

Yoga and occupational health: integrative review of intervention studies

Yoga na saúde do trabalhador: revisão integrativa de estudos de intervenção

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ABSTRACT | **Background:** Effects of yoga on physical and mental health have been investigated in several fields. **Objective:** To investigate and analyze results of yoga interventions in the workplace reported along 10 years after the formulation of the National Policy of Integrative and Complementary Practices. **Method:** We located 10 studies published from 2006 to 2015 which met the inclusion criteria, included in databases Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medical Literature Analyses and Retrieval System Online (MEDLINE), Web of Science, Scopus, Cochrane and Scientific Electronic Library Online (SciELO). Analyzed variables were: publication year, authorship, title, aims, results, and conclusions. Interventions were characterized based on yoga style, practices implemented, frequency and duration of sessions, duration of intervention, measurement instruments, and additional interventions. **Results:** Our findings suggest that yoga has physical and psychological effects on workers from different professional categories. However, we did not find benefits for some conditions, and yoga practice does not have the same positive effects on all practitioners. Workers' adherence to programs influences the results of research. Many studies did not clearly describe the implemented programs. **Conclusion:** The characteristics of interventions show substantial differences among programs, which enable a synthesis, but not comparisons.

Keywords | occupational health; complementary therapies; yoga; review.

RESUMO | **Introdução:** Efeitos do ioga no bem-estar físico e mental têm sido estudados em diversas áreas. **Objetivos:** Investigar e analisar o que a literatura científica dos dez anos subsequentes à publicação da Política Nacional de Práticas Integrativas e Complementares apresenta sobre resultados de intervenções utilizando ioga no ambiente de trabalho com trabalhadores. **Método:** Foram encontrados 10 artigos que se enquadraram nos critérios de inclusão, publicados de 2006 a 2015, disponíveis nas bases Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medical Literature Analyses and Retrieval System Online (MedLine), Web of Science, Scopus, Cochrane e Scientific Electronic Library Online (SciELO). Os artigos foram analisados quanto a ano de publicação, autoria, título, objetivos, resultados, conclusões e as intervenções caracterizadas quanto ao tipo de ioga, práticas envolvidas, frequência, duração da prática e da intervenção, instrumentos de medida e intervenções adicionais. **Resultados:** Os achados sugerem que o ioga está relacionado a efeitos físicos e psicológicos em trabalhadores de diferentes áreas, mas não foram encontrados benefícios sobre determinadas condições e a prática não proporciona o mesmo efeito positivo para todos. Verificou-se que a adesão dos trabalhadores aos programas propostos influencia os resultados das investigações. Muitos dos estudos não descreveram com clareza os programas. **Conclusão:** As características descritas evidenciam programas diferentes, permitindo uma síntese dos resultados, mas não uma comparação entre eles.

Palavras-chave | saúde do trabalhador; terapias complementares; ioga; revisão.

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INTRODUCTION

Work is a means to meet economic needs and ensure the social inclusion of individuals. However, as a function of the conditions under which it is performed, work might also be a cause of physical and mental illness, and bring suffering to workers and the people close to them.

The conditions under which work is performed influence the quality of the resulting products, therefore they have also impact on consumers. Work-related diseases might reduce productivity, cause absenteeism, sick leave, restrictions to activities, and need for compensation. How organizations treat their employees reflects on customers and communication means, projects on their public image, and interferes with the obtainment of the necessary material and human resources. All these issues have economic and social impacts for companies¹.

Illness among the economically active population affects the national economy and the social security administration, as well the health system as a function of the cost of health care and the possible violation of the fundamental right to health set as goal in the Brazilian Health Reform², formalized at the 8th National Health Conference³, defined in the 1988 Federal Constitution, and established in the Organic Law on Health⁴.

Promotion of the physical and mental health of workers is relevant for employers, which have sought to accomplish this goal through institutional mechanisms, and also for the government, which is incentivizing and regulating such actions. This is the context for the National Policy of Safety and Health at Work which aims are to promote health, improve the quality of life of workers, and prevent work-related accidents and health problems⁵.

Actions for prevention, health promotion, maintenance and recovery might be considered from different theoretical and practical perspectives. Grounded on political, technical, economic, social and cultural reasons, in 2006 the Ministry of Health formulated the National Policy of Integrative and Complementary Practices (Política Nacional de Práticas Integrativas e Complementares — PNPIC) which seeks to ensure integral health care and

strengthen the principles underlying the Unified Health System through a healthcare model centered on the uniqueness of each individual⁶.

Yoga is an integrative and complementary practice acknowledged as such by the World Health Organization (WHO)⁷ and PNPIC⁸.

While in recent decades it was reduced to a simplified psychophysical practice—which is awakening the interest of the scientific community, being used as therapeutic option in several fields, and its effects are increasingly legitimized by the population—classic yoga is a millenary complex system. Originated in the Vedic tradition, initially transmitted from master to disciple (*Parampara*) and then recovered and systematized by Patañjali, yoga comprises eight techniques (*Asthanga*) which should be gradually practiced, to wit: an ethical-philosophical doctrine of restraints or abstentions (*yama*) and positive duties or observances (*niyama*), body postures (*asanas*), control of the vital energy through breathing (*pranayama*), control of sensory perceptions (*pratyahara*), concentration (*dharana*), meditation (*dhyana*) and control over mind (*samadhi*). Practice allegedly reduces the agitation of mind, which provides the conditions for Yoga, i.e. the perception of one's one essence and connection with creative energy⁹.

Therefore, yoga is originally a method for self-accomplishment based on a series of techniques, which therapeutic benefits are seen as a mere means to provide the conditions needed to accomplish the ultimate goal, and not as an end in themselves. In turn, that which eventually came to be generically known as yoga is just the practice of some such techniques. In any case, according to the WHO several studies demonstrated the benefits of yoga practice in terms of physical and mental well-being¹⁰, and the practical and psychological integration promoted by the yoga philosophy is seen as a valuable tool for human development and management¹¹.

Based on the aforementioned considerations, the aim of the present study was to investigate and analyze the scientific literature on the results of yoga interventions in the workplace published along ten years after the formulation of PNPIC. Literature reviews allow analyzing and synthesizing the results of different studies, and thus enable the application of the evidence reported in scientific studies into practice¹².

METHOD

We performed an integrative literature review, namely, a method to survey and synthesize studies on a given subject to provide a broad scoped view of the state of the art and discuss its applicability^{13,14}.

For this purpose, we followed the following steps: formulation of the research question, literature survey, data collection, critical analysis of the included studies, discussion of results, and presentation of the integrative review¹⁵.

The research question was: what the scientific literature published along ten years after the formulation of PNPIC reports on the results of yoga interventions in the workplace?

We searched for national and international studies published from 2006 to 2015 in databases Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medical Literature Analyses and Retrieval System Online (MEDLINE), Web of Science, Scopus, Cochrane, Latin American and Caribbean Health Sciences Literature (Literatura Latino-americana e do Caribe em Ciências da Saúde—LILACS) and Scientific Electronic Library Online (SciELO) using combination “yoga” and “occupational health” and corresponding expressions in Spanish—“salud laboral”—and Portuguese—“saúde ocupacional.” After removing duplicates, we performed a preliminary analysis which resulted in the exclusion of all the studies which had not been published as journal articles, were unfinished or without full text available in English, Portuguese or Spanish. The remaining studies were analyzed, and the ones corresponding to intervention studies and which described the results of classic yoga within occupational health settings were included for review.

Using instruments which ensure that all relevant information will be extracted, reduce the risk of transcription errors, warrant the accuracy of the data, and serve as record is relevant in the step of data collection¹⁵. For this reason we drew a table for data collection and organization based on an instrument developed and validated for use in integrative reviews¹², which includes the following information: year of publication, authors, title, aims, results and recommendations / suggestions.

This table grounded the initial analysis of the following data: year of publication, authors, aims, results and conclusions. We then drew a second table with information on the characteristics of interventions, including: yoga style, practices implemented, frequency and duration of sessions, duration of intervention, measurement instruments, and additional interventions.

Based on the interpretation and synthesis of the results and reference literature, we discussed the data, detected gaps, and defined priorities for future studies.

Finally, we prepared the presentation of the review, which enabled comparisons of convergences and divergences between the selected studies, and the identification of trends in the study of the subject of interest.

RESULTS

We initially located 100 studies, being 22 in database CINAHL, 18 in MEDLINE, 17 in Web of Science, 27 in Scopus, 7 in Cochrane and 9 in SciELO; no study meeting the search criteria was located in LILACS.

Sixty-five studies remained after removal of duplicates, 19 of which were excluded on the preliminary analysis (17 were not journal articles, one was not finished, and the full text of one was available in Japanese only). For the remaining 46 studies, analysis showed that 36 did not answer the research question (nine did not address classic yoga, 12 did not deal with occupational health, and 15 did not assess the results of yoga interventions). Therefore, 10 studies were included for review, as shown in Figure 1.

Variables publication year, authors, title, aims, results and recommendations / conclusions are described in Chart 1 according to publication year.

Chart 2 describes the characterization of the interventions performed in the analyzed studies.

DISCUSSION

As Chart 2 shows, two studies were published in 2009, one in 2010, two in 2011, two in 2012, one in 2013, one in 2014, and one in 2015. Four studies were conducted in the United States, two in Japan, two in the Netherlands

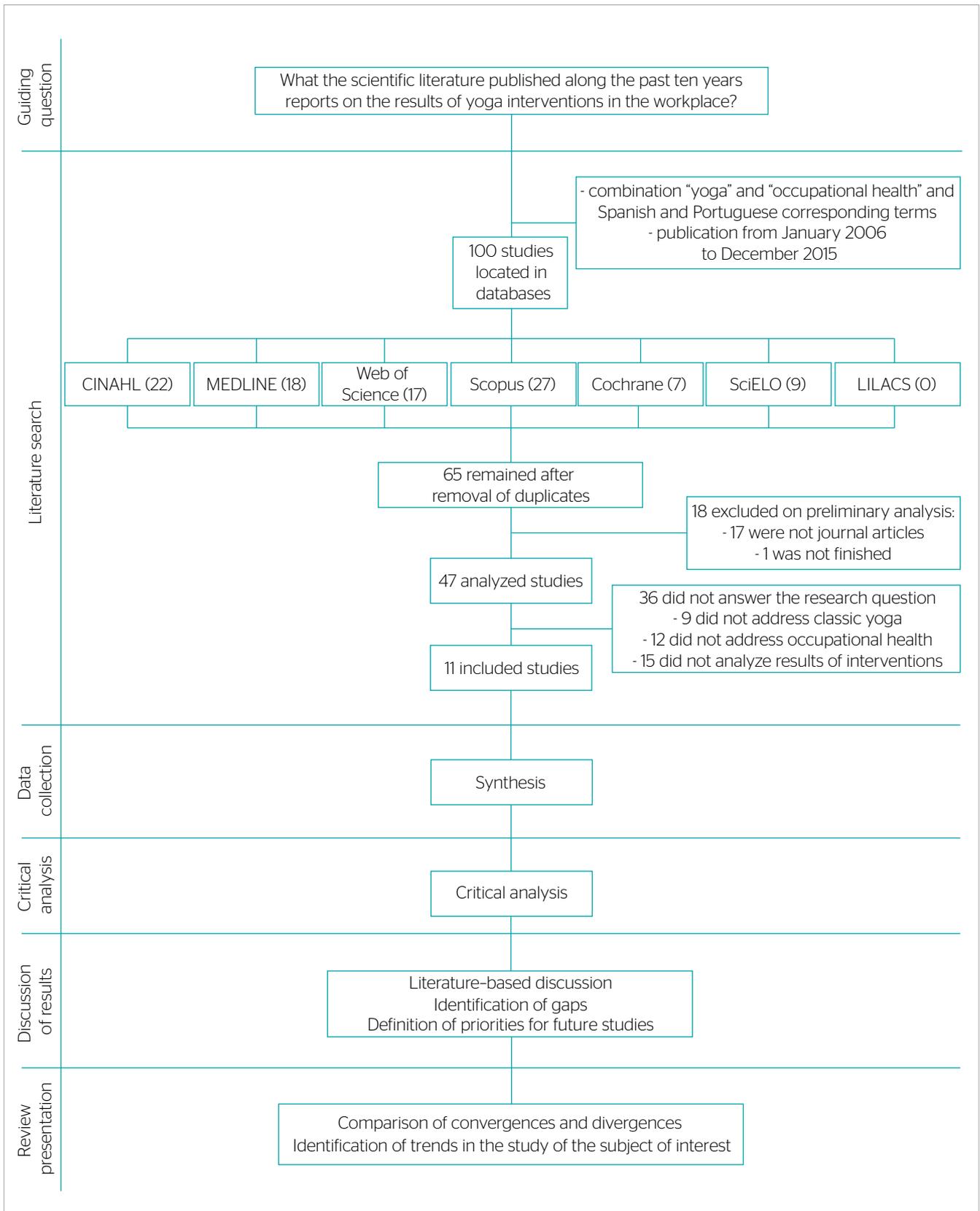


Figure 1. Flowchart representing the study steps, Campinas, 2017.

Chart 1. Synthesis of the articles included in the discussion, Campinas, 2017.

Year	Authors	Title	Aims	Results	Recommendations / conclusions
2009	Khalsa et al. ²⁴	Yoga ameliorates performance anxiety and mood disturbance in young professional musicians	To assess the benefits of yoga and meditation for musicians	Trend to less anxiety, tension, depression and irritability in the intervention groups. No difference in musculoskeletal symptoms, stress or sleep	Yoga and meditation might reduce performance anxiety and mood disturbances among professional musicians
	Telles et al. ¹⁸	Effect of Yoga on musculoskeletal discomfort and motor functions in professional computer users	To assess the effect of yoga on musculoskeletal discomfort, hand strength and typing speed among professional computer users	Lower frequency and intensity of, and less interference with work by musculoskeletal symptoms, increased hand grip strength, typing speed and flexibility in group intervention	Yoga was beneficial to professional computer users
2010	Cowen ¹⁷	Functional fitness improvements after a worksite-based Yoga initiative	To investigate the benefits of yoga on functional fitness, flexibility and stress among firefighters	Better functional fitness, job performance, flexibility, calm / focus, breathing control, resistance and balance, reduced stress and musculoskeletal pain	Yoga was well received by and beneficial to firefighters
2011	Hartfiel et al. ²⁰	The effectiveness of Yoga for the improvement of well-being and resilience to stress in the workplace	To assess the efficacy of yoga on emotional well-being and resilience among university employees	Group yoga intervention reported improvements in feelings of clear-mindedness, composure, elation, energy and confidence, increased life purpose, satisfaction and self-confidence during stressful situations	Yoga practice had favorable outcomes among the analyzed population
	Thomley et al. ²²	Effects of a brief, comprehensive, Yoga-based program on quality of life and biometric measures in an employee population: A pilot study	To establish whether a yoga program might have beneficial effects on health and well-being indicators for workers	Statistically and clinically significant improvements in body weight, body fat percentage, flexibility, blood pressure and quality of life	A yoga-based, broad-encompassing program is viable and efficacious in the short run for various health conditions and well-being among workers
2012	Strijk et al. ²³	A worksite vitality intervention to improve older workers' lifestyle and vitality-related outcomes: results of a randomised controlled trial	To assess the efficacy of a health promotion intervention with university hospital employees over 45 years old	Significant increase of physical activity and fruit intake, and reduction of the need to recover after a work day in the intervention group. No effect on ability for vigorous-intensity physical activity, aerobic capacity or mental health	Yoga and training programs, and provision of fruit in the workplace should be considered by employers as means to promote healthier lifestyles
	Sakuma et al. ¹⁶	Effect of a home-based simple Yoga program in child-care workers: a randomized controlled trial	To analyze the effect of a home-based yoga program on the psychophysical state of female child-care workers	Improvements in menstrual pain, sleep disturbances, anxiety and low-back pain	Yoga programs might improve physical and mental symptoms and the general state of health among child-care workers

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Chart 1. Continuation.

Year	Authors	Title	Aims	Results	Recommendations / conclusions
2013	Strijk et al. ²⁵	Effectiveness of a worksite lifestyle intervention on vitality, work engagement, productivity, and sick leave: results of a randomized controlled trial	To assess the efficacy of an intervention on vitality, work engagement, productivity and sick leave	No significant difference in vitality, work engagement, productivity or sick leave between group intervention and controls, but better effects among high yoga compliers	Yoga programs in the workplace might be useful to promote improvements in occupational outcomes and the personal lives of workers, but a high level of adherence is necessary
2014	Barros et al. ²¹	Yoga e promoção da saúde	To analyze self-reported symptoms and well-being among yoga and health promotion program participants	Improvements in self-reported symptoms and perceived well-being among some participants	Yoga is a relevant therapy and promotes health for most people; it increases the self-perception and self-care ability, but effects are not the same for all individuals
2015	Nosaka and Okamura ⁹	A single session of an integrated Yoga program as a stress management tool for school employees: comparison of daily practice and nondaily practice of a yoga therapy program	To assess the effect of daily practice of yoga within a program designed as a stress management tool for school employees	Increased levels of calmness, comfort and cheerfulness, and decrease in cognitive mind and body stress, including physical symptoms, anxiety, insomnia and social dysfunction; these differences were statistically significant between cases and controls	The program was efficacious to reduce stress and promote mental health among school employees

(relative to one and the same intervention), one in India, and one in Brazil.

The studies analyzed specific populations, to wit: musicians, professional computer users, firefighters, university employees, university hospital employees, child-care female workers, and school employees.

Nine of the ten included studies reported favorable results of yoga practice among the analyzed populations; five for all the assessed outcomes¹⁶⁻²⁰, and four for some outcomes²¹⁻²⁴, while the results of one study did not evidence benefits of yoga for any analyzed outcome²⁵.

The studies which found benefits of yoga practice reported reduction of symptoms and undesirable health

conditions, and increase of desirable conditions, with impact on the performance of physical, functional, professional and social activities²¹.

Such studies reported improvements in physical health aspects (flexibility^{17,18,22}, breathing pattern¹⁷, sleep^{16,19}, weight loss, body fat percentage, and diastolic blood pressure²²), pain (menstrual¹⁶, musculoskeletal^{16,17}), psychosocial aspects (physical symptoms¹⁹, stress¹⁷, anxiety^{16,19,24}, tension, depression, irritability²⁴, social dysfunction¹⁹, concentration, resistance and balance¹⁷, comfort¹⁹, calmness^{17,19}, cheerfulness^{19,20}, clear-mindedness, quietness, energy, confidence, life purpose, satisfaction, self-confidence in stressful situations²⁰, feeling

Chart 2. Characteristics of interventions, Campinas, 2017.

Study	Yoga style	Practices implemented	Frequency	Session duration	Intervention duration	Measurement instruments	Additional interventions
Khalsa et al. ²⁴	Kripalu	Postures, meditation, discussion of yoga philosophy and practice, meditation techniques, breathing control and mindful eating	Not reported	Not reported	8 weeks	Performance Anxiety Questionnaire (PAQ), Profile of Mood States (POMS), Performance-Related Musculoskeletal Disorders (PRMD), Perceived Stress Scale (PSS), Pittsburgh Sleep Quality Index (PSQI), visual analogue scale	Discussion of challenges to music performance
Telles et al. ¹⁸	Not reported	Yoga postures (15 minutes), exercises for joints (10 minutes), breathing exercises (10 minutes) visual cleansing exercises (10 minutes) and guided relaxation (15 minutes)	5 days / week	1 hour / day	60 days	Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), hand grip dynamometer, typing speed measurement device, sit-and-reach device for assessment of low back and hamstring flexibility	Not reported
Cowen ¹⁷	Not reported	Breathing exercises, postures and relaxation	Not reported	Not reported	6 weeks	Demographic, behavioral, physical and additional descriptive data, functional fitness assessment instrument and Perceived Stress Scale (PSS).	Not reported
Hartfiel et al. ²⁰	Dru yoga	Not reported	Once per week	60 minutes	6 weeks	Profile of Mood States Bipolar SCALE (POMS-Bi), Inventory of Positive Psychological Attitudes (IPPA)	Guided home 35-minute sessions CD
Thomley et al. ²²	Vinyasa flow	Postures, reflection on philosophical notions, instruction about the benefits of mindfulness, breathing and meditation	6 days / week	1 hour	6 weeks	Biometric measures (height, weight, blood pressure, flexibility, body fat) and quality-of-life measures (physical, emotional and spiritual well-being)	Yoga practice encouraged outside intervention; weekly informative e-mails
Sakuma et al. ¹⁶	Not reported	Not reported	Not reported	Not reported	2 weeks	General Health Questionnaire (GHQ30)	Home practice DVD

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Chart 2. Continuation.

Study	Yoga style	Practices implemented	Frequency	Session duration	Intervention duration	Measurement instruments	Additional interventions
Strijk et al. ^{23*}	Not reported	Not reported	Once per week	Not reported	6 months	General health survey (RAND-36); Utrecht Work Engagement Scale (UWES); World Health Organization Health and Work Performance Questionnaire (WHO-HPQ); Productivity and Disease Questionnaire (PRODISQ); Short Questionnaire to Assess Health-enhancing Physical Activity (SQUASH) Short Fruit and Vegetable Questionnaire; Dutch Questionnaire on the Experience and Evaluation of Work (VBBA); equipment to measure vital signs and aerobic capacity; data collection instruments and equations to calculate costs	Written information on healthier lifestyles; visits to experts; aerobic exercising; guided group training; orientation on unsupervised vigorous-intensity physical activity; free fruit provision
Barros et al. ²¹	Hatha yoga	Introspection and mantra chanting (5 minutes), joint warm-up and breathing exercises (5 minutes), postures (25 minutes), breathing control (5 minutes), relaxation with / without visual cleansing exercises (5 minutes), meditation and mantra chanting (5 minutes), philosophical notions	Twice per week	50 minutes	4 months	Measure Yourself Medical Outcome Profile (MYMOP)	Introductory booklet to the notions and practice of yoga developed by the investigators
Nosaka and Okamura ¹⁹	Integrated yoga	Stress management psychological education program (60 minutes), individual counseling (30 minutes), yoga theory (45 minutes), postures, breathing exercises, relaxation and Indian philosophy-based cognitive structure (45 minutes)	Single session	3 hours	3 months	Subjective Units of Distress for mind and body, Two-Dimensional Mood Scale General Health Questionnaire 28 (GHQ28).	Orientation for daily practice of what they had learned in the program

*Two studies corresponding to one and the same intervention.

of well-being²¹), quality of life²², self-care, (adoption of healthy habits, such as weekly sports practice and fruit intake²³) and job performance (interference by musculoskeletal symptoms¹⁸, need to recover after the work day²³, increased hand grip strength and typing speed¹⁸, and functional fitness¹⁷).

In one study, musculoskeletal discomfort increased and the typing speed decreased in the group that did not receive yoga intervention¹⁸.

Some studies did not find benefits of yoga for some outcomes, such as musculoskeletal symptoms, stress or sleep²⁴, and mental health²³. Other studies did not find statistically significant difference in the systolic blood pressure²², ability to perform vigorous-intensity physical activity or aerobic capacity²³. One study found that yoga practice did not have the same positive effects on all the participants²¹.

One study that analyzed vitality, work engagement, productivity and sick leaves did not find evidence for the efficacy of yoga in any of the analyzed outcomes²⁵.

Low adherence of workers to the indicated intervention programs might interfere with the results of studies²⁶. More expressive results were reported for the higher compliance groups^{16,25}. In one study the participants stated that the results would have been better were them to have had practiced yoga more often¹⁷. These findings suggest that the results depend on the frequency of sessions and strategies to promote adherence among workers.

Aware of the relevance of adherence, a study analyzed how a health promotion program for hospital employees was developed, for which purpose the authors analyzed factors such as context, fidelity, reach, dose delivered, dose received, and participants' attitude. The results showed that taken all the components of intervention together, the reach was just 52%. The authors attributed such low adherence rate to the distance from workplace to the workout sessions, the fact that sessions were provided during lunchtime and after working hours, and that the participants had not been included in the planning of actions; as consequence, they made suggestions to overcome such shortcomings²⁷.

Another study described a partnership between a nursing school and a nursing service management to adopt yoga as model for a health and occupational

well-being program for nurses, and discussed recommendations to ensure the program sustainability over time. The school contributed with the program implementation and research, and the hospital nursing service management with its expertise on communication channels and institutional culture. The authors observed that to ensure their sustainability, well-being programs should include continuous management infrastructure, identification of key-links for implementation, and verification of the main indicators to provide the higher management evidence of the cost-effectiveness benefit of implementation, thus justifying the corresponding financial investment²⁸.

Chart 2 further shows that several studies did not clearly describe the characteristics of the tested programs. In addition, when such characteristics were reported, they differed considerably in regard to yoga style, implemented practices, frequency and duration of sessions, duration of intervention, measurement instruments and concomitant additional interventions. For this reason, a synthesis of the results was possible, but comparisons were not. Future studies might implement similar programs so as to enable comparisons.

Similarly, a study which sought to analyze scientific studies on the efficacy of yoga for management of chronic unspecific low back pain among workers found that the number of such studies was small, most had a small sample size, and variable duration of intervention, thus hindering comparisons. The authors observed that although there were hints indicating that yoga might serve as a therapeutic option, additional research is needed to formulate definitive recommendations²⁹.

CONCLUSIONS

The results of the present review indicate that yoga practice is associated with favorable physical and psychological effects among workers from different professional categories. Therefore it emerges as an integrative and complementary practice that might be adopted in occupational health settings. In addition, results are more satisfactory when strategies to promote the participation of workers are implemented.

However, the analyzed studies described programs with different characteristics, and thus we were able to synthesize, but not to compare the results. This situation points to the

need for additional studies to implement similar programs to enable analysis leading to sound conclusions on the best methods to be used.

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