohort's BYP, Survey Monkey generated a Microsoft Excel (Microsoft Corp, Redmond, Washington) file that was de-identified by Yoga Yoga personnel and sent electronically to the study team (MQ).

Data Analysis

We used descriptive statistics as the primary method of data analysis and conducted Pearson chi-square tests of independence between select sociodemographic covariates and non-response at endpoint using a *P* value of .05 for statistical significance. We dichotomized the race variable into white and non-white given the racial composition of respondents. As this analysis was exploratory, we did not use a complete case approach; therefore, the number of responses varies slightly by question. Analyses were conducted in STATA/IC v11.2 (StataCorp LP, College Station, Texas). The Institutional Review Board of Brigham and Women's Hospital, Boston, Massachusetts, approved this study.

RESULTS

Response Rate

During the data collection period, Yoga Yoga enrolled 2322 adults across 11 BYP cohorts. Using this enrollment figure as a potential maximum of respondents, a total of 604 (26%) respondents completed the baseline survey. Response rates at baseline varied by cohort (16%-47%). The endpoint survey was completed by 290 of the 604 baseline respondents, resulting in a 48% response rate. The response rate for individuals who completed both baseline and endpoint surveys was 12.5%. Results of Pearson chi square tests show a statistically significant difference in endpoint response rate between individuals with yoga experience prior to the BYP ($P < .001$) compared

to novice responders, with a higher endpoint response rate found in individuals with prior yoga experience. The relationship of age to response at endpoint was borderline significant ($P = .10$), with older individuals being less likely to respond at endpoint. Nonresponse at endpoint was independent of gender ($P = .60$), race (white/non-white) ($P = .27$) Hispanic ethnicity ($P = .97$), income ($P = .87$), education ($P = .79$), religion ($P = .83$), and self-rated health ($P = .14$).

Demographics

The majority of respondents were female (86%), white (89%), non-Hispanic (91%), and 4-year college educated or more (78%) (Table 1). The median age of respondents was 35.5 years (range 18-67). The majority of respondents (79%) rated their health as “Good” or “Very good” on the single-item SF-36. Respondents held a variety of religious views, with the most common response (32%) being no religious identification.

Perception

The majority of those surveyed at baseline endorsed multiple perceptions of yoga. Yoga was endorsed as an exercise activity (92%), a spiritual activity (73%), a means to manage or treat a health condition (50%), or something other than or in addition to these categories (17%). These response patterns were similar at endpoint. The most common responses from the “other” write-in category, at either timepoint, were that yoga is an intellectual exercise, a lifestyle, or a way to manage stress, focus, or connect mind and body.

Motivators

The primary reasons individuals started or returned to yoga were general wellness (81%), physical exercise (80%), and stress management (73%) (Table 2). The most common responses to the “other” option, endorsed by 20% of respondents, was (1) to gain clarity, balance, focus, or flexibility; (2) to manage weight; (3) to begin a new journey or mark a change in life; and (4) to return to a yoga practice. In terms of health, respondents endorsed yoga for illness prevention (23%) and

as a way to alleviate a health condition (28%), with anxiety, arthritis, back conditions, depression, diabetes, and high blood pressure being the conditions most cited in open-response fields. Additionally, 5% of respondents cited doctor recommendation as the reason for doing yoga. At baseline, the response to “Doing yoga will improve my health” was that nearly 98% agreed (Agree = 39%, Strongly Agree = 59%).

Barriers

Among respondents who had tried yoga prior to the BYP at Yoga Yoga, having a busy schedule was the main reason (55%) reported for stopping their pre-BYP yoga practice. As respondents could endorse multiple reasons, the next most frequent reasons for stopping was cost (30%) followed by being unable to find a convenient location (15%), difficult classes (7%), and not finding yoga beneficial at the time (6%). Additionally, 34% of respondents provided comments for the “other” category, which included health issues, the instructor, boredom, lack of self-discipline, unable to find a suitable style, moved or traveling, closed studio, and lack of childcare. At endpoint, respondents who stopped attending or missed more than half of the BYP endorsed the same reasons with similar frequency as baseline. Few respondents answered this question at endpoint; however, the most common response was “My schedule was busy” (6.5%) with the remaining categories (ie, not beneficial, cost, not interested in style being taught, yoga-related or other injury, class too difficult, inconvenient location, friend stopped, disliked teacher, and other) representing 0.5% to 2.1% of responses. At endpoint, 86% of respondents said they would continue yoga “regularly,” with 10% and 4% selecting “Yes, but not regularly” and “I don’t know,” respectively; the response category “No” was not selected.

Patterns of Use

At baseline, the majority of respondents (64%) had yoga experiences prior to the BYP, reporting a median age of 36 years, with the median age of 28 years for age at first of yoga class. Of these students, 48% had taken yoga classes regularly in the past (ie, at least once a week for 3 months or more). The majority of current BYP respondents spent between 3 and 4 hours a week practicing yoga in and out of class (58%). Approximately 16% practiced less than 2 hours and 26% practiced for 5 hours or more each week. Upon completion of the 4-week BYP, the majority of respondents reported attending an average of two 75-minute yoga classes per week (62%) while approximately 17% practiced three times a week, leaving 21% divided across six remaining time categories. During the 4-week program, few students endorsed practicing yoga outside of class, with 70% endorsing ≤ 1 time per week, followed by 15% practicing twice a week, and the remaining 15% practicing three or more times a week outside of class. Of those who practiced outside of class on a weekly basis, 20% practiced >30 minutes, 21% practiced 21 to 30

Table 2 Reasons Why Respondents Started or Returned to Yoga (N = 604)

General wellness	81%
Physical exercise	80%
Stress management	73%
Seeking a spiritual experience	37%
Alleviate a health condition	28%
Personal recommendation	25%
Illness prevention	23%
Other	20%
Seeking a hobby	18%
Social interaction	16%
Doctor recommendation	5%

minutes, 31% practiced 11 to 20 minutes, and 23% practiced 1 to 10 minutes; 5% did not practice outside of class. Of those students who practiced yoga outside of class, 57% were likely to use instructional materials at some point but with varying degrees of frequency, endorsing “Yes, always” (19%), “Yes, sometimes” (28%), and “Yes, rarely” (10%). However, 38% responded that they never use instructional materials (ie, video/DVD, book, or other form of instruction), with the remaining 5% selecting “not applicable.”

DISCUSSION

This study demonstrates that it is feasible to conduct a survey study in a naturalistic manner. However, our low response rate indicates further work is needed to determine the viability of this approach for more complex studies. We found that many BYP respondents (64%) had prior yoga experience and were more likely to respond at baseline and endpoint. Therefore, this work provides information on the views of both novice and experienced students, as opposed to the original intent to capture only beginners' responses. Respondent demographics corroborate the existing literature, including the tendency for generally healthy, educated, white females to register for community-based yoga classes; however, data on nonresponders is needed to gain more comprehensive data. We learned that yoga is perceived in different ways, which may result in new learners stopping their practice if expectations are not realized. Future studies of yoga may consider measuring and/or setting realistic expectations concerning the benefits of a yoga practice over the short and long term. There are many physical and psychological reasons why individuals begin or return to yoga, of which preventing or treating illness and achieving or maintaining sound physical and emotional health was dominant. While many barriers to maintaining a yoga practice mirror more traditional forms of physical activity (eg, busy schedule, cost), aspects more relevant to yoga surfaced (eg, connecting with the instructor, style, and class environment). Given the reported spiritual aspects of yoga and its use in fostering improved mental health, barriers that involve the individual's sense of connection with the practice may be of importance to researchers implementing or evaluating yoga programs. Finally, this study provides data on usage patterns of community-based yoga students over an active practice period of 4 weeks. To the best of our knowledge, this is the first report of real-time practice data in a non-clinical setting. Our data show it is common for someone engaging in a new yoga practice to attend classes twice a week and to practice outside of class to some degree. The finding that 38% of individuals did not rely on instructional materials in their home-based practice is meaningful, as low or no-cost forms of physical activity could have appeal in the broader community.

Our findings are supported by Atkinson and Permuth-Levine's focus group study, which validates our survey questions and resulting response themes.¹⁶

Though not national in scope, their study asked yoga users and nonusers in-depth questions on their thoughts and experiences, including perceived barriers and benefits of yoga. Although the Atkinson and Permuth-Levine study was limited to one yoga studio at a single timepoint and had a smaller sample size than our study (N=50), a range of yoga users was interviewed, which may provide a finer level of detail in these subgroups. National level surveys of yoga use provide additional supporting results. In 1998, Saper et al conducted a national phone survey of yoga use¹⁷ that provided detail on yoga users throughout the United States. However, the study had a low sample size (N=154) and did not ask questions on practice frequency or non-health reasons for use, areas our study addresses. Results of the NHIS studies,^{12,13} a secondary data analysis based on 2002 NHIS data,¹⁸ and the *Yoga Journal* study,¹⁴ which polled 5050 nationwide respondents, provide findings similar to ours in terms of the demographics of US yoga users. The *Yoga Journal* study also mirrored our findings in that respondents cited that the primary reason for practicing yoga was to improve overall health (eg, general wellness) with 6.1% reporting that a physician recommended yoga,¹⁴ a number slightly higher than our finding of 5%. Each of these studies contributes to developing a clearer picture of US yoga users, including why and how individuals engage in yoga practice.

Strengths

This study suggests that it is feasible to survey yoga students in the community using a naturalistic approach to gain demographic, health, and yoga behavior information. The main strength of this study is that it provides a level of ecological validity through a naturalistic approach to gathering data. For example, while not manipulated by the study investigators, the diversity in yoga sites (five in total) over different seasons (the survey ran for 1 full year), several yoga styles, and varied instructors add a positive level of variability to the yoga experience.

Limitations

This study has several limitations, namely its low response rate and restriction to a population sample in Austin, Texas. Additional limitations include self-selection and potential for measurement error. This study employed a convenience sample that relied on motivated respondents who made up a small percentage of the overall eligible population. In this study, the response rate was low (26%), with no data on the remaining eligible individuals. It is possible that some eligible individuals did not have Internet access (the method employed for administration), thus excluding them from the study. Furthermore, individuals not responding to the endpoint survey were more likely to be those without prior yoga experience, potentially biasing endpoint results. It is also unknown if nonresponse was due to stopping class attendance. While the baseline

characteristics of our sample are similar to those identified in national surveys over approximately 10 years,^{12,13,17,18} generalizability of these findings is limited. In terms of using an online survey tool for data collection, there were no controls put on the respondent, such as forced responses or modifiable questions based on question skip patterns, what may result in inaccurate responses for some questions. Finally, the data were obtained through self-report and is subject to recall bias.

Future Research

While there is a growing literature on the health effects of yoga in a clinical setting, there is insufficient research at the community level among non-clinical populations, particularly data on how yoga is incorporated into daily life. Directions for future research may include studies designed with national sampling methodologies that use a naturalistic, observational approach to understanding the yoga user experience. Researchers looking to conduct community-based yoga interventions may benefit by these findings in designing and implementing studies. Given the perceived benefits of yoga and a growing number of scientific studies demonstrating the health benefits of yoga, it is in the public's best interest to facilitate approaches that lessen the real-world barriers to practice, which may be magnified in minority populations,¹⁹ in order to increase access to a potentially beneficial physical and psychological health activity. We believe this work helps to contextualize the existing yoga research and hope this pilot survey study can be improved upon in both content and design in order to more fully capture the individual experience with the mind-body-movement therapy of yoga.

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My friend's uncle's second cousin's son has autism.
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