J Relig Health (2012) 51:132–147
DOI 10.1007/s10943-010-9348-5

ORIGINAL PAPER

Buddhists' Religious and Health Practices

W. H. Wiist · B. M. Sullivan · D. M. St. George · H. A. Wayment

Published online: 25 March 2010

Abstract A web survey of Buddhists' religious practices and beliefs, and health history and practices was conducted with 886 Buddhist respondents. Eighty-two percent were residents of the USA. Ninety-nine percent practiced Buddhist meditation and 70% had attended a formal retreat for intensive meditation practice. Eighty-six percent were converts to Buddhism and had been a Buddhist for a median of 9 years. Sixty-eight percent of respondents rated their health as very good or excellent. A one-point increase on a Buddhist Devoutness Index was associated with a 15% increase in the odds of being a non-smoker and an 11% increase in the odds of being in good to excellent health.

Keywords Buddhists · Buddhism · Health practices · Religious practices · Web survey

Introduction

The reported estimates of the Buddhist population in the United States vary and are uncertain. Wuthnow and Cadge (2004) reported that there are 1.4–4 million Buddhists in the US, about 0.07% [sic] to 1.9% of the 209 million adult population. The US Religious Landscape Survey conducted by the Pew Forum on Religion and Public Life (2008)

W. H. Wiist (✉)
College of Health and Human Services, Northern Arizona University, P.O. Box 15015, Flagstaff, AZ 86011-5015, USA
e-mail: Bill.Wiist@nau.edu

B. M. Sullivan
Religious Studies Program, Department of Comparative Cultural Studies, Northern Arizona University, Flagstaff, AZ, USA

D. M. St. George
Department of Epidemiology and Preventive Medicine, University of Maryland School of Medicine, Baltimore, MD, USA

H. A. Wayment
Department of Psychology, Northern Arizona University, Flagstaff, AZ, USA

surveyed a representative sample of 35,009 Americans and reported that 0.7% [sic] ($n = 405$) of respondents were Buddhists.

Over the past 20–30 years, particularly during the 1990s, several broadly encompassing narrative descriptions were written about the history of Buddhism in America and the West, including those by Layman 1976; Fields 1992; Tweed 1992; Batchelor 1994; Morreal 1998; Prebish and Tanaka 1998; Seager 1999; Prebish 1999; Coleman 2001; Prebish and Baumann 2002. Those reviews described the introduction of various Buddhist traditions in America or the West such as the Buddhist Churches of America, Soka Gakkai, Zen, Therevada, Tibetan, and others. They explained the differences and similarities in beliefs, practices and history of the various traditions; described the immigrant, and later, native-born western leaders who trained in the East or trained in the West under immigrant leadership; the establishment of centers in various locations and how they operated; the growth of scholarly interest in Buddhism and its establishment as a field of religious study in academia; and the secular adaptation of meditation to treat illness and promote health.

Those historical accounts also pointed out issues unique to the introduction and development of Buddhism in America and the West, including the challenges of defining Western Buddhism; the emphasis in the West on lay practice versus traditional monastic Buddhism; the segregation between Buddhist immigrants and European American "converts;" the power and role of women in Western Buddhism; the relationship between Buddhism and modern psychology or psychiatry; and engaged Buddhism. The narratives also included discussions about controversies that have arisen around issues such as the proper relationship between Buddhist teachers and center leaders and their students.

However, the historical accounts mentioned earlier did not provide systematically collected quantitative primary data to describe the growth, development or characterization of Buddhism in America or the West, including those published in the past decade (except for Coleman 2001). It appears that there were only four quantitative surveys conducted over the past decade to characterize any aspect of US Western or US Buddhists' beliefs and practices (Machachek 1999; Coleman 2001; Ostrowski 2006; Smith 2007). A survey about religious beliefs and practices in the US also included some Buddhists in the sample (Pew Forum on Religion and Public Life 2008). While narrative, historical descriptions about Buddhism in the West or America as a type of qualitative research have provided important and useful information, studies using systematic quantitative research designs and methodologies are needed.

In recent decades, there has been an increased interest in the study of the relationship between spirituality/religion and health(S/RH) but little has been done in the field to conceptualize or develop instruments to measure S/RH among US populations who practice religions other than Christianity. The S/RH field lacks population-based studies of religious beliefs and practices, epidemiological studies of health practices or health status of non-Christian religious practitioners (Hufford 2005; Newberg 2005).

The scope of the studies that did examine Buddhists' health has been limited. Buddhist meditators have been the subjects of research about the neurological effects of meditation (Cahn and Polich 2006, 132), Western psychiatric therapy has engaged Buddhist psychology and concepts (Kelly 2008, 5), and there are some studies about illness and conditions of Buddhists but there has been little population-based research about their health status or practices, religious practices, and the intersection of those two (Weaver et al. 2008, 183).

The first step in quantitative, population-based science or epidemiological research is to provide a basic, quantitative characterization or description of the population of interest. The study reported here is a step toward remediating the lack of quantitative studies of Buddhists' beliefs and practices, specifically the recommended expansion of S/RH research into different races, cultures, and religions (Hill and Pargament 2003, 64; Hall et al. 2008, 134). The increased interest in Buddhism in the US, including an increased scholarly interest, the estimated size and growth of the Buddhist population in the US, interest in the characteristics and motivations for practicing Buddhism (Gregory 2001, 233) and the lack of quantitative data about Buddhists, particularly their health practices, suggest the importance of studying this population. Building upon basic quantitative descriptive data, researchers can conduct in-depth studies to better address the myriad of specific issues such as those identified in the narrative, historical reports. The purpose of the Web survey reported here was to quantitatively assess the religious practices and beliefs and the health history and practices of Buddhists.

Methods

A Web-based survey consisting of 265 questions was administered for six months to measure Buddhist religious practices and beliefs, health history and practices, and demographic characteristics. Participants aged 18 or older were recruited to participate in the Web survey (details about the participant recruitment and preliminary results for all survey respondents are found elsewhere (Wiist et al. 2008)). The first question of the survey asked participants to indicate either: "I am a Buddhist" or "I believe some aspects of Buddhism and/or I engage in some Buddhist practices." This report includes only those who were Buddhists.

The survey questions about Buddhist practices and beliefs (64 questions, including probing sub-questions) were developed by the investigators and assessed for face validity by colleague scholars of Buddhism. Questions modeled after a scale used by Dockett and Rahmann (2007) were also included to measure the respondents' perceptions of their understanding of each of the components of the Buddhist eightfold path on a 5-point Likert-like scale. The health questions and demographic questions were adapted from population-based national health surveys (Centers for Disease Control and Prevention (CDC) 2000, 2005–2006, 2006a, b). The areas of the US in which respondents lived were grouped by zip code in regions (Pew Forum on Religion and Public Life 2008, 1–140). Dietary behavior was assessed with questions about alcohol consumption and following a vegetarian diet (CDC 2006b), variance-adjusted daily servings of fruits and vegetables (except French fries), percent energy from fat, and daily grams of fiber were calculated from a food frequency questionnaire respondents completed (National Cancer Institute (NCI) 2000).

To facilitate a targeted analysis of the relationship between the numerous religious practices and the many health practices ascertained in the survey, a Buddhist Devoutness Index (BDI) of beliefs and practices was created (available upon request) on which respondents were assigned a score of zero to twenty. The ranking was created by scoring responses to questions about whether or not respondents had formally taken the Buddhist three refuges, regularly attended Buddhist meetings, the length of time the person had been a Buddhist, whether or not they chanted or repeated a mantra at Buddhist services, attended Buddhist retreats, studied Buddhist scriptures, had received instruction in Buddhism from a monk or nun, whether or not they practiced a form of Buddhist meditation, the frequency

of meditation and amount of time spent in meditation, and the level of their confidence in their understanding of the Buddhist eightfold path.

Logistic regression analysis was used to examine the association between the Buddhist Devoutness Index score and selected health practices and medical history. Health outcome variables included in the analysis were body mass index, current cigarette smoking, engaging in moderate intensity leisure physical activity, daily servings of fruits and vegetables eaten, the percent of calories in the diet from fat, following a vegetarian diet, self-reported health, and diagnosis of anxiety or depression. The logistic regression analysis included adjustment for age, gender, income, and the two factors thought to be important in previous S/RH research: disability (difficulty participating in social activities was used as a surrogate measure) and social support. The question about difficulty participating in social activities was taken from the National Health Interview Survey questionnaire (CDC 2006a). The question from the National Health and Nutrition Examination Survey (NHANES) questionnaire (CDC 2005–2006) about how many close friends respondents have was used as the measure of social support. For a crude measure of structural social support, the number of individuals in the network or sources of support have been shown to be related to such measures as decreased risk of mortality (Vogt et al. 1992, 659), increased quality of life (Keyes et al. 2005, 433), decreased mortality from myocardial infarction (Berkman 2000, 3), and increased purpose in life (Hong et al. 2001, 154). Odds ratios (OR) and 95% confidence intervals (CI) were calculated as a measure of association between devoutness and the health variables (OR greater than 1.00 show an increased association).

Results

The results reported here include only those respondents who responded "I am a Buddhist" to the first question of the survey, thus identifying themselves as Buddhist. Those who did not identify themselves as a Buddhist but responded that they believe or practice some aspects of Buddhism were excluded from this analysis. During the six months that the survey was available on the Web, 886 Buddhists participated in at least some portion of the survey.

Respondents were highly educated, many with graduate degrees, financially well-off (45% had an annual family income of $60,000 or more), predominantly residents of the US, on average were 47 years of age (SD = 12.5), and most were white (Table 1). They were actively involved in Buddhist practices (Table 2). Eighty-seven percent of respondents reported having taken the three refuges to mark their membership in Buddhism; 76% had taken them formally before other Buddhists. Most respondents (86%) were converts to Buddhism and had been a Buddhist for a median of 9 years although 13% reported also being a participating member of another religion. Thirty-six percent had other family members who were Buddhists. Of those who had a Buddhist family member, 54% had a spouse who was Buddhist and 14% had Buddhist parents. Five percent of respondents were monks or nuns and 2% lived as monks, nuns, or priests but were not officially ordained. Seventy-eight percent of respondents exclusively practiced one Buddhist tradition with 60% of those individuals exclusively practicing Tibetan Buddhism and 21% exclusively practicing Zen/Ch'an/Son.

Almost all of the respondents practiced Buddhist meditation (Table 2), spending a median of 30 min in a typical meditation session. Sixty-five percent of respondents meditated at least once per day; 22% two or more times per day (Table 3). The types of Buddhist meditation techniques in which the most amounts of time per week were spent

Table 1 Demographic characteristics of survey respondents

Characteristic	Mean or proportion[a]
Mean age (559)	47 years (SD = 12.5)
Gender (560)	54% Female
Education (564)	33% College graduate 49% Graduate or professional degree
Annual family income (550)	10% < $20,000 39% $20,000-$59,999 45% $60,000-$149,999 5% ≥ $150,000
Country of residence (564)	82% USA or a US Territory
Region of residence among US residents (460)	16% Northeast 29% South and Puerto Rico 8% Midwest 47% West
Country of birth (556)	79% USA or a US Territory
Race of US born respondents (416)	90% Non-Hispanic white

[a] % = proportion of all respondents to the specific question who answered that question; (n) = denominator

Table 2 Survey respondents Buddhist practices and beliefs

Activity	%[a]
Practice some type of Buddhist meditation (748)	99
Received instruction in meditation from a monk or nun (740)	85
Received instruction in meditation from reading scriptures (743)	83
Chant or repeat a mantra as part of Buddhist practice (861)	83
Engage in prayer in a Buddhist context (863)	79
Regularly attend meetings of a Buddhist sangha or church (883)	47
Very often attend services at a temple with Buddhist priests (862)	16
Have attended a session of chanting of Buddhist scriptures as part of a regular religious service (861)	85
Been formally instructed in Buddhist doctrines and ideas by a Buddhist monk or nun in a temple, church, lecture, or meditation hall (747)	89
Read and study Buddhist scriptures (865) and if so, Very often read and study Buddhist scriptures	96 38
Ever attended a formal retreat or stayed in a monastery for intensive meditation practice (746)	70
Formally taken the three refuges in the presence of other Buddhists (881)	76

[a] % = proportion of all respondents to the specific question who answered that question; (n) = denominator

were as follows: visualization, mindfulness, and reciting a phrase. Participants used other unspecified meditation techniques as much as they did the Buddhist meditation techniques. Sixty-six percent of respondents reported that their Buddhist practice very often included conscious efforts to increase their altruism and compassion; to increase loving-kindness, 66%; to decrease anger and/or hatred, 62%, and to decrease attachment and/or greed, 59%.

Table 3 Frequency of practicing meditation

Frequency of meditation	Number of respondents[a]	%
Do not meditate	11	1.5
Almost never	3	0.40
Sporadically	77	10
Often but not daily	169	23
One time per day	142	19
One time per day on some days, more on other days	184	25
Usually two times per day	118	16
Usually more than two times per day	43	6

[a] Of the 886 survey participants, 138 did not respond to question about meditation; one participant did not respond to questions about frequency of meditation

Seventy percent of respondents reported having been on a formal retreat or stayed at a monastery for an intensive practice of meditation, a median of 5 times ever and a median of 7 days during the past year. Twenty-nine percent of respondents engaged in rituals for their ancestors.

The main independent variable of interest in this analysis was the Buddhist Devoutness Index (composite of responses to 13 questions as described above). While most (74%) of respondents answered all 13 of those component questions, the others omitted one or more of the questions. We dealt with this missing data by calculating BDI only for the 811 (of the 886 Buddhist in the sample) who provided answers to the majority (at least seven) of the 13 devoutness score component questions. Those 75 respondents for whom devoutness scores were not calculated had responded to between zero and six of the 13 questions. Among those for whom the BDI composite score was calculated, scores ranged from 1–20 with a median score of 13.

All logistic regression models were adjusted for three sociodemographic factors (age, sex, and income), social support, and disability. The number of close friends ranged from 0 to 50, with a median of five. Most respondents (80%) reported no difficulty at all participating in social activity; 20% had difficultly, ranging from only a little difficulty to not being able to participate at all.

Less than one percent of the respondents had no understanding of the individual components of the eightfold path. Approximately two-thirds of respondents reported that they understood the eightfold path but varied on the difficulty or ease of application of the components in their daily life, while a smaller proportion both understood and could teach each of the components to others (Table 4).

Sixty-eight percent of respondents rated their health as very good or excellent. Three percent or fewer of the respondents reported ever having been told by a healthcare professional that they had had a heart attack, angina, coronary heart disease, hypertension, hypercholesterolemia, stroke, cancer, diabetes, asthma, emphysema, arthritis, gout, or fibromyalgia. All but 13% of respondents had health insurance or another type of healthcare plan. About one-third of respondents did have some health care issues (Table 5), including obtaining little routine preventive healthcare, mental health problems, and lack of finances to obtain needed healthcare.

Few respondents smoked cigarettes, most used their seatbelt, and most respondents regularly participated in leisure time physical activity (Tables 6 and 7). Less than 2% of respondents had experienced physical violence or unwanted sex with an intimate partner,

Table 4 Survey respondents' understanding of the eightfold path

Eightfold path components	%[a]
Right understanding: (738)	
Understand but have difficulty applying in daily life	31
Understand and can easily apply in daily life	37
Understand and can teach to others	20
Right thought: (738)	
Understand but have difficulty applying in daily life	34
Understand and can easily apply in daily life	38
Understand and can teach others	20
Right speech: (738)	
Understand but have difficulty applying in daily life	32
Understand and can easily apply in daily life	35
Understand and can teach others	27
Right action: (738)	
Understand but have difficulty applying in daily life	27
Understand and can easily apply in daily life	42
Understand and can teach others	24
Right livelihood: (738)	
Understand but have difficulty applying in daily life	18
Understand and can easily apply in daily life	43
Understand and can teach others	31
Right effort: (738)	
Understand but have difficulty applying in daily life	30
Understand and can easily apply in daily life	38
Understand and can teach others	22
Right mindfulness: (738)	
Understand but have difficulty applying in daily life	32
Understand and can easily apply in daily life	38
Understand and can teach others	22
Right concentration: (738)	
Understand but have difficulty applying in daily life	35
Understand and can easily apply in daily life	32
Understand and can teach others	21

[a] % = proportion of all respondents to the specific question who answered that question; (n) = denominator

but a larger proportion had been threatened with physical violence (Table 6). Respondents ate an average of 3.30 (SD = 0.997) servings of fruits and vegetables (except French fries) per day, obtained 33.49% (SD = 3.04) of their calories from fat and consumed 13.99 (SD = 4.40) grams of fiber per day. One-half of respondents had followed a vegetarian diet for the past 12 months, and of those, 90% had totally excluded meat (Table 6). The average body mass index of respondents was 25.07 kg/m^2 (SD = 5.14), (men = 25.4 kg/m^2; women = 24.3 kg/m^2) although only 198 respondents had provided their height and weight for use in calculating BMI.

Table 5 Survey respondents' healthcare access and medical history

Event	%[a]
Seen a doctor for a routine checkup within the past year or less (740)	62
Been told by a health professional that have a depressive disorder (213)	37
Been told by a health professional that have an anxiety disorder (213)	31
Within the past 12 months could not afford needed prescription medicine, mental health care, dental health care, or eyeglasses (748)	30
Six months or less since last saw or talked to a doctor or other healthcare professional about your health (including as a patient in the hospital) (750)	65
Difficulty participating in social activities (visiting friends, attending clubs and meetings, going to parties): (748)	
Not at all difficult	78
A little difficult	11
Somewhat difficult	7
Very difficult	2
Cannot do at all	0.1
Do not do this activity	3

[a] % = proportion of all respondents to the specific question who answered that question; (n) = denominator

Table 6 Survey respondents' smoking, dietary practices, seat belt use, and experience with intimate partner violence

Health practices	%[a]
Currently smoke cigarettes (381)	13
Followed a vegetarian diet for all of the past 12 months (678), and if so, totally excluded (336):	50
Meat (beef, pork, lamb, etc.)	90
Poultry (chicken, turkey, duck)	71
Fish and seafood	54
Eggs	16
Dairy products	11
Always use seatbelt when drive or ride in a car (663)	90
An intimate partner has ever threatened you with physical violence, including threats to hit, slap, push, kick or hurt you in any way (703)	21

[a] % = proportion of all respondents to the specific question who answered that question; (n) = denominator

Over three-fourths of respondents participated in moderate or greater effort leisure time physical activity for at least 10 min over the past 30 days (Table 7). Those respondents engaged in that level of activity a median of 16 times per month at a median of 40 min each time. Forty-seven percent of all respondents engaged in at least 600 min (10 h) of moderate or greater effort leisure time physical activity per month. Slightly more than one-half of respondents engaged in physical activity specifically to strengthen muscle (Table 7). Those respondents engaged in muscle strengthening exercise a median of 12 times during the past 30 days. Forty-six percent of all respondents engaged in muscle strengthening exercise at least eight times per month. Eight percent of respondents watched

Table 7 Survey respondents' physical activity

Type of physical activity	%[a]
Participated in moderate or greater effort leisure time activities for at least 10 min each time during the past 30 days. (688)	78
During the past 30 days participated in physical activity specifically designed to strengthen muscles. (690)	54
Over the past 30 days, (691)	
Watched TV or videos less than 1 h each day outside of work	32
Watched TV or videos 1 h each day outside of work	19
Watched TV or videos 2 h each day outside of work	19
Watched TV or videos 3 h each day outside of work	9
Watched TV or videos 4 h each day outside of work	5
Watched TV or videos five or more hours each day outside of work	8
Did not watch TV or videos outside of work	9
Over the past 30 days, (691)	
Used a computer less than 1 h each day outside of work	22
Used a computer 1 h each day outside of work	25
Used a computer 2 h each day outside of work	23
Used a computer 3 h each day outside of work	11
Used a computer 4 h each day outside of work	5
Used a computer five or more hours each day outside of work	13
Did not use a computer outside of work	1

[a] % = proportion of all respondents to the specific question who answered that question; (n) = denominator

TV five or more hours per day outside of work and 13% worked on the computer five or more hours each day outside of work (Table 7).

Analysis of the association between devotedness to Buddhism, as measured by the Buddhist Devoutness Index (BDI), and selected health practices showed that BDI was related to only two of the health measures analyzed. An analysis of association with direct measures of health, such as disease status, was not possible due to the low prevalence of diseases reported by survey respondents, lack of information about some contributing variables, and missing data. There was no statistically significant difference between male and female scores on the BDI. The only significant associations found were that being a non-smoker (OR = 1.15, 95% CI = 1.03, 1.29) and having good to excellent self-assessed general health status (OR = 1.11, 95% CI = 1.01, 1.22) were associated with increased devoutness (as measured by the BDI), when the analyses were adjusted for demographic characteristics, social support, and disability. Each one point increase in the BDI score was associated with a 15% increase in the odds of being a non-smoker and an 11% increase in the odds of reporting being in good to excellent health.

Discussion

The study reported here, with 886 Buddhist participants, appears to be the largest, and possibly only population-based religion and health survey of Buddhists ever conducted. In the literature, there are reports of four quantitative surveys of Buddhists (Machachek 1999;

Coleman 2001; Ostrowski 2006; Smith 2007) but none of the surveys included questions about health, and three were not focused on respondents' Buddhist religious beliefs and practices. Machachek's (1999) mail survey was of a sample of US subscribers to Soka Gakkai International (SGI) publications in the US about their experience with SGI. Ostrowski (2006) conducted an online survey at two Buddhist Web sites about characteristics of users of those sites. Smith (2007; 308) conducted a mail survey of US Buddhist centers about their activities and the demographic characteristics of members.

Coleman's (2001) mailed survey was of a purposive sample of seven Buddhist centers in North America (2 Tibetan, 2 Zen, 2 Vipassana, and one unaffiliated), all but one of which was in California. The 44-question survey asked about Buddhist practices and beliefs, and attitudes and practices related to social issues. No questions about health were included. There were 359 respondents to the survey.

In addition to surveys administered specifically to Buddhists, the Pew Religious Landscape survey (Pew Forum on Religion and Public Life 2008) was a telephone survey of a representative sample of 35,000 adult US residents, including 405 Buddhists, conducted to obtain estimates of the size of religious groups, their religious beliefs and practices, social and political values, and demographic characteristics. The survey included two questions specifically for Buddhists respondents: whether they believed in nirvana and whether they prayed at a shrine or religious symbol in their home. No questions about health were asked.

Because so few quantitative, large population studies of individual Buddhists have been conducted, comparisons and contrasts between the present study and Coleman's 2001 survey and the Pew 2008 survey are important. The purpose of Coleman's survey and some of the questions about Buddhist practices were more similar to those in the present study than were the other three surveys, and the Pew survey was a random sample of the US population. The comparison illuminates demographic characteristics of Buddhist respondents and changes in beliefs and practices over time.

The respondents to Coleman's survey were on average 46 years of age, 58% were women, 51% had graduate degrees, and 20% had an income greater than $90,000. Coleman did not report race, ethnicity, or country of origin. Almost 2% of Coleman's respondents had a Buddhist family background.

Forty percent of respondents to the Pew survey were aged 30–49 years, 47% were women, 26% held graduate degrees, 22% had incomes greater than $100,000, 74% were US born, and 53% white. In the Pew survey, 0.4% of Buddhist respondents had been raised in the Buddhist religion as a child, 0.6% of the spouses or partners of married or partnered respondents were Buddhist.

Respondents in the study reported here were about the same age (47 years) as in the Coleman and the Pew surveys, had about the same proportion of respondents with graduate degrees (49%) as in the Coleman survey but a larger proportion than in the Pew survey, had a slightly larger proportion of respondents who were US born (79%) than the Pew survey, but included a larger proportion of whites (90%) than did the Pew survey. A larger proportion of the respondents in the Coleman and Pew surveys had incomes above $90,000 than respondents in survey reported here (16%). A smaller proportion of respondents in the Pew survey had been raised in the Buddhist religion than in the study reported here (86% converts); and in the present study, among the 36% who had a Buddhist family member, 54% had a spouse who was Buddhist and 14% had Buddhist parents.

There were also similarities and differences across the three studies in the respondents' Buddhist practices. In Coleman's study (2001), respondents attended Buddhist group meetings and centers, on average slightly more than once per week (47% in the study

reported here regularly attended sangha or church and 16% very often attended a temple that had a Buddhist priest) and they chanted together (in the present study 83% chanted or recited a mantra). Almost 93% had attended at least one intensive meditation retreat (in the present study 70% had), averaged one retreat per year (in the present study respondents had spent a median of 7 days in the past year in a retreat). Coleman reported that the majority of respondents practiced meditation (in the present study 99% of respondents meditated). The "typical respondent" in Coleman's study meditated almost every day for an average of a little more than 40 min at a sitting (in the present study 65% meditated at least once per day, typically for a median of 30 min each session). Coleman's respondents used a variety of meditation techniques but more than 50% followed or counted their breaths (in the present study, the most commonly used techniques were visualization, mindfulness, and reciting a phrase).

The Pew study (Pew Forum on Religion and Public Life 2008) found that 17% of Buddhist attended a religious service one or more times per week (in the present study 47% attended regularly). The Pew study also found that 12% of Buddhists participated in prayer groups, scripture study groups, or religious education programs at least once each week; 28% read religious scripture at least once per week outside of religious services (in the present study, among the 96% who read and study Buddhist scriptures, 38% did so very often). The Pew study found that 6% of Buddhists meditated at least once per week (in the present study 19% meditated at least once per day).

In summary, compared to the random sample Pew survey, the demographic characteristics of respondents in the survey reported here included a larger proportion of whites, women, and those with graduate degrees, but a smaller proportion with income levels of $90,000 or larger. A larger proportion of respondents to the present study had family connections to Buddhism than those in the Pew survey. Compared to respondents in Coleman's study, reported 8 years prior to this study, the respondents in this survey meditated more frequently, but about 10 min less each session, used different meditation techniques; a smaller proportion had attended a retreat, and a larger proportion came from families with a Buddhist member. These findings may reflect differences in survey methodology and sampling biases or changes in religious practices from Coleman's 2001 report to the 2008 Pew survey and the present study.

The study reported here also adds information to on-going historical discussions that view the US Buddhist population as consisting of three major groups amenable to study: (a) Westerners who have "converted" to Buddhism, (b) those who believe some aspects of Buddhism or follow some Buddhist practices, and (c) native-born residents not of Western European heritage or immigrants who have been Buddhist for all or most of their lives. Smith (2006, 149) categorized these groups as European American converts or Asian immigrants although this "two Buddhisms" categorization created controversy around a prejudice against Asian Buddhists and immigrants, the definition of conversion, dual religious identity (Numrich 2003, 55), and several groups that are excluded under the classification (Gregory 2001, 233).

The participants in the survey reported here were primarily from the group described earlier as Western converts who were active and strong adherents of Buddhism. Respondents participated extensively in Buddhist meditation, regularly attended Buddhist services, studied Buddhist scripture, had received formal training about Buddhist doctrines from Buddhist priests, nuns or monks, and believed that they understood key Buddhist precepts. They are similar to the descriptions of Western Buddhist followers who are between traditional monastic and lay followers who are not monks, nuns or priests but who are full-time practitioners (Wetzel 2002, 275–284; Coleman 2008, 195). While a large

proportion of respondents in this study had participated in formal Buddhist activities or training, their high levels of participation in individual solitary practices such as meditation and their low frequency of attendance at services is similar to what Tanaka (2007, 115) described as "privatized" American Buddhism. However, in contrast to Tweed's (1999, 71–90) description of "night stand" Buddhists, the respondents in this survey *did* identify themselves as Buddhists. However, the influence of Buddhist teachings on some of the survey respondents' specific practices is unclear.

While meditating on loving-kindness and altruism are sometimes emphasized in Tibetan Buddhism, those were not the meditation techniques most practiced even though many respondents practiced Tibetan Buddhism and respondents reported making conscious efforts to increase altruism, compassion, and loving-kindness. A focus on the breath or on nothing is sometimes emphasized in Zen/Ch'an/Son, but neither technique was one of the most practiced meditation techniques by respondents in this survey. The selective emphasis on specific techniques among respondents may reflect their level of meditative skill or simply their personal preference for a specific technique. The emphasis on other, unspecified meditation techniques may suggest that Buddhist priests, monks, and nuns providing instruction in meditation to US Buddhists do not emphasize a singular technique, or it may suggest that respondents use techniques learned outside of Buddhism.

The health practices of Buddhist participants in this study were generally close to the practices recommended by official health agencies. A much smaller proportion (13%) smoked than the overall US population (20.8%) (CDC 2007a). Forty-seven percent of all respondents met or exceeded the recommended 2.5 h/week (10 h/month) of moderate intensity physical activity), and 46% of all respondents exceeded the recommended 2 days per week (8 times per month) of muscle strengthening activity (CDC 2008).

The respondents' rating of their health as good to excellent is consistent with research showing an association between self-rated health and physical and mental health (Zahran et al. 2005, 1–35). The respondents' average BMI was at the lowest end of the overweight BMI (CDC 2007b) but lower than the average BMI of 26.6 for men and 26.5 for women in the US (National Health And Nutrition Examination Survey (NHANES), July 2003).

The proportion of Buddhists who had been threatened (21%) by or experienced physical violence (2%) from an intimate partner were both lower than the proportions reported in a national survey in the US that found 39% ofwomen and 25% of men had been threatened and 31% of women and 45% of men had been physically assaulted as adults (Tjaden and Thoennes 2000, 13–19). That survey also found that threats were associated with injury from physical assault. Other research has shown that threats are associated with later physical violence (Aldarondo, 1996, 141) and severity of abuse (McFarlane et al. 1998, 134). These findings suggest that some of the 21% of respondents in this survey of Buddhists who had been threatened may be at risk of future physical violence.

Half of the respondents followed a vegetarian diet. In a survey conducted with Western Buddhists who were somewhat similar in religious tradition and sociodemographic characteristics to those in the study reported here Kaza (2005, 385) found that 43% of respondents considered themselves to be vegetarian; half never eating red meat, 42% never eating poultry, and three percent never eating fish. While vegetarianism is an ideal known among all Buddhist traditions, based on the Buddhist precept of abstaining from killing and other aspects of the eightfold path, its practice is debated and it is unevenly practiced (Kaza 2005, 385). Mahayana Buddhists add to the rationale for vegetarianism the aspiration and practice of bodhichitta (Rangdrol 2004, 25). While a vegetarian diet has been shown to have health benefits (Fraser 1999, 523S), Western Buddhists have a range of additional

philosophical, ethical, humane, and environmental motivations for practicing vegetarianism that support and overlap their Buddhist beliefs (Kaza 2005, 385).

The finding that devoutness in Buddhist practice is associated with not smoking and general good health is an important result. Smoking is a well-established risk factor for numerous causes of illness and death. However, the cross-sectional nature of this study does not allow drawing the conclusion that Buddhist practices lead to not smoking or to good health. Prospective studies are needed to help understand whether there is such a causal relationship. The finding that the BDI was associated with only two of the health indicators analyzed also suggests that additional research is needed to determine whether the associations reported here can be replicated and whether devoutness might be associated with other health practices or indicators not measured here. Future studies should also include more precise measures of disability and social support for use as adjustment variables in statistical analyses. Additional research is also needed to further develop and test the BDI.

Study Limitations

This study used a cross-sectional design with a convenience sample, and thus the ability to generalize the results is limited. The respondents were not representative of Buddhists nor representative of Buddhists worldwide since most respondents were from the US, highly educated and with high annual household income. Respondents self-selected to participate in the survey and a variety of factors could have influenced their participation including level of computer and Web skills and their proficiency with the English language. Respondents were similar to the well educated, white, adherents of one tradition, American Buddhist internet users described by Ostrowski (2006, 91).

The number of questions not answered, particularly in later sections of the survey, suggests that the length of the survey and the time involved may have deterred some respondents from completing the survey. The small number of respondents for some of the health questions such as weight and height particularly limits the interpretation of the results of the analysis of devoutness and health practices in which numerous variables were used in the analysis. While most scholars of Buddhism would likely agree with the practices included in the Buddhist Devoutness Index, there could be some disagreement about the weighting given to those practices.

Future Research

The results of this study suggest several avenues for future research. More in-depth quantitative studies are needed to extend the results reported here and that would quantitatively examine issues raised in the historical narrative accounts of Buddhism in America. For example, quantitative studies are needed about practices and beliefs of practitioners of specific Buddhist traditions; the beliefs and practices of immigrants; the number of Buddhist women practitioners, their beliefs and practices, and that of ethnic group practitioners; the number and types of services and activities provided by Buddhist centers and the number and characteristics of practitioners that participate in them; the types and quality of relationships between Buddhist teachers, monks, leaders, and their students; the extent of Buddhists participation in community charitable, environmental and social justice activities, and the numbers and Buddhist psychological practitioners, types of Buddhist therapeutic modalities applied, characteristics of patients and therapeutic outcomes. Finally, quantitative study is needed to better understand the applicability of

metaphorical typologies of American Buddhism compared to definitions by regions of the US (Wilson 2009).

In order to generalize about Buddhist religious and health practices, a survey with a randomly selected, representative sample of Buddhists is needed. In-person interviews with Buddhists that include the collection of biomedical measures of disease risk factors are also needed. Studies among practitioners of specific Buddhist traditions would also be helpful in providing a more in-depth understanding of whether tradition-specific types of religious practices or beliefs are related to health.

Conclusion

The Buddhists who participated in this Web survey were involved and dedicated practitioners who identified as Buddhists. They were generally in good health and adhered to recommended practices for maintaining good health and reducing risk for disease and injury. The data collected in the study reported here about religious belief and practices and health appears to be unique among studies of Buddhists and provides a foundation upon which to build additional quantitative research about Buddhists.

Acknowledgments This study was funded in part by a grant from the Intramural Grant Program, Office of the Vice President of Research at Northern Arizona University. The authors express their appreciation to the many Buddhists who generously contributed their time to participate in this survey.

References

Aldarondo, E. (1996). Cessation and persistence of wife assault: A longitudinal analysis. *American Journal of Orthopsychiatry, 66*(1), 141–151.

Batchelor, S. (1994). *The awakening of the West: The encounter of Buddhism and Western culture*. Berkeley, CA: Parallax Press.

Berkman, L. F. (2000). Social support, social networks, social cohesion and health. *Social Work in Health Care, 31*(2), 3–14.

Cahn, B. R., & Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin, 132*(2), 180–211.

Centers for Disease Control and Prevention. (2000). Behavioral Risk Factor Surveillance System Questionnaire 2000. Retrieved February 13, 2007 from http://www.cdc.gov/brfss/questionnaires/pdf-ques/2000brfss.pdf.

Centers for Disease Control and Prevention. (2006a). National Health Interview Survey 2006 Adult Questionnaire. Retrieved March 2, 2007 from ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2006/English/QADULT.pdf.

Centers for Disease Control and Prevention. (2006b). Behavioral Risk Factor Surveillance System 2006 Questionnaire. Retrieved February 13, 2007 from http://www.cdc.gov/brfss/questionnaires/pdf-ques/2006brfss.pdf.

Centers for Disease Control and Prevention. (2007a). Fact sheet. Retrieved July 1, 2008 from http://www.cdc.gov/tobacco/data_statistics/Factsheets/adult_cig_smoking.htm.

Centers for Disease Control and Prevention. (2007b). About BMI for adults. Retrieved July 1, 2008 from http://www.cdc.gov/nccdphp/dnpa/bmi/adult_BMI/about_adult_BMI.htm#Interpreted.

Centers for Disease Control and Prevention. (2008). Physical activity for everyone. Retrieved July 1, 2008 from http://www.cdc.gov/nccdphp/dnpa/physical/everyone/recommendations/index.htm.

Centers for Disease Control and Prevention National Center for Health Statistics. (2005–2006). National Health and Nutrition Survey Questionnaires, Examination Components and Laboratory Components 2005–2006. Retrieved March 2, 2007 from http://www.cdc.gov/nchs/about/major/nhanes/nhanes2005-2006/questexam05_06.htm.

Coleman, J. W. (2001). *The New Buddhism: The Western transformation of an ancient tradition*. New York: Oxford University Press.
Coleman, J. W. (2008). The emergence of a new Buddhism: Continuity and change. In P. D. Numrich (Ed.), *North American Buddhists in social context* (pp. 195–201). Leiden: Brill.
Dockett, K., & Rahmann, A. (2007). *Buddhist practice outcomes: Protective factors that mitigate depression*. Philadelphia, PA: Paper presented at the meeting of the Eastern Psychological Association.
Fields, R. (1992). *How the swans came to the lake: A narrative history of Buddhism in America*. Boston, MA: Shambhala Publications.
Fraser, G. E. (1999). Associations between diet and cancer, ischemic heart disease, and all-cause mortality in non-Hispanic white California Seventh-day Adventists. *The American Journal of Clinical Nutrition, 70*, 532S–538S.
Gregory, P. N. (2001). Describing the elephant: Buddhism in America. *Religion and American Culture, 11*(2), 233–263.
Hall, D. F., Meador, K. G., & Koenig, H. G. (2008). Measuring religiousness in health research: review and critique. *Journal of Religion and Health, 47*, 134–163.
Hill, P. C., & Pargament, K. I. (2003). Advances in the conceptualization and measurement of religion and spirituality: Implications for mental and physical health research. *The American Psychologist, 58*, 64–784. doi:10.1037/0003-066X.58.1.64.
Hong, J., Seltzer, M. M., & Krauss, M. W. (2001). Change in social support and well-being: A longitudinal study of aging mothers of adults with mental retardation. *Family Relations, 50*(2), 154–163.
Hufford, D. J. (2005). An analysis of the field of spirituality, religion and health (S/RH). Retrieved June 7, 2005 from www.metanexus.net/tarp.
Kaza, S. (2005). Western Buddhist motivations for vegetarianism. *Worldviews, 9*(3), 385–411.
Kelly, B. D. (2008). Buddhist psychology, psychotherapy and the brain: A critical introduction. *Transcultural Psychiatry, 45*(1), 5–30.
Keyes, C. L., Michalec, B., Kobau, G. R., Zahran, H., Zack, M. M., & Simoes, E. J. (2005). Social support, health-related quality of life among older adults — Missouri, 2000. *Mortality and Morbidity Weekly Report, 54*(17), 433–437.
Layman, E. M. (1976). *Buddhism in America*. Chicago, IL: Nelson-Hall.
Machachek, D. W. (1999). The appeal of Soka Gakkai in the United States: Emergent transmodernism. *Research in the Social Scientific Study of Religion, 10*, 57–75.
McFarlane, J., Wiist, W., & Watson, M. (1998). Predicting physical abuse against pregnant Hispanic women. *American Journal of Preventive Medicine, 15*(2), 134–138.
Morreal, D. (Ed.). (1998). *The complete guide to Buddhist America*. Boston, MA: Shambhala.
National Cancer Institute. (2000). Self-report version of the Multifactor Screener in the 2000 NHIS Cancer Control Module. Retrieved May 29, 2007 from http://appliedresearch.cancer.gov/surveys/nhis/multifactor/multi_screener.pdf.
National Health and Nutrition Examination Survey (NHANES). (2003). Healthy weight, overweight, and obesity among US adults. Retrieved September 15, 2008 from http://www.cdc.gov/nchs/data/nhanes/databriefs/adultweight.pdf.
Newberg, A. B. (2005). Field analysis of the neuroscientific study of religious and spiritual phenomena. Retrieved June 7, 2005 from www.metanexus.net/tarp.
Numrich, P. D. (2003). Two Buddhisms further considered. *Contemporary Buddhism, 4*(1), 55–78.
Ostrowski, A. (2006). Buddha browsing: American Buddhism and the Internet. *Contemporary Buddhism, 7*(1), 91–103.
Pew Forum on Religion and Public Life. (2008). *US Religious landscape survey*. Washington, DC: Author. http://religions.pewforum.org/portraits.
Prebish, C. S. (1999). *Luminous passage: The practice and study of Buddhism in America*. Berkeley, CA: University of California Press.
Prebish, C. S., & Baumann, M. (Eds.). (2002). *Westward Dharma: Buddhism beyond Asia*. Berkeley, CA: University of California Press.
Prebish, C. S., & Tanaka, K. K. (Eds.). (1998). *The faces of Buddhism in America*. Berkeley, CA: University of California Press.
Rangdrol, S. T. (2004). *Food of Bodhisattvas: Buddhist teachings on abstaining from meat. Translated by the Padmakara Translation Group*. Boston, MA: Shambhala.
Seager, R. H. (1999). *Buddhism in America*. NY: Columbia University Press.
Smith, B. G. (2006). Buddhism in America: An analysis of social receptivity. *Contemporary Buddhism, 7*(2), 149–164.
Smith, B. G. (2007). Variety in the Sangha: A survey of Buddhist organizations in America. *Review of Religious Research, 48*(3), 308–317.

Tanaka, K. K. (2007). The individual in relation to the Sangha in American Buddhism: An examination of ''privatized religion''. *Buddhist-Christian Studies, 27*, 115–127.

Tjaden, P., & Thoennes, N. (2000). Prevalence and Incidence of Rape, Physical Assault, and Stalking. In *Full report of the prevalence, incidence, and consequences of violence against women.* 13–19. National Institute of Justice and Centers for Disease Control and Prevention. http://www.ncjrs.gov/pdffiles1/nij/183781.pdf.

Tweed, T. (1992). *The American encounter with Buddhism 1844–1912: Victorian culture and the limits of dissent*. Bloomington, IN: Indiana University Press.

Tweed, T. (1999). Night-stand Buddhists and other creatures: Sympathizers, adherents, and the study of religion. In D. William & C. Queen (Eds.), *American Buddhism: Methods and Findings in Recent Scholarship* (pp. 71–90). Richmond: Curzon.

Vogt, T. M., Mullooly, J. P., Ernst, D., Pope, C. R., & Hollis, J. F. (1992). Social networks as predictors of ischemic heart disease, cancer, stroke and hypertension: Incidence, survival and mortality. *Journal of Clinical Epidemiology, 45*(6), 659–666.

Weaver, A. J., Vane, A., & Flannelly, K. (2008). A review of research on Buddhism and health: 1980–2003. *Journal of Health Care Chaplaincy, 14*(2), 118–132.

Wetzel, S. (2002). Neither monk nor nun: Western Buddhists as full-time practitioners. In C. Prebish & M. Baumann (Eds.), *Westward Dharma: Buddhism beyond Asia* (pp. 275–284). Berkeley: University of California Press.

Wiist, W. H., Sullivan, B. M., Wayment, H. A., & Warren, M. (2008). A web-based survey of the relationship between Buddhist religious practices, health, and psychological characteristics: Research methods and preliminary results. *Journal of Religion and Health*. doi:10.1007/s10943-008-9228-4.

Wilson, J. (2009). Mapping the American Buddhist terrain: Paths taken and possible itineraries. *Religion Compass, 3*(5), 836–846.

Wuthnow, R., & Cadge, W. (2004). Buddhists and Buddhism in the United States: The scope of influence. *Journal for the Scientific Study of Religion, 43*, 363–380. doi:10.1111/j.1468-5906.2004.00240.x.

Zahran, H. S., Kobau, R., Moriarty, D. G., Zack, D. G., Holt, J., & Donehoo, R. (2005). Health-related quality of life surveillance-United States, 1993–2002. In: Surveillance Summaries, October 28, 2005. *Mortality and Morbidity Weekly Report,* 54 (SS-4):1–35. http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5404a1.htm.