

Yoga and Sexual Satisfaction: The Role of Practice and Potential Mechanisms of Influence



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Abstract

Objectives: Although the number of evidence on yoga practice and its beneficial effects on health and well-being continue to increase, studies focusing on sexuality are scarce. The present study aims to evaluate the potential role of yoga practice in promoting women's sexual satisfaction. Potential mechanisms explaining this association (stress, mood, mindfulness) were explored.

Methods: The research was conducted through the administration of an online questionnaire to a sample of 224 Italian women aged between 18 and 74 years ($M = 40.03$; $SD = 14.35$). The questionnaire investigated the perceived level of stress, the mood (both positive and negative), mindfulness and sexual satisfaction. Demographic information, general level of health, questions relating to yoga practice (inclusion of meditation, frequency of attendance) were included in the questionnaire.

Results: Participants who practice yoga reported higher levels of sexual satisfaction ($p < .03$); this association was mediated by lower levels of stress ($p < .01$) and a better mood ($p < .05$). Furthermore, yoga practice led to a reduction in negative mood ($p < .01$) and an increase in mindfulness ($p < .05$), which in turn are associated with sexual satisfaction ($p < .05$; $p < .01$). No indirect effect of yoga practice on sexual satisfaction through the mediation of negative mood ($p = .08$) and mindfulness ($p = .06$) were detected. Including meditation in the yoga sessions enhance the benefits of the practice on sexual satisfaction ($p < .05$).

Conclusions: The present study shows the potential impact of yoga practice on sexual satisfaction. Yoga represents a useful and easily applicable practice which can be incorporated into programs promoting physical and psychological health.

Keywords: Yoga; Sexual Satisfaction; Mindfulness; Stress; Mood; Yoga Practice

Introduction

Sexual satisfaction, defined as the satisfaction level experienced in relation to one's own sexual life [1], is recognized as a sexual right from the World Health Organization [2] and represents a fundamental component of psychological and social well-being, especially for women [3,4]. Indeed, greater sexual satisfaction is associated with higher levels of physical and psychological health [5], greater life satisfaction [6] a better quality of life [7] and higher subjective happiness [8]. Research also showed a positive association between sexual satisfaction and a safer sexual life: the greater the satisfaction, the greater the frequency of behaviors such as using of contraceptive methods, protection from sexually transmitted diseases and other preventive behaviors [9-12]. This specific aspect of health is determined by multiple factors included in different socioecological levels: individual (e.g.,

physical, and mental health, stress), microsystem (e.g., quality of couple relationship and sexual functioning, social support) and macrosystem (e.g., cultural values, religion, and spirituality) [13].

Current solutions to improve sexuality and to treat sexual dysfunction are primarily represented by cognitive-behavioral and medical/pharmacological interventions. However, cognitive-behavioral interventions might be economically unsustainable for some people while medical and pharmacological interventions are not always effective in solving the underlying problem [14] and can cause collateral effects [15,16]. Furthermore, past studies on the efficacy of pharmacological treatments for female sexual dysfunctions have not been conclusive [17]. These are the main reasons to start looking for more accessible and versatile interventions aimed at promoting sexual satisfaction: one

possible option is represented by mind-body techniques. Among these techniques, yoga might represent a useful and powerful resource; however, the potential role of yoga in promoting sexual satisfaction is currently under-investigated. The aim of the current study is to evaluate the association between yoga practice and sexual satisfaction and potential processes explaining this association.

Yoga is a mind-body practice born in ancient India that has gained a lot of popularity also in western countries over the past decade [18]. It mainly consists in the combination of physical postures, breathing exercises and meditation [19] aimed at promoting a state of physical and mental health [20] thanks to a greater level of control over the senses, emotions, and thoughts [21]. The growing popularity of this practice is also reflected in the psychological and medical research literature, where the number of studies on the benefits of yoga is progressively rising [22-27]. The literature shows that practicing yoga is associated with reduced levels of stress [25], anxiety [24] and depressive symptoms [24,28,29] as well as with improved quality of sleep [23], physical and psychological health [30], greater self-efficacy [31], self-control and self-awareness [32]. With respect to stress, numerous studies have found a positive effect of yoga practice on the regulation of the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system, which is accompanied by some physiological indicators such as reduced levels of cortisol in saliva [33], slower heart rate and lower systolic and diastolic pressure [34-36]. Furthermore, these benefits are maintained in the long term: yoga practitioners seem to be more resistant to stressful conditions and have a lower risk of developing numerous pathologies, primarily cardiovascular disorders [37].

Although the associations between yoga practice and mental health (e.g., stress, mood, depression) have been extensively investigated, few studies have focused on the benefits of yoga on sexual satisfaction [38-39]. Indeed, most of the studies in this area have been focused on sexual function. Moreover, a review by Rakshith and colleagues (2017) on the association between yoga [postures (asanas), breathing techniques (pranayama), muscle movements/gestures (bandhas and mudras)] and sexual life, underlined that these benefits have been mainly investigated in male populations. For example, Dhikav and colleagues [40] showed that yoga practice can lead to the same or greater improvements in ejaculation time compared to fluoxetine-based treatments (i.e., Prozac). This practice has also been associated with an increased desire level, sexual satisfaction, performance, trust, synchronization with the partner, erection, ejaculation, control, and orgasm in a sample of men aged 24-60 years [41].

Regarding women, a significant improvement has been detected in sexual functionalities following a daily-based training of yoga in a sample of healthy women aged 22-55 years [42]. Moreover, significant enhancements have been noted on arousal

and lubrication in a sample of women with a metabolic syndrome (which is often connected to female sexual dysfunctions) following a two-week intervention during which participants practiced Hatha yoga for one hour twice a week [43]. Although empirical evidence about yoga benefits on sexuality is scarce, a vast non empirical literature is present [39]. According to the theory on which yoga practice is based, sexual dysfunctions are due to vital energy (Kundalini) blocked in the very first or the second chakra, located respectively in the pelvic floor/perineal area and in the reproductive organs/sacral plexus. Yoga practice can free this energy by letting it flow to the higher chakras [44] this should favor an increase in sexual pleasure and in the duration of sexual activity, for example by delaying male ejaculation [45].

A specific technique aimed to reach this objective, is named Moola Bandha and consists in a contraction in perineal muscles similar to the ones obtained with Kegel's exercises [46], having the aim to reinforce the muscles that support vagina, rectum and urethra [47]. Furthermore, Moola Bandha aims to reinforce the activity of the sympathetic and parasympathetic nervous system: besides its physical beneficial effect on both men (e.g. prevention of inguinal hernia) and women (e.g., reduction of physiological difficulties related to sexual activity) [48], the technique has been shown to balance, stimulate and rejuvenate the pelvic floor area thanks to its ability to stretch muscles and improving the circulation [46]. Moreover, although scientific literature on potential benefits of yoga on sexual satisfaction is scarce [42], yoga has been shown to promote multiple components of psychological well-being that are, in turn, associated to higher levels of sexual satisfaction, such as lower levels of stress, higher levels of mindfulness and a better mood [13,49]. Indeed, mindfulness can promote sexual satisfaction through greater emotional regulation which, in turn, promotes better management of some problematic aspects during sexual activity (e.g., self-criticism or anxiety about sexual performance, [50,51]). In addition, by improving the ability to be present in the moment, it has the potential to amplify sexual pleasure [50] and satisfaction toward one's own relationship and sex life [51]. At the same time, reduced levels of stress and a better mood can make it easier to enjoy sexual activity [39, 51-54].

In summary, yoga could be a useful resource to promote sexual satisfaction thanks to its action on several fronts: on the one hand, yoga seems to directly act on the physical health of the body parts involved in sexual activity; on the other hand, by reducing stress, promoting mindfulness and positive emotions it has the potential to increase sexual satisfaction. For these reasons, considering the scarcity of studies investigating yoga in relation to sexual satisfaction (especially among females and in the Italian context), the current study is aimed at investigating whether yoga practice is associated with sexual satisfaction in a sample of Italian women. Potential mechanisms explaining this association (stress, mood, mindfulness) were explored.

Method

Procedure

The research was conducted through the administration of an online questionnaire (created with the platform Qualtrics). Participants were recruited by posting the questionnaire in different social media and with the support of the Italian Iyengar Yoga Association that shared the questionnaire in its newsletter. Informed consent was filled in both at the beginning and at the end of the survey.

Participants

The questionnaire was completed by 224 women aged between 18 and 74 years ($M = 40.03$; $SD = 14.35$). 2.2% of the sample had a post-graduate degree, 30.4% a master's degree, 20.5% had a bachelor's degree, 41.5% a high school diploma, and 3.6% a middle school diploma. About a quarter of the sample (25.4%) reported not have a partner.

Measures

A questionnaire measuring different components of lifestyle and sexuality was created. For the aim of the current study, the following measures were analyzed. Stress. The 10-item Perceived Stress Scale (PSS) [55] was used to measure perceived stress (sample item: "In the last month, how often have you felt nervous and "stressed"?"). For each question, participants were asked to indicate how often they experienced a specific thought or emotion using a 5-point Likert scale (0 = "never"; 5 = "very often"). The total score was computed by adding the scores of each item. Higher scores correspond to higher levels of stress. Since an Italian version was not available, the PSS was translated by two researchers independently, following translation and back translation procedures [56]. The 10-item Perceived Stress Scale showed a good internal consistency ($\alpha = .88$).

Mood. Participants' mood was measured through the Positive and Negative Affect Schedule (PANAS) [57], a scale composed of 10 items assessing positive moods (e.g., relaxed, active) and 10 items measuring negative moods (e.g., irritable, guilty). For each item, participants indicated to which extent they experienced a particular mood during the month preceding the survey, using response categories ranging from 1 to 5 (1 = "very little/not at all"; 5 = "Extremely").

Two final scores were obtained, one for positive and one for negative mood, both obtained by summing up the scores of items included in the two subscales (both ranging from 10 to 50; higher scores indicating higher levels of positive and negative mood). Good internal consistency was found for the two subscales ($\alpha = .91$ and $.88$, respectively). Mindfulness. The Italian version of Cognitive and Affective Mindfulness Scale-Revised [58,59], a 12-item scale, was employed to measure mindfulness (sample item: "It is easy for me to concentrate on what I am doing", "I am able to focus on the present moment"). For each item, the subjects

indicated how often they feel the way described using a 4-point Likert scale (1 = "not at all / rarely"; 4 = "almost always"). The final score was calculated by adding scores of the individual items. The higher the score, the higher the mindfulness level. The CAMS-R showed a good internal consistency in the current research ($\alpha = .85$.)

Sexual satisfaction. Sexual satisfaction was measured through the ego-centred subscale of the New Sexual Satisfaction Scale (NSSS) [60], which is composed by 10 items investigating the levels of satisfaction with different aspect of sexuality (sample item: "My focus/concentration during sexual activity", "The intensity of my sexual arousal") and participants responded on a scale ranging from 1 = "not at all satisfied" to 5 = "extremely satisfied". The final score was computed by summing up the scores of each item: higher scores corresponded to greater sexual satisfaction. Since an Italian version of the scale was not available, the scale was translated by two researchers independently (following translation and back-translation procedures; [56]). The internal consistency of the scale was good ($\alpha = .96$). Health. A single item was used to measure perceived health [61]. "Would you say your health is..." with four possible answers: "excellent", "good", "fair", "poor". Furthermore, questions relating to yoga practice (inclusion of meditation, frequency of attendance) were included in the questionnaire. Participants were also asked to indicate whether they practiced other sports and reported demographic information (gender, sentimental situation, level of education).

Data Analyses

The analyses were carried out using statistical programs SPSS 26 and R. First of all, descriptive analysis of the sample was performed. Subsequently, t-test was used to evaluate the differences in sexual satisfaction between the group who practiced yoga and the group who did not. We also analyzed differences in sexual satisfaction based on the frequency of yoga practice (less than twice a week versus twice a week or more) and on the inclusion of meditation within the practice. Finally, three different path analyses were run (one for each mediating variable) in order to evaluate the potential role of stress, mood and mindfulness in mediating the association between yoga and sexual satisfaction. Age, perceived health, sport and relationship status were included in the models as control variables.

Results

Descriptive Statistics

Descriptive statistics of the variables under study (sexual satisfaction, stress, positive and negative mood and mindfulness) are shown in (Table 1). Regarding yoga practice, 42.4% of participants declared to practice yoga whereas 57.6% of participants did practice other sports or no physical activities. Among those who practiced yoga, 73.5% practiced at least twice a week and 48.5% included meditation in their yoga sessions.

Table 1: Descriptive statistics (mean, minimum and maximum score, and standard deviation) relating to the variables of interest for the research (n = 224).

Variable	M (SD)	Range
Sexual satisfaction	30.89 (10.19)	10 - 50
Stress	19.30 (6.94)	2 - 37
Positive Mood	36.61 (9.71)	15 - 59
Negative Mood	22.69 (7.97)	10 - 47
Mindfulness	32.82 (6.66)	16 - 48

Between Group Comparisons

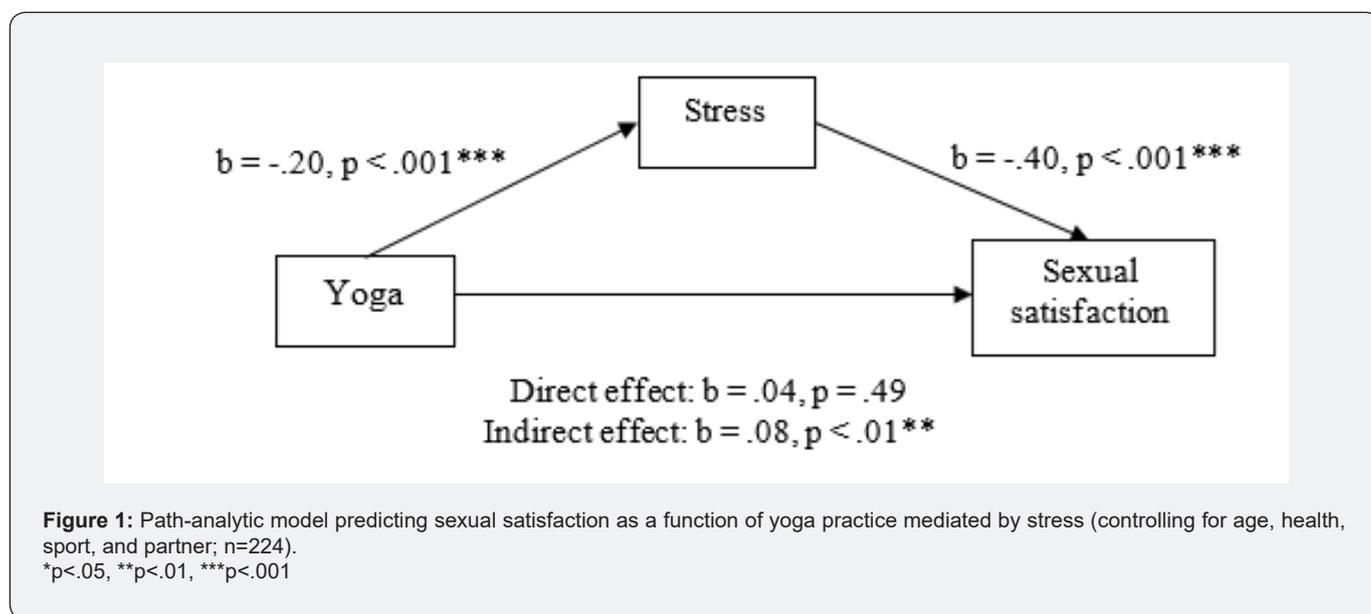
Bivariate analyses investigating the differences in sexual satisfaction based on the yoga practice are presented in (Table 2). The group of women practicing yoga reported a significantly higher level of sexual satisfaction compared to those who did not.

The same happens for those who reported to practice yoga at least twice a week as compared with the group practicing with a lower frequency ($p < .01$). Moreover, participants including meditation in their yoga sessions reported higher levels of sexual satisfaction ($p < .05$).

Table 2: Results of independent samples t-test.

Variable	Group	N	Mean (SD)	P-value	R2
Sexual Satisfaction	Yoga	95	32.63 (10.22)	.028*	0.022
	No yoga	129	29.61(10.01)		
	< 2 a week	18	26.94 (11.22)	.008***	0.073
	> 2 a week	77	33.96 (9.57)		
	Meditation	51	34.59 (10.60)	.044*	0.043
	No Meditation	44	30.36 (9.37)		

* $p < .05$, ** $p < .01$, *** $p < .001$



Path Analyses

The role of stress in mediating the association between yoga and sexual satisfaction (Figure 1) shows the results of the path analysis including stress as the mediating variable in the relationship between yoga and sexual satisfaction (controlling

for age, perceived health, sport, and presence of a partner; the same control variables were included in each model tested). The yoga practice was negatively associated with the level of stress ($p < .001$), which in turn was associated to lower levels of sexual satisfaction ($p < .001$). There was a significant and positive

indirect effect of the yoga practice on sexual satisfaction ($p < .01$): practicing yoga was associated with higher levels of sexual satisfaction through its negative association with stress, while a direct association between yoga and sexual satisfaction was not found. Stress was also negatively associated with age and health ($p < .001$) (i.e., younger participants and participants with worse health reported greater levels of stress). Furthermore, older participants reported a lower sexual satisfaction ($p < .01$) while the presence of a partner was associated with higher levels ($p < .001$). 25% of the variance in stress and 29% of the variance in sexual satisfaction are explained by the model.

The role of mood in mediating the association between yoga and sexual satisfaction (Figure 2) represents the model testing the association between yoga and sexual satisfaction taking into account the mediating role of mood (both positive and negative). Yoga practice was associated with higher levels of positive mood ($p < .01$) which, in turn, showed a positive association with sexual satisfaction ($p < .001$). Consistently, practicing yoga was associated with lower levels of negative mood ($p < .01$), which was negatively associated with sexual satisfaction ($p < .05$). An indirect effect of

yoga practice on sexual satisfaction was found only when taking into account positive mood as mediator ($p < .05$). Both positive and negative mood were associated with age and health level: an increase in age ($p < .01$) and health level ($p < .001$) corresponded to an increase in positive mood. Negative mood, on the other hand, showed a decrement. The model accounts for the 15% of the variance in positive mood ($R^2 = .15$), the 17% in negative mood ($R^2 = .17$) and 31% in sexual satisfaction ($R^2 = .31$).

The role of mindfulness in mediating the association between yoga and sexual satisfactionThe third regression model explored the association between yoga and sexual satisfaction considering mindfulness as a mediating variable. A positive association emerged between yoga and mindfulness ($p < .05$) and between mindfulness and sexual satisfaction ($p < .001$). Despite this, the overall indirect effect of yoga on sexual satisfaction was not significant. Moreover, mindfulness was positively associated with age and perceived health ($p < .001$). The model explained 21% of the variance in mindfulness and 27% of the variance in sexual satisfaction (Figure 3).

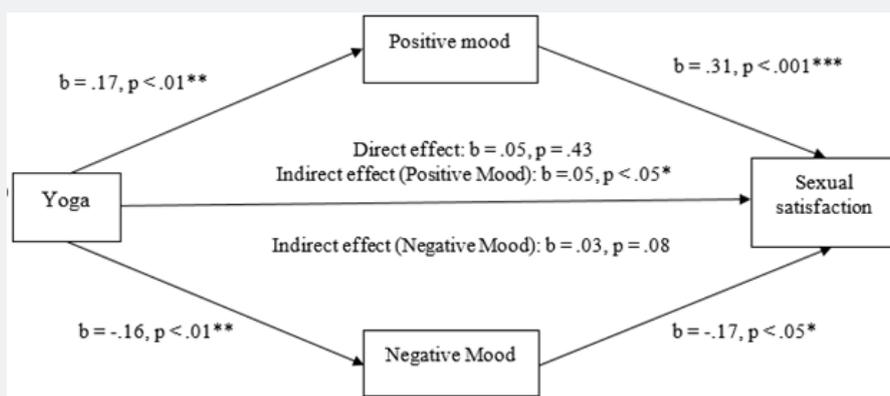


Figure 2: Path-analytic model predicting sexual satisfaction as a function of yoga practice mediated by mood (controlling for age, health, sport, and partner; $N=224$).
* $p < .05$, ** $p < .01$, *** $p < .001$

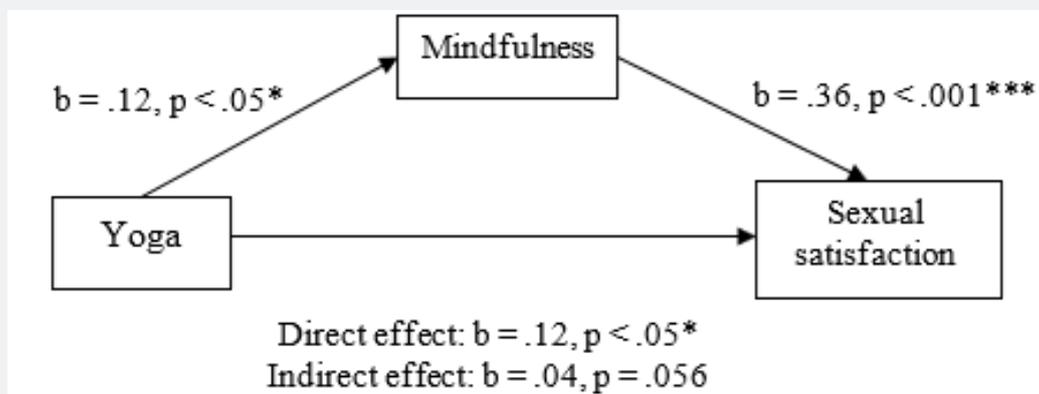


Figure 3: Path-analytic model predicting sexual satisfaction as a function of yoga practice mediated by mindfulness (controlling for age, health, sport and partner; $n=224$).
* $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

The current research was aimed at investigating the role of yoga practice in relation to sexual satisfaction, evaluating the possible mechanisms explaining this association. Overall, our findings showed that participants who practice yoga reported higher levels of sexual satisfaction; this association was mediated by lower levels of stress and a better mood. First, yoga appears to indirectly improve sexual satisfaction by reducing stress, in line with past literature showing the beneficial effects of yoga on stress reduction [25]. Indeed, yoga has been found to decrease cortisol levels in saliva (an indicator of the body's stress level) and to regulate heart rate and blood pressure [33,35,36]. In addition to the alteration of physiological parameters associated with stress, yoga seems to improve the development of adaptive coping strategies. Incorporating yogic breathing in everyday life situations is an example of technique that helps to cope with daily stressors [29,62].

Furthermore, the mediation role of stress in the relation between yoga and sexual satisfaction corroborates the evidence according to which the stress can have an impact on sexual satisfaction [13]. Indeed, stress has been shown to influence sexual satisfaction by negatively impacting sexual arousal [53,54] and creating difficulties in communication with one's partner [5], this, in turn, can lead to lower satisfaction with the sexual relationship. Similarly, yoga seems to have a beneficial indirect effect on sexual satisfaction by promoting positive mood. Indeed, yoga was associated with higher levels of positive mood which, in turn, was linked to higher levels of satisfaction. This result is in line with other studies showing how yoga promotes a state of emotional well-being [63], which is one of the determinants of a satisfactory sexual life [7,52]. On the other hand, the effect of yoga on sexual satisfaction through negative mood was not significant, despite the negative association found between yoga and negative mood and between negative mood and sexual satisfaction. The link between yoga practice and mood finds support in literature showing its role in reducing depressive and anxious symptoms [64-66].

The same thing happens when considering the mediating effect of mindfulness in the relationship between yoga practice and sexual satisfaction: albeit yoga was positively associated with mindfulness, that in turn was related to sexual satisfaction, no indirect effect occurred. This result partially differs from previous findings: yoga is a mind-body practice that emphasizes the importance of paying attention to body sensations and can sustain the concentration on the present moment [67], what in literature is called mindfulness [68]. Masters and Johnson [69] indicated these as important factors for sexuality since they could reduce "spectatoring" (i.e., process of "focusing on oneself from a third person perspective during sexual activity, rather than focusing on one's sensations and/or sexual partner"; [70]) during sexual activity. A higher level of mindfulness could lead to a greater

concentration on sexual activity and on one's own pleasure by promoting the ability to mindfully observe one's own thoughts, recognizing the distracting ones and returning to the present moment [71]. Indeed, women who have high levels of distraction during sexual activity present lower levels of sexual satisfaction [72,73].

All of these findings are in line with the literature suggesting a beneficial effect of yoga on sexual satisfaction. This practice, indeed, improves attention, breathing [74,75] and induces a state of relaxation [35,76], all factors associated with an improvement in sexual response. In relation to the characteristics of the practice, a higher level of sexual satisfaction was found in women who practice yoga more than twice a week and in those who include meditation in their practice. It is possible that spending more time practicing facilitates learning and confidence in the techniques, leading to greater benefits from the practice itself. Additionally, the results suggest the importance of the psychological component of the practice (e.g., meditation) in addition to the physical one, present in any other sporting activity. Those who practice yoga must therefore take into consideration that practicing less frequently and not including meditation might switch the focus of the practice on the physical performance, thus reducing the ability to perceive the mind-body connection.

Overall, our findings show the potential of yoga practice in positively influencing female sexuality (regardless of age, health and the presence of a partner).

Limitations and Future Research Directions

Some limitations need to be underlined. First, a large part of the sample was composed of people who already practiced yoga before the investigation, and this may have influenced research findings. Indeed, individuals who spontaneously decide to practice yoga probably have similar characteristics that differentiate them in some way from the rest of the population. Secondly, only female participants have been included in the study. Sexual functionality differs greatly for men and women and further research is needed to deepen the effect of yoga on sexuality and well-being also in male populations. More accurate tools comparing male and female sexuality are required as an alternative to those already used for the assessment of general sexual functioning. Furthermore, the study participants were not randomly selected and are not representative of the general population of Italian women. Moreover, having administered the questionnaire online (due to the quarantine imposed because of Covid-19) made it possible to reach only people with access to the internet and, in particular, to Facebook.

Randomized-control trials, comparing participants' sexuality before and after a period of yoga practice, would allow to mitigate the impact of variables not related to the practice (e.g., gender, intrinsic characteristics of participants belonging to specific groups, internet accessibility). In addition, the scales used in the

present research were mostly translated from English because of the absence of an Italian validated version. This may have influenced the results, albeit the translation was carried out by two independent researchers and followed translation and back-translation procedures [56]. Finally, the self-administered questionnaire used in the study might also have activated in the respondents a series of bias, such as social desirability. However, considering the sensitivity of the topic, a self-reported questionnaire was considered the most adequate method.

Conclusion and Implications for Practice

Although the number of studies on yoga practice and its beneficial effects continue to increase over the years, studies focusing on sexuality are scarce. Our findings represent a starting point in understanding the relationship between yoga and sexuality in the Italian context. Yoga practice, indeed, proved to be associated to women's sexual satisfaction through the mediation of stress and positive mood. Furthermore, yoga practice led to a reduction in negative mood and an increase in mindfulness, which in turn are associated with sexual satisfaction. Most of the research on this topic is characterized by methodological limitations that prevent from drawing strong conclusions on this technique and its role on health promotion [77-80]. Yoga studies are often carried out mainly in oriental populations, who are already culturally predisposed to mind-body practices also involving spirituality; this could affect the generalization of the findings to Western populations [80].

The results of the present study, combined with those in the literature, underline the potential impact of yoga practice on sexual satisfaction. Yoga is configured as a useful and easily applicable resource even in contexts that are normally little inclined to treat sexuality, first of all the school context. In Italy, emotional and sexual education in schools is not yet mandatory and, indeed, is often opposed or carried out incorrectly. This occurs despite a survey carried out by the Italian National Institute of Health shows that the rate of boys and girls who had sexual intercourse before the age of 15 was 22% in 2018 [81,83]. Yoga practice, moreover, represents a valuable added ingredient in clinical treatments and in programs promoting health and well-being [23,26,82] and could be an effective alternative to standard treatment for sexual impairments. Its basic characteristics, in fact, make the practice of yoga non-invasive, easy to integrate into everyday life [23] and absent from side effects. On the contrary, it has widely demonstrated benefits and impacts positively on people's quality of life, enhancing overall medical and psychological well-being [26,82] especially when accompanied by mindfulness [23].

Declarations

Ethical standards

Approval was obtained from the ethics committee of the University of Padua. The procedures used in this study adhere to

the tenets of the Declaration of Helsinki.

Consent

Informed consent was obtained from all individual participants included in the study.

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