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Role of Yoga on Sleep and Quality of Life among Elderly.

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Abstract

In the elderly, the majority of health problems are addressed by health care. However, sleep and quality of life in old age are overlooked while managing old age challenges. The present study aimed to do a literary review to find the role of Yoga on sleep and quality of life among the elderly and to conduct a prospective pilot study aimed to assess the sleep quality and quality of life among elderly with mild cognitive impairment (MCI). In a thorough review on Google scholar and pub med, we come across a total of 20 clinical trials which assessed sleep and/or quality of life. In the prospective pilot study, twenty-seven community-dwelling elderly (aged 62.22±6.01, male-14) having MCI were recruited. Weekly, six sessions of Integrated Yoga (IY) were administered to all the participants for eight weeks. Each session was of 60 minutes. Assessment for MCI was done by using Montreal Cognitive Assessment (MoCA). Participants were assessed before and after intervention for change in sleep quality by using the Pittsburgh Sleep Quality Index (PSQI) and quality of life by Quality of life scale (CASP-19). A Shapiro-Wilk test shown significant improvement in Sleep quality W(26) = -3.76, P= 0.001, and quality of life W(26)= -4.29, P=0.001 at the end of eight weeks, compared to baseline scores. We conclude that Yoga intervention is an effective and potential tool to enhance sleep quality and quality of life among the elderly. However, generalizations of results have limitations. Further studies with strong methodology, large sample size and active control group, and objective outcomes might add value to this work.

Keywords: Yoga, Geriatric care, Cognitive impairment, Mind-body medicine, Sleep, Quality of Life

1 Introduction

Aging is a natural and multidimensional process. Throughout the process of aging, there is gradual, progressive deterioration in physiological and physical functions [1]. As per the World Health Organization report on aging and health globally, peoples aged 60 years and above in 2015 were 901 million, and it will increase up to 2.1 billion in 2050; this number is more than double by 2050[2]. Loss of adaptive response to different stresses in the life that in turn increases the risk of progression of aging and age-associated diseases[3]. Increased age is a major risk factor for many disorders in old age[4]. Among the elderly cognitive decline is one of the major health challenges. It affects

activities of daily living and leads to poor quality of life and well-being. The overall prevalence of cognitive impairment among the elderly varies between 10% to 34%[5-6]. Another common complaint among the elderly is disturbed sleep. The prevalence of poor quality of sleep among the elderly is varied in different epidemiological studies. Sleep disturbance has a multi-factorial etiology in old age. Poor sleep initiation, maintenance, and increased daytime napping are the issues of sleep in aging. Epidemiological studies in the elderly reported that the prevalence of poor quality of sleep was 62.4% in Thailand[7], elderly adults living in urban china were 41.5%[8], and 16.6% among Mexican Americans elderly[9]. Poor quality of sleep has negative effects on physical and mental health[10-11]. Cognitive impairment and sleep are positively associated. Evidence supports that disturbed sleep or poor quality of sleep is a major risk factor for cognitive impairment[12-14]. The elderly with cognitive impairment are at high risk of developing dementia or Alzheimer's disease. So managing the risk factors of cognitive impairment will reduce the disease progression. Disturbed sleep as a major risk factor for cognitive impairment is often overlooked. Cognitive impairment and disturbed sleep have a negative impact on well-being and quality of life among the elderly[15-16]. Pharmacological interventions are available for disturbed sleep[17]. However, their use is associated with side effects and misuse[18-20]. In recent times, mind-body interventions for disturbed sleep are widely used. The most commonly used mind-body interventions are Yoga, mindfulness meditation, biofeedback, guided imagery, hypnotherapy, qi gong, and tai chi[21-22].

1.1 Sleep and Health- Ancient literature review

Ayurveda gives importance and wide explanation about sleep. It is one of the pillars of life. According to Acharya Charak and Vagbhata, health and well-being are influenced by Sleep[23-24]. In diseased conditions, sleep quality degrades. Also, sleep is disturbed, or decreased hours may lead to various illnesses. If sleep is disturbed, then it is called nidravikara by Acharya Madhav in Madhav Nidanam. He explained various symptoms of disturbed sleep like lack of attention, mental and physical tiredness, and fatigue [25]. As age increases, age-associated illnesses also impact the quality of sleep among the elderly. As per Bhagavad Gita, moderation in sleep can bring well-being and mitigate all suffering of life along with practicing Yoga[26]. Chhandogya and Mandukya Upanishad explain sleep. In deep sleep, the mind is withdrawn from senses, and Atma (Sloe) does not have a desire for anything and does not dream anything. This state is called suptavastha[27-28]. Suptavastha is also called unconscious Trans state, where the body-mind rest and rejuvenates itself. Hence proper sleep is essential for healthy living and for good quality of life.

1.2 Role of Yoga on sleep and quality of life among elderly – evidence-based literature review

Yoga is the oldest spiritual practice evolved in India. In recent times, it gained global recognition due to its health benefits. Commonly Hathyoga practices are used for health promotion and as Yoga therapy. It comprises Kriya (cleansing technique), Asana (body postures), Pranayama (regulated breathing), Dharana, and Dhyan (Meditation). Yoga is a major complementary and alternative practice. It improves physical, mental, and spiritual health. Scientific studies have reported the usefulness of Yoga in various non-communicable diseases [29]. It is also capable of promoting positive health [30]. Yoga enhances psychological health, and it improves stress, depression, anxiety, cognition [31-32]. Clinical trials have reported, Yoga improves sleep and quality of life in various populations. To know the impact of Yoga on sleep and quality of life among elderly we conducted

literature review from the inception to till date on electronic databases such as Pub Med and Google scholar. We found a total of 20 clinical trials which assessed sleep and quality of life among the elderly [33-52]. Of 10 trials, were on sleep quality and seven trials on quality of life among the elderly. 3 trials were assessed both sleep and quality of life [39-41].

Out of 13 studies on quality of sleep, 6 were RCTs, one was a controlled trial, one was a cross-sectional study, and 5 were pre-post trials (see table No. 1). Among 6 RCTs, only two RCT had active intervention control group [36&45]. 5 trials recruited elderly had a various chronic illness like depression, Parkinson's disease, cancer, osteoarthritis, and other Non-communicable diseases [36-39&42]. The age range of the elderly was between 55 to 90 years of age. The type of Yoga interventions and yoga protocols were varied in all the studies. Ten trials were used Pittsburg Sleep Quality Index (PSQI) tool to assess sleep quality. Three trials used the Insomnia rating scale, visual analog scale, and self-rated sleep questionnaire [34,39&45]. All 13 studies showed a positive impact on sleep irrespective of health condition, type of yoga intervention, and delivery protocol among the elderly.

Out of 10 studies on quality of life, 5 were RCTs, three were controlled trials, one cross-sectional and one pre-post trial [see table No.2] 4 trials have active control group [39,46,49&55], and five trials had wait-list or passive control group [40,41,47,48&50]. Three studies recruited only female participants [48,49&51], while 7 studies had both male and female elderly participants. Various types of yoga intervention like hath yoga, Thai Yoga, Adapted yoga program, Classical Yoga, validated yoga module, Yoga Exercise, Iyengar Yoga were used. The period of yoga intervention was varied from 12 weeks to 2 years. The duration of yoga sessions was varied from 60 to 90 minutes in different studies. Except for one, all the studies have reported significant improvement in quality of life among the elderly. This literature review shows that Yoga has the potential to enhance sleep and quality of life among the elderly.

Table no.1 Literature review – Effect of Yoga on sleep among elderly

Sr. No	Study Title	Type of study	Population	Sample size	Age range	Type of Yoga Intervention	Yoga protocol	Sleep Assessment tool	Outcome
1	Shree Ganesh HR et al./2021[33]	RCT	Community-dwelling elderly	96	60 - 75	Validated Yoga Protocol	60 min/3 days per week for 12 weeks	PSQI	The yoga group has significant improvement in sleep quality compared to wait-list control.
2	Hastuti H et al./2021[34]	Pre-Post trial	NM	13	-	Gymnastics Yoga	Not mentioned	IRS	There is a significant improvement in insomnia among elderly
3	Grace PH et al./2020[35]	Pre-Post trial	Elderly living in the elderly care home	38	60-85	Yoga Exercise	8 week (session details not maintained)	PSQI	There is a significant improvement in sleep quality among elderly
4	Wahbeh H et	RCT	Elderly with	30	55–90	iRest meditatio	2-day retreat followed by 20	PSQI	Improvements in sleep impairment in older

	al./2019[36]		depression symptoms			n	min home practice for 6 weeks		adults compared to the music control group
5	Memarian A et al./2017[37]	RCT	Elderly with Parkinson's disease	24	55 to 75	Laughter Yoga	45 min/for 2 days per week for 8weeks	PSQI	Significant improvement in sleep quality in the Laughter Yoga group compared to the routine activity control group.
6	Hegde A et al./2017[38]	Pre-Post trial	Elderly with a chronic health problem	28	60-80	Integrated Yoga	60 min/6 days per week/ for 4 week	PSQI	Yoga practice significantly improved sleep quality.
7	Yagli NV et al/2015[39]	Controlled Trial	elderly with cancer	20	65-70	Classical Yoga	60 min/weekly once for 8 weeks	VAS	Significant improvement in sleep quality in Yoga group compared to the exercise group.
8	Haripras ad VR et al./2013[40]	RCT	Elderly living in the elderly care home	120	60 and above	Validated yoga module	60 min/daily for 4 weeks /weekly once for 12 weeks followed by 12 weeks home practice	PSQI	Yoga significantly improved the overall sleep quality of elderly living in old age homes compared to wait-list control.
9	Bankar MA et al./2013[41]	cross-sectional study	Community-dwelling elderly	65	60 and above	Yoga Exercise	60 min/daily/ for 2 years or more	PSQI	Long-term practice of Yoga exercises by elderly people is associated with less sleep disturbances and good sleep quality.
10	Taibi DM et al./2011[42]	Pre-Post trial	Women with osteoarthritis and symptoms of insomnia.	13	55–85	General Yoga	75 min/weekly once for 8 weeks and 20 min daily home practice	PSQI, ISI, ESS	Only Insomnia Severity Index was significantly improved.
11	Chen KM et al./ 2010[43]	Pre-Post trial	Elderly living in the elderly care home	69	65 and above	Silver Yoga	70 min/ / 3 days per week for 24 weeks	PSQI	Silver yoga improves sleep quality.
12	Chen KM et al./2009[44]	RCT	Community-dwelling elderly	128	60 and above	Silver Yoga	70 min/ 3 days per week for 24 weeks	PSQI	Sleep was significantly improved after the silver yoga practice compared to the control group.
13	Manjunath NK at al./2005[45]	RCT	Elderly living in the elderly care home	69	60 and above	Integrated approach of Yoga	60 min/6 days per week for 24 week	SRQ	Self-rated sleep assessment was significantly improved in Yoga than Ayurveda - rejuvenating tonic and wait-list control group.

NM- not maintained, RCT-Randomized control trial, PSQI- Pittsburg Sleep Quality Index, VAS-visual analog scale, ISI-Insomnia Severity Index, ESS-Epworth Sleepiness Scale, SRQ- sleep rating questionnaire

Table no. 2 Literature review – Effect of Yoga on quality of life among elderly

Sr. No	Study Title	Type of study	Population	Sample size	Age range	Type of Yoga Intervention	Yoga protocol	Quality of life assessment tools	Outcome
1	Noradechanunt C et al./2017[46]	RCT	Sedentary elderly	39	60 and above	Thai Yoga	90 min/weekly twice for 12 weeks	SF-36	Thai Yoga improved quality of life in older adults significantly than Tai Chi, or Counseling.
2	Tew GA et al./2017[47]	RCT	Sedentary elderly and multiple comorbidities	52	60 and above	Adapted yoga program	75 min session/10 sessions over 12 weeks	Health status and WEMWBS	Yoga group had better self-reported health status and mental well-being compared to wait-list control.
3	Yagli NV et al./2015[39]	Controlled Trial	Elderly with cancer	20	65-70	Classical yoga	60 min/weekly once for 8 weeks	NHP	Yoga significantly improves the quality of life in the elderly with breast cancer compared to the exercise group.
4	Haripras ad VR et al./ 2013[40]	RCT	Elderly living in the elderly care home	120	60 and above	Validated yoga module	60 min/daily for 4 weeks /weekly once for 12 weeks followed by 12 weeks home practice	WHOQOL-BREF	Yoga significantly improves all the domains of QOL compared to the wait-list control group.
5	Bankar MA et al./2013[41]	cross-sectional study	Community dwelling elderly	65	60 and above	Yoga Exercise	60 min/daily/ for 2 years or more	LEIPAD	Regular Yoga exercises improve QOL significantly than the passive control group.
6	Gonçalves LC et al./ 2011[48]	Controlled Trial	Relatively healthy elderly women	83	62-81	Hath yoga	60 min/weekly twice for 14 weeks	WHOQOL Old	In Yoga group a significant improvement in QOL, than in the control group.
7	Tüzün S et al./ 2010[49]	Controlled Trial	postmenopausal osteoporotic women	26	55-85	Hath yoga	60 min/weekly twice for 12 weeks	QUALEFFO	Yoga enhances QOL significantly than classical exercise.
8	Greendale GA et al./	RCT	Elderly with kyphosis	118	60 and abov	Hath Yoga	6o min/3 days per week for 24 weeks	HRQOL	Yoga practice did not improve HRQOL compared to the

	2009[50]				e				control group who got monthly luncheon and seminar and mail.
9	Mastrangelo MA et al./2007[51]	Pre-Post Trial	Menopausal elderly women	6	44-62	Iyengar Yoga	71 min/weekly twice for 8 weeks with home practice	MSQOL	Yoga practice significantly improves QOL.
10	Oken BS et al./2006[52]	RCT	Healthy elderly	135	65–85	Iyengar Yoga	90 min /weekly once for 24 weeks with home practice	SF-36	Significant improvement in quality of life in yoga group compared to walking exercise class or wait-list control.

RCT-Randomized control trial, QOL- Quality of Life, SF 36- Short-Form 36 Health Survey, WEMWBS- Warwick-Edinburgh Mental Well-being Scale, NHP-Nottingham Health Profile, WHOQOL bref-World Health Organization Quality of Life, LEIPAD- Quality of Life Leiden-Padua Questionnaire, WHOQOL Old- World Health Organization Quality of Life old questionnaire, QUALEFFO- Quality of Life Questionnaire of the European Foundation for Osteoporosis, HRQOL- Self assessed health-related quality of life, MSQOL- Menopausal Specific Quality of Life survey.

Sleep, cognitive impairment, and quality of life are associated with each other. If either of these deteriorates, have a negative impact on health in susceptible population like elderly. Among the elderly with various health conditions Yoga interventions have a positive impact on sleep and quality of life. However, no study has assessed the impact of Yoga on sleep and quality of life among elderly who have mild cognitive impairment. Hence this prospective pilot study was conducted to investigate the effect of Yoga on sleep and quality of life among elderly with MCI.

2 Materials and Methods

2.1 Participants

Community-dwelling elderly aged between 55 and 80 years were recruited in this study.

2.2 Eligibility criteria

Elderly having MCI. Those elderly were able to read, write English, Hindi, or both languages. Participants who were able to do yoga asana and other practices were included in this trial. Both males and females were considered for this study. The elderly with a history of psychiatric disorder or chronic neurologic disease were excluded. Besides this, those who were on antipsychotic or similar drugs, elderly those who are finding it difficult to perform Yoga postures were excluded from this study.

2.3 Settings and design

This was an uncontrolled pre-post study. For the recruitment of the Participants, banners were placed in the public visiting areas and advertisements given in the newspaper. After contacting interested elderly people, they were screened for eligibility. To screen cognitive impairment, Montreal Cognitive Assessment (MoCA) tool was used[53]. The administration time of MoCA is nearly 10 minutes. The maximum total score of MoCA is 30 points. A score of 26 or more is considered normal. It has a high test-retest reliability and an interclass correlation coefficient of 0.87.

2.4 Ethical Considerations

The institutional ethics committee of Swami Vivekananda Yoga Anusandhan Samsthan was reviewed and approved this study (RES/SVYASA/117/2017). The trial of the research was explained to all the participants, and written consent was obtained from all the participants.

3 Outcome Variable

Pittsburg sleep quality index (PSQI)[54]: This is a self-rated paper-pencil test designed to assess overall sleep quality. The questionnaire has open-ended and likert-type questions. The questionnaires have nine items or components. Of these scores are derived for seven components. Each item scored 0 (no difficulty) to 3 (severe difficulty). The summation of all items gives the total score. It ranges from 0 to 21. Higher scores indicate lower sleep quality. Cronbach alpha for PSQI is 0.83.The test-retest reliability of this test is 0.85. The sensitivity and specificity are 89.6% and 86.5%, respectively.

Quality of life Scale (CASP19)[55]: CASP has 19 items and has four domains. The domains are control, autonomy, pleasure, and self-realization. The internal consistency of the test (Cronbach's alpha) is between 0.6 and 0.8. Test item describes the life in old age and how they feel. The score for each item is between 0 to 3.

4 Intervention

An Integrated Yoga module was used as an Integrated Yoga intervention. Before finalizing the practices for the elderly the module was discussed with Yoga therapy experts. Weekly, six yoga sessions were administered to all participants for eight consecutive weeks. Each session was of 60 minutes. A trained yoga expert administered Yoga practices. Integrated Yoga module consisted of the following practices. 1) Everyday session was started with starting and closing prayer. 2) Loosening and strengthening practices for major body joints for 15 minutes. 3) Breathing exercises for 5 minutes. 4) Asanas (Hat yoga asana for beginners) for 20 minutes. 5) Pranayama (yogic regulated breathing) for 10 minutes. 6) OM chanting and lastly guided deep relaxation technique each for 5 minutes.

5 Data Collection

Pre-data was collected one week prior to the yoga intervention, and post-data was collected at the end of eight weeks of intervention. A trained psychologist administered this instrument to the participants before the data extraction.

6 Statistical analysis

To assess the normality of the data Shapiro-Wilk test was used. The data were not normally distributed. Hence nonparametric Wilcoxon Signed Ranks test was used to compare before and after Yoga intervention. Demographic details were reported using descriptive statistics.

7 Results

Total 51 elderly people were screened for eligibility. Then they were assessed for mild cognitive impairment on MoCA. The scores less than 26 were considered for mild cognitive impairment. After screening, 30 elderly were recruited in the study. Three participants were dropped out before the completion of the study. The reasons for their drop out were was that two participants were forced to travel outside the geriatric home by the family members, and one participant was finding it difficult to follow class time. None of the participants had any side effects while practicing Yoga techniques throughout the intervention period. Demographic details, history of known illness, and cognitive impairment scores of MoCA of all the participants were recorded and given in Tables 3 and 4. After eight weeks of the Yoga Practice, there was a significant improvement in the quality of sleep ($P \leq 0.001$; 28.5%) and quality of life ($P \leq 0.001$; 11.7%) compared to baseline among elderly with MCI. Table 5 given the comparison of PSQI and CASP-19 before and after the Integrated Yoga Practice.

Table 3: Demographic Details of study participants

Yoga group Demographics		**(n=27)**
Age in years		62.22±6.01
Gender	Male	14
	Female	13
Education in Years		10.30±3.68
BMI		26.70 ±4.41
Participants having number of illness		1.52±1.09
Montreal Cognitive Assessment		19.14±3.78

Mean ± Standard deviation

Table 4: Participants having type and number of illness

Type of illness	**n=27 (%)**
Hypertension	11 (40)
Diabetes Mellitus	8 (30)
Heart Disease	2 (7)
Dyslipidemia	2 (7)
Joint Pain	10 (37)
Other illnesses	6 (30)

Table 5: Effect of eight week Yoga intervention Sleep and quality of life

Sr. No	Variables	Mean ± SD		Z –value[a]	p-Value	% change
		Pre	Post			
1	PSQI	4.81±2.84	3.44±2.06	-3.76	0.001[b]	28.5
2	CASP-19	45.19±7.08	50.48±6.10	-4.29	0.001[b]	11.7

[a]Shapiro-Wilk test, [b]P ≤0.001, PSQI, Pittsburg sleep quality index; CASP-19, Quality of life in elderly

8 Discussion

In the present study, we reported that sleep is important pallor of healthy life as per Vedic scripture. In a thorough scientific literature review, we found 17 clinical trials of these 10 were RCTs assessed sleep and/or quality of life in the elderly. The various type of Yoga interventions for elderly with health conditions supports that Yoga practice has a positive impact on sleep and quality of life. Hence, Yoga can be implemented as a non-pharmacological lifestyle intervention among the elderly for sleep enhancement and well-being. We also conducted a prospective pilot study to assess sleep and quality of life on 27 elderly with MCI has shown the effectiveness of Yoga intervention. Previously, in a randomized control trial, 120 elderly were divided into Yoga and wait-list control group. The Yoga intervention was given to the experimental group daily for one month and then weekly once for here months. After this, participants were asked to do self-practice for two months. There was significant improvement after six months in sleep and quality of life compared to control[40]. Another cross-sectional study done by Bankar MA et al., 2013 reported that the elderly Yoga participants practicing Yoga for more than two years have a better quality of sleep and quality of life as compared to the control group[41]. Both the studies had a long-time intervention, and recruited participants did not have any neuropsychiatric issues. Whereas, in our study, the Yoga intervention was given two months weekly, six days for one hour. And recruited participants have

MCI. Our study was an uncontrolled trial. With this intervention, there was a significant improvement in sleep quality and quality of life. A systematic review and meta-analysis conducted by Wang W et al., 2020, reported that Yoga is effective among insomnia women. Post-menopausal/elderly women have more benefits through Yoga[56]. Our findings are also in line with previous research evidence.

The exact mechanism of Yoga on sleep is not well established. However, the researchers postulate that Yoga enhances physical strength, enthusiasm, energy, and a more balanced feeling[57]. This may enhance the quality of life. In addition to this, Yoga reduces physical, psychological stress and reduces the disruption of daily activities[58]. Also, Yoga Practices were reported to reduce sympathetic activity and enhance parasympathetic activity, which in turn modulates the hypothalamo- pituitary-adrenal (HPA) axis response to stress[59]. This could be elongating the sleep stage[60] and shortening the latent period, led to enhance the sleep quality.

Limitations of the study: In the present study, we have conducted a literature review, but to have a conclusive outcome need systematic review and meta-analysis. A prospective study on the elderly with MCI was an uncontrolled pre-post trial and having a small sample size. Further randomized control trials with a large sample size are needed to have a definite conclusion. The duration of intervention should be longer. Objective measures in future studies like- sleep study biomarkers along with objective measures would be assessed in future studies.

9 Conclusion

We conclude that Yoga intervention is an effective and potential tool to enhance sleep quality and quality of life among the elderly. However, generalizations of results have limitations. Further studies with strong methodology, large sample size and active control group, and objective outcomes might add value to this work.

Conflict of interest: None

“I, Dr. Shivaji Chobe as the Corresponding Author, declare and undertake that in the study titled as **Role of Yoga on Sleep and Quality of Life among Elderly**, scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation."

10 References

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