Original Research

Comparative Study on Mental Health Parameters among Yoga and Non-Yoga Practitioners in Older Adults Amidst COVID-19 Pandemic

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Abstract

The COVID-19 pandemic has increased stress and disrupted routines affecting the psycho-social health of older adults, a vulnerable section of the population. Yogic practices have shown the potential to reduce stress, inflammation, and psychological health among other benefits. Hence, we explored the benefits of regular yoga practice on specific key mental health attributes in older adults amidst the pandemic. Using a case-control design, older adults (n = 54) who had been regularly practising yoga for the past six months with Swami Vivekananda Yoga Anusandhana Samsthana were compared in an online survey conducted with age- and gender-matched controls who self-reported themselves as non-practitioners of yoga (n = 52). The participation was voluntary, and the participants were telephonically interviewed for resilience, depression, and perceived stress. Relative to non-practitioners, active yoga practitioners exhibited significantly higher scores of resilience (adjusted mean difference (AMD), 0.19 (95% CI, 0.09 to 0.37); $p < 0.05$) and lower scores in perceived stress (AMD: -9.27 (-10.84 to -7.70); η^2-0.57; $p < 0.05$) and loneliness (AMD: -22.92 (-25.40 to -20.45); η^2-0.77; $p < 0.05$). There were no changes in other mental health markers like geriatric depression and COVID-anxiety. The findings indicate the potential of regular yoga practice to

negate and cope with mental health amidst the COVID-19 pandemic by reducing the perception of stress. The validity of these findings could also be tested and extended in the post-COVID period, to lower mental health scores in older adults.

Keywords

Older adults; COVID-19; resilience; perceived stress; yoga

1. Introduction

The devastating impact of COVID-19 and the associated challenges of social isolation and lockdowns have had a profound effect on individuals across all age groups. Still, older adults have been particularly vulnerable, facing increased health risks and significant disruptions to their daily lives [1]. Besides physical health, the pandemic has a substantial impact on the mental health and overall well-being of older adults worldwide [2-5]. Given their functional dependency and COVID fear-induced probability of precipitation of existing behavioural and psychological ailments, in particular depression and anxiety, older people emerged as a psychologically vulnerable group [6]. The situation was more devastating in India as it is undergoing significant demographic transitions of population aging [7], with recent projections suggesting that adults aged 60 years and over will constitute over 13% of the Indian population by 2031 [8] and are expected to have over 500 million adults aged 60 and over by 2050 [9].

India's aging population has seen a rise in noncommunicable diseases and a decline in familial support due to industrialization and the shift towards nuclear families [10], which left many older adults feeling isolated and lacking the necessary social and emotional support, which led to the development of depression [10, 11]. The pandemic has only served to exacerbate these existing challenges further, as older people have been forced to maintain strict social distancing measures and limit their interactions with loved ones. Moreover, the prevalence of multimorbidity, or the co-occurrence of multiple chronic health conditions, is a growing concern among the elderly in India [12]. These underlying health issues made older adults more susceptible to severe COVID-19 symptoms, further contributing to COVID-19 fear and anxiety. The strict impositions restricting their movements heightened their fear of contracting the COVID-19 infection, increasing perceived stress [13]. The lack of precedence and the novelty of the stress of the pandemic made it difficult for people, especially the elderly, to handle the stress, leading to many psycho-social health consequences and thus emerging as a unique healthcare challenge [14].

Additionally, many older adults possess lower resilience [15], making it more challenging to cope with stress and adapt to the rapid changes brought on by the pandemic. Social isolation due to lockdowns and social distancing measures has resulted in significant feelings of loneliness. In contrast, the disruption of daily routines and loss of social activities have left many older adults feeling aimless and despondent [16]. The grief associated with losing loved ones to the virus has compounded feelings of isolation and depression [17]. Financial concerns and economic stress further exacerbate anxiety and hopelessness [18] as older adults face increased medical expenses and diminished resources.

Thus, addressing the mental health needs of this vulnerable population has become crucial, as all these mental health problems can have far-reaching consequences, including increased risk of mortality and decreased quality of life [4, 19, 20]. Encouraging virtual social connections, engaging in regular physical activity, and practising mindfulness and relaxation techniques can significantly improve mental well-being [21]. Interventions that could foster resilience were deemed one of the most relevant tools to aid older adults in compensating for their loss of functional capacity and mental health [22]. Mind-body interventions have been reported with considerable evidence supporting their beneficial role in physical and mental health-related variables in older adults, particularly resilience [23]. Additionally, the beneficial potential of regular yoga practice was recognized amidst the pandemic. A recently reported systematic review endorses yoga-based interventions that resulted in small to moderate improvements in quality of life and mental well-being in people aged 60+ years [24]. Along similar lines, the trending research amidst the dynamics of COVID-19 also supported the effectiveness of yoga as a nonpharmacological approach for the enhancement of the overall well-being of older adults. It was put forth as a coping strategy [25, 26]. Unlike other interventions, Yoga relies on the holistic principle of uniting the body, mind, and consciousness [27]. As a psycho-somatic practice, it harmonizes various dimensions of life, including the physical, mental, emotional, and spiritual aspects [28]. Through its core pillars—asana (physical postures), pranayama (breathing techniques), and meditation, with or without mantra chanting—yoga fosters an integrated connection between the mind and body [24, 29, 30].

Hence, we undertook a cross-sectional study to understand the influence of yoga on older adults, wherein regular yoga practitioners were compared with non-practitioners for mental health outcomes associated with the pandemic. This cross-sectional study evaluated the association between yoga practice in older adults and the critical mental health variables.

2. Methods

The study was a one-time cross-sectional survey. One hundred and six registered yoga practitioners and age- and gender-matched non-practitioners were recruited from geriatric health programs at Swami Vivekananda Yoga Anusandhana Samsthana, a University for Yoga studies situated in Karnataka, India. Study participants were enrolled via Google Forms for those who were familiar and comfortable with using Information Technology like Google Forms or had someone to assist them in this process, and telephonic interviews for those who cannot access smart apps. The study population comprised older adults >60 years who had access to the internet using social media applications and who were literate and could understand English, Hindi, or Kannada. Participants were approached through telephonic interviews and asked for their willingness to participate in the study. Inclusion criteria were age 60-80 years, male and female gender, and self-reported practice of regular yoga for the past 6 months, with continued practice during the survey. Participants were excluded if diagnosed with chronic ailments, like cancer, neurodegenerative diseases, or psychiatric disorders. The control group consisted of older adults who self-reported no practice of yoga or any other structured physical activity regimen in the past 6 months.

2.1 Assessments

2.1.1 Sociodemographic Data

Age was calculated from date of birth as per the evaluation date. Marital status was categorized into four groups (single/married/divorced/widowed). Education was assessed in years. Employment status was categorized as either currently employed or unemployed. Smoking status was categorized into three groups (Never, Former, Current). Self-reported comorbidities have been noted.

2.1.2 Study Outcomes

Different scales were used to assess different mental health outcomes. The Brief Resilience Scale (BRS) measures self-perceived resilience, with higher scores indicating greater resilience [31]. The UCLA Loneliness Scale (Version 3) evaluates feelings of disconnection, with scores ranging from 20 to 80, where higher scores reflect higher levels of loneliness [32]. The Geriatric Depression Scale (GDS-SF), a 15-item Yes/No questionnaire, categorises depression from normal to severe [33]. The Perceived Stress Scale (PSS) measures stress perception, with higher scores denoting more stress [34]. Lastly, the COVID-19 Anxiety Syndrome Scale (C-19ASS) identifies COVID-19 anxiety syndrome, with higher Likert-scale scores indicating more significant anxiety [35].

2.2 Statistical Analysis

The Statistical Package for Social Sciences Version 21 (SPSS, Chicago, IL) was used for data analysis. Descriptive statistics included frequencies and percentages and means and standard deviations, as appropriate. Differences between groups were explored through chi-squared and T-tests based on categorical and continuous data. Bivariate correlation was performed to assess the relation between variables. Univariate analysis was performed with study outcomes as a dependent variable and adjusted for covariates (age, gender, education, and employment status) to assess the adjusted means of individual groups and the mean difference between practitioners and non-practitioners. Effect sizes (ES) were calculated as partial eta squares (η^2). Additionally, linear regression analysis was performed in order to identify the possible relation of yoga practice with study outcomes. The level of statistical significance was set at $p < 0.05$.

3. Results

The study included 106 participants, 54 yoga practitioners and 52 non-yoga practitioners. As mentioned in Table 1 the average age of the participants was 68.13 years (SD = 5.57), Gender distribution showed 62.26% females and 37.73% males. The mean years of education were 7.66 (SD = 3.34). Employment status showed 44.33% of the participants were currently employed, with 46.29% of yoga practitioners and 42.30% of non-yoga practitioners employed. Marital status was as follows: 1.88% single, 87.73% currently married, 0.94% divorced, and 9.43% widowed or widower, with no significant differences between the groups (p = 0.652). Smoking status indicated that 95.28% had never smoked, 1.88% were former smokers, and 2.83% were current smokers. A total of 49.05% had hypertension, and 70.75% had diabetes mellitus.

Table 1 Demographic characteristics of study participants.

Variable	Total (n = 106)	Yoga practitioners (n = 54)	Non-Yoga practitioners (n = 52)	*p*-value
Age, years, mean (SD)	68.13 (5.57)	67.87 (5.52)	68.40 (5.65)	0.624
Gender, n (%)				
Female, n (%)	66 (62.26)	32 (59.25)	34 (65.38)	0.515
Male, n (%)	40 (37.73)	22 (40.74)	18 (34.61)	
Years of education, mean (SD)	7.66 (3.34)	8.26 (3.28)	7.04 (3.33)	0.060
Employed currently, n (%)	47 (44.33)	25 (46.29)	22 (42.30)	0.679
Marital status, n (%)				
Single, n (%)	2 (1.88)	1 (1.85)	1 (1.92)	
Currently married, n (%)	93 (87.73)	49 (90.74)	44 (84.61)	0.652
Divorced, n (%)	1 (0.94)	0 (0)	1 (1.92)	
Widow/Widower	10 (9.43)	4 (7.40)	6 (11.53)	
Smoking status, n (%)				
Never	101 (95.28)	53 (98.14)	48 (92.30)	
Former	2 (1.88)	0 (0)	2 (3.84)	0.280
Current	3 (2.83)	1 (1.85)	2 (3.84)	
Comorbidities, n (%)				
Hypertension	52 (49.05)	28 (51.85)	24 (46.15)	0.557
Diabetes mellitus	75 (70.75)	37 (68.51)	38 (73.07)	0.606

Data is represented using percentages for categorical variables and mean (standard deviation) for continuous variables; Chi square tests were performed for categorical variables, and Mann Whitney U test for continuous variables. BMI: Body mass index, *p < 0.05.

Table 2 presents correlation analysis between study variables, that revealed significant negative correlation of COVID-anxiety with resilience (correlation coefficient = -0.221, p-value = 0.023) and geriatric depression (correlation coefficient = -0.333, p-value = 0.00). Loneliness scores had negative correlation with resilience (correlation coefficient = -0.206, p-value = 0.034) and positive correlation with geriatric depression (correlation coefficient = 0.240, p-value = 0.13) and perceived stress (correlation coefficient = 0.759, p-value < 0.001).

Table 2 Correlation between the study markers.

Variables		Resilience	COVID Anxiety	Geriatric Depression	Perceived stress	Loneliness score
Resilience	Correlation Coefficient	1	-0.221[*]	-0.011	-0.133	-0.206
	p-value	--	0.023	0.907	0.174	0.034*
COVID Anxiety	Correlation Coefficient	-0.221[*]	1	-0.333	0.083	-0.15
	p-value	0.023	--	<0.001**	0.399	0.109
Geriatric Depression	Correlation Coefficient	-0.011	-0.333	1	0.18	0.240
	p-value	0.907	<0.001**	--	0.064	0.013*
Perceived	Correlation Coefficient	-0.133	0.083	0.18	1	0.759

stress	*p*-value	0.174	0.399	0.064	--	<0.001**
Loneliness	Correlation Coefficient	-0.206	-0.15	0.240	0.759	1
score	*p*-value	0.034*	0.109	0.013*	<0.001**	--

Pearson bivariate correlation was performed to analyse the correlation between study markers. *$p < 0.05$; **$p < 0.001$.

Table 3 explains the univariate analysis. For perceived stress, yoga practitioners had an adjusted mean of 5.94 (95% CI: 4.85 to 7.03), whereas non-yoga practitioners had 15.21 (95% CI: 14.10 to 16.35), resulting in an adjusted mean difference of -9.27 (95% CI: -10.84 to -7.70) with a significant F-value of 137.18 and a partial eta square of 0.57. For COVID anxiety, yoga practitioners had an adjusted mean of 23.87 (95% CI: 21.48 to 26.26). In comparison, non-yoga practitioners had an adjusted mean of 23.61 (95% CI: 21.17 to 26.04), leading to an adjusted mean difference of 0.26 (95% CI: -3.18 to 3.71) and a non-significant F-value of 0.02 with a partial eta square of 0.00. On the geriatric depression scale, yoga practitioners had an adjusted mean of 4.91 (95% CI: 4.12 to 5.71). Non-yoga practitioners had an adjusted mean of 5.06 (95% CI: 4.25 to 5.87), yielding an adjusted mean difference of -0.15 (95% CI: -1.29 to 0.99) and a non-significant F-value of 0.06 with a partial eta square of 0.00. For the resilience scale, yoga practitioners had an adjusted mean of 3.27 (95% CI: 3.14 to 3.40), compared to 3.08 (95% CI: 2.95 to 3.21) for non-yoga practitioners, resulting in an adjusted mean difference of 0.19 (95% CI: 0.09 to 0.37) with a significant F-value of 4.34 and a partial eta square of 0.04. Finally, on the loneliness scale, yoga practitioners had an adjusted mean of 15.05 (13.34 to 16.76), compared to 37.98 (36.23 to 39.73) for non-yoga practitioners, resulting in an adjusted mean difference of -22.92 (-25.40 to -20.45) with a significant F-value of 338.58 and a partial eta square of 0.77. Effect sizes through Cohen's d show the large effect in perceived stress, followed by minor effects in resilience, geriatric depression and COVID anxiety.

Table 3 Mean changes across the practitioners and non practitioners.

Variables	Adjusted Means (95% CI)		Adjusted Mean Difference (95% CI)	F-value, η^2	Cohen's d
	Yoga practitioners	Non-yoga practitioners			
Perceived stress	5.94 (4.85 to 7.03)	15.21 (14.10 to 16.35)	-9.27 (-10.84 to -7.70)	137.18, 0.57**	1.52
COVID anxiety	23.87 (21.48 to 26.26)	23.61 (21.17 to 26.04)	0.26 (-3.18 to 3.71)	0.02, 0.00	0.03
Geriatric Depression	4.91 (4.12 to 5.71)	5.06 (4.25 to 5.87)	-0.15 (-1.29 to 0.99)	0.06, 0.00	0.05
Resilience	3.27 (3.14 to 3.40)	3.08 (2.95 to 3.21)	0.19 (0.09 to 0.37)	4.34, 0.04*	0.40
Loneliness scores	15.05 (13.34 to 16.76)	37.98 (36.23 to 39.73)	-22.92 (-25.40 to -20.45)	338.58, 0.77**	1.75

Data are presented as mean (standard deviation); Group differences in the study outcomes were analysed by univariate general linear model adjusted for other study covariates (age, gender, employment status, education). Effect sizes are mentioned as partial eta square (η^2). Cohen's d is calculated as dividing the mean difference by the standard deviation of dataset. *$p < 0.05$, **$p < 0.001$.

4. Discussion

The advent of COVID-19 gave us a platform to understand the real-time influence of yoga on the mental health of older adults amidst the pandemic. This article presents exploratory findings of a study conducted to find the effect of continued yoga practice on mental health factors in an older adult cohort amidst the pandemic. In the analyzed cohort, yoga had a profound positive influence on perceived stress, loneliness scores, and resilience. However, this should be further confirmed by long-term studies.

The study results align with previous analyses highlighting yoga modules as integrated mindfulness-based practices that harmonize the body, mind, and breath. This holistic approach positively influences physiological, psychological, and social functioning, fostering a comprehensive state of homeostasis across various aspects of individual well-being [36].

There is an indication that a six-month-long yoga-based intervention is beneficial in improving mental health parameters, like resilience, and reducing loneliness and stress in older people [37]. The results of this study align with other studies evidencing the benefit of yoga practices in improving resilience [38] and reducing stress, re-establishing the balance of the HPA axis (hypothalamo-pituitary-adrenocortical) [39]. Yoga may play a significant role in addressing the psychosocial aspects and recovery of COVID-19 patients who have experienced isolation and disengagement, particularly by helping to manage feelings of anxiety [40]. Evidence suggests that stress, anxiety, and depression can increase susceptibility to viral upper respiratory infections, supporting the biologically plausible association between psychological distress and a weakened immune response to COVID-19 infection [41].

Resilience termed the result of complex, multidimensional processes having interactive mental health and biological factors, is an adaptive mechanism to cope with stress and other adverse conditions and maintain physiological and psychological balance [42]. It has also been reported to play a buffering role in mental health issues in older adults against the effects of multiple mental health markers [43]. We attribute these findings to the mindfulness of yoga-based practices in improving resilience and reducing stress. The mindfulness component of the yoga intervention has been reported to promote resilience by facilitating self-awareness to make coping strategies more flexible in managing negative emotions and crises during the pandemic [44]. Biologically, the resilience-building attribute of yoga could be explained by enhancing autonomic balance, relaxation, better emotional status, and behavioural changes concerning self-care [45]. Moreover, the correlations between the study outcomes (Table 2) underscore the importance of resilience as a protective factor against COVID-19 anxiety and loneliness. Hence, our findings imply that yoga-based interventions could alleviate mental health via resilience.

Breath control (pranayama) regulates the autonomic nervous system, calming the "fight or flight" response through vagus nerve activation and improved heart rate variability [46]. Physical postures (asanas) release muscular tension, lower cortisol levels, and stimulate endorphin production, promoting physical and emotional balance [47]. Meditative practices (dhyana) reduce amygdala reactivity, enhance prefrontal cortex function, and foster mindfulness, enabling better emotional regulation and adaptive coping [48]. Together, these practices harmonize physiological and psychological systems, creating a holistic foundation for stress reduction and resilience. Together, these would contribute to understanding the mechanistic explanation of the influence of yoga on mental health. The study also highlights the relation of loneliness with other health outcomes like

perceived stress and depression (Table 2), suggesting the need for integrated mental health interventions that address both emotional and social well-being. Furthermore, the strong association between COVID-19 anxiety and depression suggests that mental health efforts in the context of the pandemic should focus on alleviating anxiety to prevent or reduce depressive symptoms.

The study is limited by the cross-sectional nature of its design, and the self-selection of participants into yoga or non-yoga groups limits causal interpretations. Additionally, the reliance on self-reported data could have affected the accuracy of responses as these are subjective markers. Future studies consider incorporating objective measures or informant reports to complement self-reported data. Unfortunately, we did not collect detailed information on the control group's daily activities, such as whether they were sedentary or engaged in unstructured physical activity. We acknowledge this as a limitation of the study. Future studies could incorporate this information to provide a more comprehensive understanding of the factors influencing mental health outcomes. As the survey was administered through Google Forms, this could be a limitation for older populations since they sometimes face challenges with technology. Yoga is not usually practised by individuals with physical disabilities and those with hearing and visual impairments, which reduced the generalizability of yoga as an intervention for improving mental health markers in several disadvantaged groups. There have been pandemics before the COVID-19 pandemic, and possibilities of more in the future. The most promising and encouraging aspect of the study is that yoga significantly improved the mental health parameters in the older adult population.

Author Contributions

SR contributed to data collection, analysis, and writing of the manuscript. AS contributed to data collection, analysis, and writing of the manuscript. MNK supervised the study and contributed to the review of the manuscript. VM conceptualized the study and contributed to the writing and review of the manuscript.

Competing Interests

The authors have declared that no competing interests exist.

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