

Yoga in Australia: Results of a national survey

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ABSTRACT

Introduction: The therapeutic benefits of yoga and meditation are well documented, yet little is known about the practice of yoga in Australia or elsewhere, whether as a physical activity, a form of therapy, a spiritual path or a lifestyle.

Materials and Methods: To investigate the practice of yoga in Australia, a national survey of yoga practitioners was conducted utilizing a comprehensive web-based questionnaire. Respondents were self-selecting to participate. A total of 3,892 respondents completed the survey. Sixty overseas respondents and 1265 yoga teachers (to be reported separately) were excluded, leaving 2,567 yoga practitioner respondents.

Results: The typical yoga survey respondent was a 41-year-old, tertiary educated, employed, health-conscious female (85% women). Asana (postures) and vinyasa (sequences of postures) represented 61% of the time spent practicing, with the other 39% devoted to the gentler practices of relaxation, pranayama (breathing techniques), meditation and instruction. Respondents commonly started practicing yoga for health and fitness but often continued practicing for stress management. One in five respondents practiced yoga for a specific health or medical reason which was seen to be improved by yoga practice. Of these, more people used yoga for stress management and anxiety than back, neck or shoulder problems, suggesting that mental health may be the primary health-related motivation for practicing yoga. Healthy lifestyle choices were seen to be more prevalent in respondents with more years of practice. Yoga-related injuries occurring under supervision in the previous 12 months were low at 2.4% of respondents.

Conclusions: Yoga practice was seen to assist in the management of specific health issues and medical conditions. Regular yoga practice may also exert a healthy lifestyle effect including vegetarianism, non-smoking, reduced alcohol consumption, increased exercise and reduced stress with resulting cost benefits to the community.

Key words: Australia; cardiovascular; exercise; health; injuries; injury; medical; meditation; mental health; musculoskeletal; quality of life; survey; therapy; women's health; yoga.

INTRODUCTION

Yoga is an ancient Eastern philosophy of living that includes techniques such as physical postures (asana), breathing practices (pranayama), meditation and relaxation, moral codes and other practices.^[1] Together, these practices are said to provide a path to self-realization, or union between the individual and the universal consciousness.^[2] In Western society, aspects of yoga are commonly practiced

for exercise, relaxation or for their therapeutic potential; however, little is known about the actual practice of yoga in Australia, whether as a physical activity, a form of therapy, a spiritual path or a lifestyle.

Participation and practice

The participation rate for yoga in Australia is unclear. Studies designed to measure participation in sport and physical activities report yoga participation at between 1.7%^[3] and 2.9%^[4] of the adult population in 2005-2006, making yoga the 13th or 14th most popular physical activity respectively, just ahead of Australian Rules football. In those studies, yoga participants were most likely to be women (90%) and in the 25-34 and 35-44 age groups. Class attendance and home practice was evenly split with most people practicing at least once a week or fortnight for at least part of the year. By contrast, a national survey

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of Complementary and Alternative Medicine (CAM) use in Australia in 2005 found participation in yoga as a CAM therapy was 6.8% of the adult population for practitioner visits (i.e. attending a yoga class), and 12.0% for all use of yoga including practitioner visits and home practice.^[5]

In the US, yoga participation was estimated at 7.5% of the adult population in 2004-2005 with 77% being females. Participants generally practiced 2-4 times a week with 71% attending yoga classes. Motivators for yoga practice were, in order of frequency; flexibility, stress reduction, strength, fitness, personal growth, mental health and spiritual development.^[6,7] Although most participants were between 25 and 44 years old, participation was growing fastest in the 18-24 age group.^[8] National participation or practice data in other countries was limited or not available.

Yoga as a therapy

There is a growing body of research into the efficacy of yoga and meditation practices, either stand-alone or as an adjunct to conventional therapy, for a range of health issues and medical conditions.

Yoga has long been associated with musculoskeletal therapy. This is well supported in the literature by studies demonstrating the benefit of yoga practices for acute and chronic pain, lower back pain, joint pain, osteoarthritis and rheumatoid arthritis, functional disability and pain medication usage.^[9-14] However, there is also promising evidence for the use of yoga and meditation for mental health issues such as stress management, non-psychotic mood, high trait anxiety and generalized anxiety disorders and mild-to-moderate depression,^[15-19] usually as part of a multi-disciplinary approach. For women who practice yoga, there is good evidence of assistance with pre-menstrual syndrome and menopausal symptoms,^[20-22] while pre-natal yoga has been shown to lower rates of pre-term labor, increase birth weights and reduce pregnancy-related complications.^[23]

Regular yoga practice has also been shown to positively impact on risk factors for cardiovascular disease and diabetes such as hypertension, obesity, hyperlipidemia, glucose tolerance, insulin sensitivity, oxidative stress, sympathetic activation and cardiovascular function.^[24-26] Intensive lifestyle change, based on yogic lifestyle, including a low fat vegetarian diet, non-smoking, moderate exercise, stress management and psychosocial support, has been shown to reverse coronary artery stenosis, to reduce recurrence of adverse cardiovascular events and reduce angina pain.^[27-28] Other conditions for which yoga has shown some benefit in the literature include gastrointestinal, respiratory, cognitive function and neurological, geriatric quality of life and symptomatic relief for cancer sufferers.

Despite the heterogeneity of the yoga, meditation and adjunct techniques utilized in the literature, and a lack of clinical guidelines for their use, yoga and meditation have become two of the most commonly used complementary therapies; a national survey of Australian General Practitioners (GPs) reported that yoga and meditation were seen as highly effective and safe therapies, with around two thirds of GPs referring to, or suggesting that their patients use yoga or meditation in the previous 12 months. The only therapies receiving a higher rate of referral or suggestion by GPs were massage (87%) and acupuncture (83%).^[29]

Similarly a number of US studies found meditation, imagery and yoga to be commonly used CAM techniques,^[30-33] frequently used for chronic pain and insomnia, but, *"...used by less than 20% of those with heart disease, headaches, back or neck pain, and cancer, conditions for which there is strong research support."*^[34]

Aims and research questions

In order to investigate the practice of yoga in Australia, a national survey of yoga practitioners was conducted. The survey aimed to investigate the styles commonly practiced, characteristics of practitioners, motivation for practice, dietary and lifestyle choices, perceived benefits or otherwise of practice, and the characteristics of yoga-related injuries.

MATERIALS AND METHODS

Rationale and sample

Given the variety of styles and practices of yoga, a large number of participants were required to achieve sufficient responses in each sub-group of the data to answer the research questions. It was not economically feasible to poll a statistically representative sample of the Australian population; however, with a high rate of household internet connections in Australia,^[35] a web-based industry-wide survey was considered appropriate.

Recruitment

Recruitment took place over 18 months prior to the survey period through the yoga teacher associations to their members and by direct mail to yoga teachers listed in the Australian business telephone directory, resulting in the distribution of 40,000 invitation postcards through about 2000 yoga teachers to their students. Recruitment was assisted by promotion at yoga conferences and events, articles about the survey in the mainstream media appealing directly to yoga practitioners to participate, and by word of mouth. The promotional materials directed potential participants to visit the 'Yoga in Australia' website where the questionnaire was located. The website

also offered information about yoga research, news and events, and sign-up to a monthly email newsletter to generate return visits. Respondents were self-selecting to participate.

Ethical approval and data collection

Ethics approval was granted by the RMIT University Human Research Ethics Committee. Data collection took place over seven months between June 2005 and January 2006.

Data security and validation

Intending participants were first required to engage in a registration process by which their email address was validated, after which they could login to commence the survey. Participants were also able to logout and return later to continue taking the survey, in which case they were followed-up by email to enhance completion rates. IP address logging was used to confirm self-reported country of origin and to check for data manipulation.

Survey instrument

The survey instrument was a 30-min interactive web-based questionnaire, developed in consultation with yoga teacher associations in the 18 months prior to the survey period. The survey presented participants with groups of questions based on answers to initial questions. A paper-based survey form was also made available on request.

Data analysis

The statistical analysis was performed using SPSS Version 15 software.^[36] Variables were analyzed by frequencies and cross-tabulated as appropriate. Qualitative data was grouped by words and phrases of similar responses to determine themes using text analysis software.^[37]

RESULTS

Sample and exclusions

A total of 3,892 respondents completed the survey. Sixty overseas respondents were excluded. About one-third (1,265) of respondents were identified as yoga teachers or training to become yoga teachers and therefore excluded from this analysis (to be reported separately) on the basis of their vocational interest in yoga, leaving 2,567 yoga practitioners.

Demographic and socio-economic characteristics

Table 1 compares the demographic characteristics of respondents to the Australian population from Australian

Table 1: Comparison of demographic characteristics of respondents with the Australian population from ABS census/trends data

By state	ABS 2006 census (%)	Yoga survey (%)
NSW	33.2	38.3
VIC	24.7	33.9
QLD	19.6	11.3
SA	7.6	3.7
WA	9.9	4.8
TAS	2.4	3.1
NT	1.0	2.6
ACT	1.6	2.3
Total	100.00	100.0
By age group	ABS 2006 census (%)	Yoga survey (%)
Under 15	19.8	0.0
15-24	13.6	4.8
25-34	13.5	28.0
35-44	14.8	27.9
45-54	13.9	24.4
55-64	11.0	12.3
65-74	6.9	2.3
75-84	4.8	0.3
85+	1.6	0.0
Total	100.0	100.0
By metropolitan or rural location (RRMA classification)	ABS 2005 trends (%)	Yoga survey (%)
Capital cities	66.2 (major cities)	57.0
Large metro >100,000	(no equiv. classification)	25.5
Large rural 25,000-99,999	21.2 (inner regional)	8.2
Small rural and other rural < 25,000	10.2 (outer regional)	8.3
Remote and other remote < 5000	2.4 (remote/very remote)	1.0
Total	100.0	100.0

Census and Trends data.^[38-41] Survey participants were well distributed by State and metropolitan or rural location, but as expected, were not statistically representative of the Australian population. Likewise, given that respondents were self-selecting, they also cannot be said to be representative of all Australians who practice yoga, despite the large national response to the survey.

The mean age of respondents was 41.43 years ($SD=11.56$) with 85.5% of those females. However, the proportion of women to men varied by style of yoga, with a higher proportion of men practicing the more physical styles of yoga, e.g. Bikram (hot) yoga with 20.3% male participants. Most respondents had a tertiary or post-tertiary qualification (81.4%) and most were employed (82.3%) either full-time (49.4%), part-time (18.6%) or self-employed (14.3%). Of those who were employed, 14.6% reported employment in the healthcare industry, most commonly nursing. A quarter of respondents (26.6%) reported household income of more than A\$110,000 p.a, while three quarters (76.1%) had a household income above A\$50,000 p.a. The mean number of wage earners per household was 1.73 ($SD=0.675$).

Practice characteristics

More than half of respondents (56.6%) practiced once or twice a week, while another 24.1% practiced 3-4 sessions a week. The most popular session lengths were 60-70 min and 90-100 min ($M=83.5$ min, $SD=34.23$). Most respondents (79.1%) did most or all of their practice in a yoga class (rather than at home). The mean years since first starting was 9.17 years ($SD=9.34$), while the mean years of regular practice was 5.62 ($SD=5.96$). Lack of time (family or work commitments) was the most common reason for stopping practice (78.1%), followed by lack of money (21.5%) and availability of classes (18.3%).

About 61% of the time spent for practicing was devoted to asana/postures (48.8%) and vinyasa/dynamic sequences of postures (12.0%). The other 39% of practice time was devoted to pranayama/breathing techniques (9.1%), meditation (10.1%), relaxation (11.1%) and other practices including instruction and discussion (8.9%). Respondents spent an average of A\$83.95 per month ($SD=70.23$) on their practice, comprising yoga classes (\$70.36) and related spending (\$13.59).

Religious and spiritual orientation

While 68% of the population identified themselves as Christian in the 2002 Australian Census,^[42] only 34.8% of survey respondents indicated they held 'Christian' beliefs, whereas about a quarter of respondents (27.7%) indicated they held 'spiritual but non-religious' beliefs. Similarly, while Buddhism represented about 2% of the Australian population in the Census, 6.2% of survey respondents held Buddhist beliefs. When religious orientation was cross-tabulated by years of regular practice as shown in Table 2, 43.0% of respondents who had practiced for 0-1 years identified with Christianity compared to 27.9% of those who had practiced for 6-7 years. The proportion of those with spiritual but non-religious beliefs and those with Buddhist beliefs was also generally higher in those who had practiced for more years.

Motivations for beginning and continuing

Table 3 shows the reasons given for beginning and continuing yoga practice. Respondents were able to select multiple reasons. 'Health and fitness', and 'increased flexibility/muscle tone' were the most common reasons for starting (both about 71%) and continuing yoga practice (82% and 86% respectively). While 58.4% of respondents gave 'reduce stress or anxiety' as a reason for starting, 79.4% found this to be a reason for continuing. Only 19% of students initially saw yoga as a spiritual practice; however, this increased to 43% once practicing. Similarly, 29% initially saw yoga as a form of personal development, increasing to 59% as a reason for continuing to practice.

Table 2: Religious orientation by years of regular practice

Years of regular practice	Christian (Catholic, Anglican, Protestant, Orthodox, etc)	Secular (non-religious, atheist, agnostic)	Spiritual (non-religious spiritual beliefs)	Buddhist	Other
0-1 years (n=393)	43.0% (169)	26.0% (102)	23.4% (92)	4.1% (16)	0.03% (14)
2-3 years (n=599)	37.2% (223)	24.4% (146)	27.4% (164)	6.0% (36)	0.05% (30)
4-5 years (n=447)	32.0% (143)	24.8% (111)	30.6% (137)	6.5% (29)	0.06% (27)
6-7 years (n=219)	27.9% (61)	26.9% (59)	30.6% (67)	9.1% (20)	0.05% (12)
8-9 years (n=129)	29.5% (38)	29.5% (38)	26.4% (34)	8.5% (11)	0.06% (8)
10-14 years (n=160)	30.0% (48)	28.8% (46)	28.8% (46)	3.8% (6)	0.09% (14)
15+ years (n=187)	32.6% (61)	21.4% (40)	27.8% (52)	8.0% (15)	0.10% (19)
Total (n=2134)	34.8% (743)	25.4% (542)	27.7% (592)	6.2% (133)	0.06% (124)

Table 3: Motivations for beginning and continuing yoga practice

	Beginning (n=2, 456)	Continuing (n=2, 384)
Trendy, in vogue	2.6% (64)	0.5% (11)
Increase health and fitness	71.9% (1,767)	82.3% (1,962)
Increase flexibility, muscle tone	70.5% (1,732)	86.5% (2,061)
Reduce stress or anxiety	58.4% (1,434)	79.4% (1,893)
Specific health or medical reason	19.7% (485)	21.2% (505)
Pregnancy, childbirth	3.2% (79)	3.8% (91)
Menopause or other women's health	3.4% (83)	7.8% (187)
Spiritual path	18.9% (463)	42.7% (1,017)
Personal development	29.4% (723)	59.1% (1,410)
Enhance performance in other activity	10.9% (268)	19.6% (468)
Other	5.2% (127)	5.8% (138)

Respondents were able to make multiple selections

About 20% indicated a specific health or medical reason for practice.

Dietary and lifestyle choices

The survey asked respondents to describe their dietary and lifestyle choices and whether this choice had been influenced by their yoga practice. Results were cross-tabulated by years of regular practice as shown in Table 4. The proportion of respondents who were non-smoking, vegetarian or had a preference for organic foods was generally higher in those with more years of practice. By contrast, the proportion of non-alcohol drinking respondents remained relatively consistent regardless of years of practice. Other dietary choices, such as preference for low-fat and low-sugar foods were also more prevalent amongst those with more years of practice.

Those who reported that their lifestyle choice was influenced by their yoga practice provided a useful

Table 4: Dietary and lifestyle choices by years of regular practice

Years of regular practice	Non-smoking	Vegetarian or vegan	Non-alcohol drinking	Prefer organic foods
0-1 years (n=373)	80.70% (301)	14.75% (55)	23.32% (87)	39.68% (148)
2-3 years (n=588)	83.67% (492)	21.77% (128)	23.30% (137)	50.51% (297)
4-5 years (n=438)	81.74% (358)	25.34% (111)	24.20% (106)	56.62% (248)
6-7 years (n=216)	83.80% (181)	24.54% (53)	23.15% (50)	51.39% (111)
8-9 years (n=125)	85.60% (107)	31.20% (39)	24.00% (30)	56.00% (70)
10-14 years (n=158)	89.24% (141)	22.78% (36)	25.95% (41)	54.43% (86)
15+ years (n=181)	86.74% (157)	27.07% (49)	26.52% (49)	45.86% (83)
Total (n=2079)	83.55% (1737)	22.66% (471)	24.00% (499)	50.17% (1043)
Influenced by yoga practice? (n=594)	8.9% (210)	7.7% (182)	4.4% (103)	10.7% (252)

Respondents were able to make multiple selections

comparison with the years of practice data. For example, while the proportion of non-smoking respondents was seen to increase by as much as 8.5% between novices and those who had practiced for 8-9 years, this was somewhat reinforced by the 8.9% of respondents who said their decision not to smoke had been influenced by their yoga practice.

Sporting and physical activity

Participation in sport and physical activity in the previous 12 months was compared with known national participation rates,^[3,4] as shown in Table 5. In the case of aerobics, yoga survey respondents closely reflected the national participation figures, and also had similar participation figures in outdoor soccer and basketball; however, they exceeded the national participation rate in all other activities. In four of the top five national physical activities (walking, swimming, cycling and running), respondents were nearly three times more likely to participate than the general public.

Health and medical conditions

The survey asked respondents to identify any health issues or medical conditions for which they had used yoga as a management option and to rate the perceived effect of yoga practice on that condition on a seven-point scale. Conditions were grouped into seven categories, examples given as follows:

Musculoskeletal	Back, neck and shoulder pain, muscular pain, arthritis, disc injuries
Mental health	Stress, anxiety and related disorders, depression, sleep difficulties

Table 5: Participation in sporting and physical activity of yoga survey respondents compared to Australian Sports Commission national participation rates

Sport/physical activity undertaken in the previous 12 months	National participation rate in 2006 (%)	Participation rate of yoga survey respondents (n=2398)
Walking (not bushwalking)	36.2	92.0% (2,205)
Aerobics	19.1	19.2% (461)
Swimming	13.6	38.3% (919)
Cycling	10.1	31.6% (758)
Running	7.4	23.4% (561)
Tennis	6.8	11.9% (285)
Golf	6.8	9.8% (236)
Bushwalking	4.7	34.5% (827)
Soccer (outdoor)	4.2	4.6% (110)
Netball	3.6	5.8% (140)
Basketball	3.3	3.9% (93)
Cricket (outdoor)	3.2	*
Weight training	3.1	21.1% (507)
Yoga	2.9	*
Australian rules	2.7	3.8% (90)
Touch football	2.4	*
Dancing	2.4	18.3% (439)
Surf sports	2.3	*
Fishing	2.1	7.8% (186)
Lawn bowls	2.1	*
Martial arts	1.8	5.1% (122)
Squash	1.3	*
Hockey (outdoor)	1.0	3.8% (92)
Pilates	*	18.6% (447)
Tai Chi, body balance	*	12.8% (306)

*not canvassed

Women's health	Pre/post pregnancy, pre menstrual syndrome, menopause
Gastrointestinal	Irritable bowel syndrome, coeliac disease, constipation, indigestion
Respiratory	Asthma, bronchitis, other respiratory problems
Cardiovascular	Blood pressure, diabetes, metabolic (insulin resistance) syndrome
Other	Weight management, other conditions

The 1,862 respondents who answered this question reported a total of 4,754 conditions, which overall they perceived as:

Much better	53.3% (2563 conditions)
Better	29.3% (1374)
Little better	12.5% (583)
No change	4.5% (213)
Little worse	0.3% (15)
Worse	0.0% (2)
Much worse	0.4% (4)

The health issues and medical conditions reported are shown in Table 6. The perceived benefit of yoga practice on the conditions in each category is shown in Figure 1.

Together, stress management (15.63% of all conditions reported) and anxiety (8.25%) were more commonly being

Table 6: Perceived effect of yoga practice on health and medical conditions by category

Conditions reported	Frequency of condition	Percentage of all conditions
Musculoskeletal (n=1339, 28.17% of conditions)		
Back (563), neck (318) and shoulder (111) pain/problems	992	20.86
Joint pain/problems, arthritis	153	3.22
Other muscular pain/problems	93	1.96
Sciatica, scoliosis, disc injuries, sacroiliac problems	88	1.85
Other (fibromyalgia, osteoporosis)	13	0.27
Mental health (n=1767, 37.17% of conditions)		
Stress management	743	15.63
Anxiety	392	8.25
Depression	284	5.97
Sleep difficulties, insomnia	212	4.46
Headaches, migraine	105	2.21
Other (mood disorders, bipolar disorder, panic attacks)	31	0.65
Women's health (n=419, 8.81% of conditions)		
Menopause symptoms, e.g. hot flushes	132	2.78
Assistance with pregnancy and post natal	145	3.05
Pre menstrual syndrome, other hormonal imbalances	124	2.61
Other (endometriosis, polycystic ovary syndrome)	18	0.38
Gastrointestinal (n=322, 6.77% of conditions)		
Irritable bowel syndrome	182	3.83
Other (constipation (53), poor digestion and bloating (48), indigestion and reflux (24), coeliac disease (15))	140	2.94
Respiratory (n=305, 6.42% of conditions)		
Asthma	167	3.51
Other (Hay fever, sinusitis and allergies (44), colds/flu (34), bronchitis and breathing difficulties (31), quit smoking (29))	138	2.91
Cardiovascular (n=174, 3.66% of conditions)		
High or low blood pressure (80% high BP)	136	2.86
Other (metabolic syndrome, diabetes and raised cholesterol (21), palpitations, tachycardia and improve circulation (17))	38	0.80
Other (n=428, 9.0% of conditions)		
Weight management	227	4.77
Other (muscle tone and flexibility (54), cancer and chemotherapy (43), enhance health and well-being (21), fatigue, chronic fatigue and glandular fever (20), thyroid disease (16), enhance immune system (9), skin conditions, psoriasis and eczema (9), improve posture (8), surgery post-op (8), drug and alcohol addiction (6), epilepsy (4), multiple sclerosis (3))	201	4.23
Total	4754	100

Respondents were able to report multiple health/medical conditions.
N=1862 respondents reported, n=4754 conditions in 7 categories

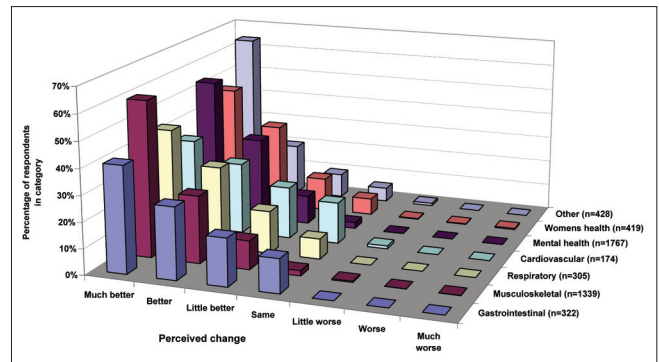


Figure 1: Perceived effect of yoga practice on health and medical conditions by category (respondents were able to report multiple health/medical conditions. N=1862 participants reported, n=4754 conditions in 7 categories)

addressed by yoga practice than by back (11.84%), neck (6.69%) and shoulder (2.33%) pain and related musculoskeletal problems. Women's health was the next largest category (8.81% of conditions) with reported improvement in pre-menstrual and menopausal symptoms and assistance during and after pregnancy, ahead of gastrointestinal (6.77%), respiratory (6.42%), and cardiovascular conditions (3.66%), with consistent improvement reported across all categories. Weight management (4.77%) was also seen to be assisted by yoga practice. Health conditions were only seen to worsen in 19 of 4,754 instances.

Perceptions of quality of life

The survey asked respondents to indicate how their practice of yoga had influenced their quality of life also on a seven-point scale, in five categories as follows:

Physical health	Fitness, muscle tone, flexibility, energy levels
Mental health	Memory, depression, sense of purpose, positivity
Emotional health	Emotional stability, anger, stress or anxiety levels
Spiritual health	Relationship with higher power, sense of inner peace and happiness
Relationships	Quality of close relationships, friends, family life, sex-life

A total of 2,389 respondents reported 10,386 measures of quality of life across the five categories, as shown in Figure 2. Perceptions of physical health were the most improved, followed by mental and emotional health. Spiritual health and close relationships were also seen as improved, but not as much as for the other domains. Quality of life was only seen to worsen in 14 of 10,386 instances, and of these, most in the area of relationships (12).

Yoga-related injuries

The survey asked respondents whether they ever had

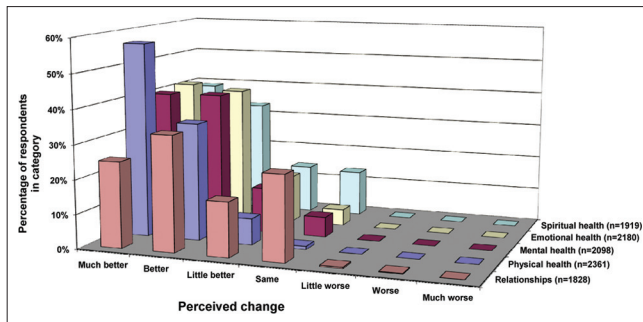


Figure 2: Effect of yoga practice on perceptions of quality of life by category (respondents were able to report perceptions of quality of life in multiple categories. $N=2,389$ respondents reported, $n=10,386$ quality of life measures in 5 categories)

an injury that may have been attributable to their yoga practice. Of the 2353 respondents who answered this question, 1851 (78.7%) indicated they had never been injured while practicing yoga. The remaining 502 respondents (21.3%) reported 576 injuries, including many minor strains, injuries that happened more than 12 months ago, recurrences of pre-existing injuries, and injuries that happened during home practice (not under supervision).

For the purposes of determining a meaningful yoga-related injury rate, an injury was defined as requiring medical treatment or similar intervention, OR causing prolonged pain, discomfort or suffering, OR resulting in time off work or similar financial loss. The proportion of respondents injured in the previous 12 months, including unsupervised practice (e.g. at home) and recurrences of pre-existing conditions, was 4.6%. For injuries occurring under supervision (e.g. in a yoga class) including recurrences of pre-existing conditions in the previous 12 months, the injury rate was 3.4%. For new injuries only, occurring under supervision in the previous 12 months, the injury rate was 2.4%.

Where provided, practices most commonly associated with injuries were headstands (7.4% of injuries reported), shoulder stands (6.3%), lotus and half lotus (seated cross-legged position) (5.3%), forward bends (4.8%), backward bends (3.1%) and handstands (2.5%). Respondents commonly took the blame for the injury on themselves, citing reasons such as ‘pushing it too far’ and not warming up, along with being ‘ego driven’.

DISCUSSION

Strengths and weaknesses of this study

A major strength of this study was a large, well-distributed response from 2567 yoga practitioners around the country. Weaknesses mostly related to potential sources of bias, such as potential recruitment bias, utilizing a web-based

survey (which may have excluded certain groups of people), a self-selecting and therefore potentially skewed sample, and the effect of respondent recall and self-report. A limitation of the methodology was the lack of a denominator, that is the inability to compare respondents with similarly recruited people who *did not* practice yoga or who had stopped practicing yoga.

Comparison with other studies

There is little national research to compare with this study, except in the US where the yoga participation rate was estimated at 7.5% in 2005.^[6,7] While the participation rate for yoga in Australia is unclear; it is likely to be between 3% (as a physical activity)^[3,4] and 12% as a CAM therapy including home practice,^[5] but potentially around 7% for organized practice when physical activity, therapy, lifestyle and spiritual path are all considered. It seems that the uptake of the more physical or dynamic styles of yoga (known to appeal more to men and the younger age groups) may be lower in Australia than in the US, given the lower proportion of men (14.5%) practicing yoga in Australia compared to 22.9% in the US, and the growth of the 15-24 age group. For similar reasons, the average age of yoga survey respondents in Australia (41.4 years) may be up to four years older than in the US (37.1 years in 2002).^[43] Other practice characteristics largely reflected overseas studies, with respondents practicing at least 1-2 times a week, being tertiary educated (81%), employed (82%), and with disposable income (75% A\$50,000 p.a. or more) suggesting yoga appeals to those of higher socioeconomic status.

Motivation and religious orientation

Yoga seems to exceed people’s expectations, suggested by the differentials between the reasons given for beginning and continuing practice, most notably as a spiritual path, for personal development and for stress management. That people discovered these aspects of yoga once practicing, may correlate with a possible reduction in Christian orientation with years of practice (up to 7 years), and a corresponding potential increase in non-religious spirituality and Buddhism over the same period. It may be that practice of yoga and meditation provides a source of meaning, and/or appeals to those who do not identify with mainstream religions, but this is currently conjecture and would need to be further explored.

Health economics of yoga practice

Physical activity

Yoga survey respondents were more likely than the general population to engage in other forms of physical activity. For example, 92% of yoga survey participants

walked for exercise, compared to 36% of the population. Of the top five physical activities in Australia, survey respondents were about three times more likely to engage in walking, swimming, cycling and running than the general population, and equally as likely as the population to participate in aerobics. Further research is required to determine if people attracted to yoga already have a tendency to engage more in other physical activities, or if this is influenced by yoga practice.

Dietary/lifestyle choices

Yoga survey respondents were vegetarian (22.6%), non-smoking (83.5%) and had a preference for organic foods (50%), among other healthy lifestyle choices. Some indicated that yoga practice had influenced their choices. For example, nearly one third of vegetarian/vegan respondents said that their decision to become vegetarian had been influenced by yoga practice. For non-smokers, about one in nine indicated that yoga influenced their decision not to smoke. Similarly, about one in five attributed their decision not to drink alcohol to yoga.

Novice yoga survey respondents were already more likely than the Australian population to be non-smokers; 80.7% were non-smoking at 0-1 years of practice compared with the national non-smoking rate of 77% in 2005.^[44] However, the non-smoking rate was higher among those with more years of practice, by a full three percentage points with 6-7 years practice, and potentially by as much as 6% after 15 years of practice. It is not possible to attribute cause and effect given that this was not a 'same subjects' comparison and in the presence of confounding factors, such as movements in the national non-smoking rate, which increased by two percentage points over the ten years to 2005.^[44]

However, the savings associated with avoided deaths and disability due to reduced tobacco use in Australia are substantial, (in the order of A\$8.6 billion over the last 30 years);^[44] therefore, there may be considerable cost benefit to the Australian healthcare system, and human benefit to the community, of a reduction in smoking of just one or two percentage points if such a reduction can be shown to stem from yoga practice. Further, well-designed national research in this area is required to quantify the benefit if any, and to better understand the mechanism by which regular yoga practice may exert a non-smoking influence. For similar reasons, further research is needed to quantify the apparent influence of yoga to engage in healthy eating, vegetarianism, higher levels of exercise, and reduced alcohol consumption.

Health/medical conditions and quality of life

It is generally accepted in the literature that use of

complementary therapies is increasing, led by educated, professional women^[45] (similar to the typical yoga survey participant), and that a perceived lack of 'holism' in western medicine has been a central reason why people have increasingly looked outside the biomedical model for their healthcare.^[46]

Respondents reported perceived benefits of yoga practice on many health issues and medical conditions, most commonly mental health and musculoskeletal health. The conditions reported by yoga survey participants closely reflected the research in the medical literature described earlier, suggesting that while the evidence-base may still be developing, yoga practitioners are currently gaining real-life benefits in these areas. Unsurprisingly, perceptions of quality of life were more dramatically improved. Future studies should attempt to quantify the extent of personal and community cost benefit.

One notable exception was in cardiovascular health, an area in which there is good scientific evidence for the use of yoga and yoga lifestyle, yet little apparent uptake of yoga to address cardiovascular conditions and risk factors (only 3.8% of conditions reported in the yoga survey were cardiovascular). The same could probably be said about yoga for respiratory and gastrointestinal conditions where the evidence is developing.

Lack of current application of the research evidence represents an opportunity for the yoga teaching community to develop programs that meet specific community needs, especially in mental and cardiovascular health and other areas for which there is research support.

Yoga-related injuries

Yoga-related injuries were relatively low (4.6% of participants sustained an injury in the previous 12 months including home practice and recurrences of previous injuries), but lower under supervision (3.4%) and even lower (2.4%) after excluding recurring injuries. The postures most commonly associated with injuries were advanced postures such as head and shoulder stands, and lotus position. However, forward and backward bends were also prominent, suggesting a need for greater training and supervision in, and caution progressing to, stronger postures.

CONCLUSIONS

The typical yoga survey respondent was a 41-year-old, tertiary educated, employed, health-conscious female. Men and the younger age groups were better represented in the stronger, more dynamic styles of yoga. Asana (postures) and Vinyasa (flowing sequences of postures) were found

to represent 61% of the time spent for practicing yoga; however about one third of the time spent for practicing (39%) was devoted to the gentler practices of relaxation, pranayama (breathing techniques), meditation and receiving instruction.

Respondents commonly started practicing yoga for muscle tone and flexibility, but often continued practicing for stress reduction. Some discovered personal development or a spiritual path in yoga once started practicing. One in five practiced for a specific health or medical reason.

Medical conditions and perceptions of quality of life were perceived to be improved by yoga practice. Of those who reported using yoga for a specific health or medical condition, more people used yoga to address stress management and anxiety than back, neck or shoulder problems, suggesting that mental health may be the primary health-related motivation for practicing yoga.

However, in the absence of any formal system of co-ordination or referral between the medical and yoga teaching professions, it seems that people are self-prescribing yoga for their health needs. Better integration in this area would likely have additional health benefits for the community.

Regular yoga practice may have multiple benefits to the individual and to the community, and may reduce the burden on the healthcare system due to associated lifestyle choices such as vegetarianism, non-smoking, reduced alcohol consumption, increased exercise, reduced stress, and other mental and physical health benefits.

Further research is required to better understand the mechanisms and to quantify the effects of yoga practice on dietary and lifestyle choices, on health and medical conditions, as well as to quantify the benefits and potential cost savings to the Australian community and healthcare system.

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