

Effect of yoga on vigilance, self rated sleep and state anxiety in Border Security Force personnel in India

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Abstract.

BACKGROUND: Military occupations require heightened vigilance with resultant sleep disturbances, increased anxiety and reduced vigilance.

OBJECTIVE: To compare yoga with physical training to reduce insomnia, anxiety and increase vigilance in security personnel.

METHODS: One hundred and twelve Border Security Force personnel (BSF group, males; mean age \pm SD = 30.4 \pm 7.4 years) were compared with 112 personnel of a private security firm (SIS group). The BSF group received yoga for nine days and the SIS group received physical training for the same period. Assessments were at baseline and after 9 days, with the digit vigilance test (DVT), Spielberger's STAI-S, and a sleep rating questionnaire.

RESULTS: (1) Between groups: (i) at baseline the BSF group had higher vigilance and more daytime naps compared to the SIS group and (ii) after nine days the SIS group had higher state anxiety compared to the BSF group (ANOVA, Bonferroni adjusted *post-hoc* comparisons; SPSS Version 24.0) (2) In post-pre intervention comparisons (i) the BSF group increased vigilance and decreased state anxiety after yoga, with improved sleep, while (ii) the SIS group showed increased vigilance after physical training.

CONCLUSION: Yoga may improve sleep, reduce anxiety while increasing vigilance in occupations requiring vigilance.

Keywords: Alertness, insomnia, armed forces, unease

1. Introduction

Military occupations can be broadly categorized as combat or support roles. The relevance of this categorization is that a service member would experience difficult levels of stress due to the nature of deployment [1]. Military service members live and

work in a unique and challenging environment facing physically and mentally demanding workloads, deployments and exposure to combat [2]. These stressors could contribute to impaired physical and psychological performance. After a simulated combat exercise, U.S. army officers showed impaired vigilance, reaction time, attention, memory, and reasoning [3]. Most military exercises require vigilance, which if prolonged could lead to physiological arousal and stress [4]. Increased vigilance has been associated with increased sympathetic nervous system activity [5].

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The long-term effects of hyper-vigilance can be devastating and may impact cognition, including attention, concentration, memory, as well as various functions essential for health such as sleep [6]. Military personnel have sleep disorders due to multiple factors apart from hyper-vigilance. These include the need to be on night duty, deployment through different time zones, and managing insomnia and drowsiness with sedatives or caffeine, respectively [7–9]. The most common sleep disorder is insomnia.

In India the Border Security Force (BSF) is the chief force guarding the territorial boundaries of the nation [10, 11]. The BSF is a Central Armed Police Force responsible for guarding India's land borders during peace time and preventing transnational crime [12].

Recent studies conducted on BSF personnel to understand their health and wellbeing, showed a high incidence of physical and mental illness including anxiety and insomnia, many of which were listed as lifestyle-related [13]. In many cases BSF, personnel adopted certain unhealthy stress coping strategies [14].

Yoga practice provides an alternative as a stress reducing strategy with additional health benefits [15]. Five hours of yoga practice per day for seven days improved the quality of sleep, total time spent asleep, time taken to fall asleep and number of arousals in healthy adults [16]. Similar benefits were found in a population with chronic insomnia; who showed improvement in sleep efficiency, total sleep time, total wake time, sleep onset latency and wake time after sleep onset following eight weeks of an hour of yoga every day [17]. Apart from insomnia, yoga was useful for the other problems faced by the BSF, i.e., anxiety and increased arousal due to vigilance. Yoga practice reduced both state and trait anxiety in persons with stress related symptoms, who practiced approximately an hour of yoga every day for ten days [18]. This effect of yoga in reducing anxiety may be the reason why after a single two hour session of yoga, military personnel performed better in an attention task while their state anxiety decreased [19].

The present study was designed to determine whether a yoga intervention could (i) reduce state anxiety, (ii) improve self-reported sleep and (iii) improve performance in a vigilance task in BSF personnel. Comparisons were made with age and gender as comparable to private security personnel whose job involved vigilance and who did not receive yoga but who received physical training during the period of intervention.

2. Methods

2.1. Participants

The trial was carried out on 224 males whose job involved security and vigilance. There were two groups: the Border Security Force, India (BSF group) and the Security and Intelligence Services India Ltd (SIS group from a private security service agency). Both groups had 112 participants (BSF group mean age \pm SD = 30.4 ± 7.4 years; SIS group mean age \pm SD = 29.1 ± 6.4 years). No incentive was given to either group. To be included in the trial participants had to (i) be male and (ii) spend at least eight hours each day on duty requiring vigilance. The criteria for exclusion were: (i) ill-health at the time of assessment based on a routine case history and clinical examination or (ii) taking any medication or nutraceuticals. None of the participants were excluded for these reasons. The study design was explained to the participants and all participants' signed informed consent was taken. The study was approved by the institution's ethical committee (approval number PRF/16/0014).

2.2. Design

The study was a comparative controlled trial. The two groups were comparable with respect to their age, duty shifts, and lifestyle. The BSF group was given a yoga program consisting of yoga postures (*asanas*), breathing techniques (*pranayamas*) and guided relaxation; for 240 minutes per day for a period of nine days. The SIS group was given a total of 180 minutes of physical training (60 minutes per day for three days) during the nine days. Details of the yoga and physical activity interventions are provided below. The fact that the amount of time allotted to the intervention differed in the two groups is a limitation of the study.

2.3. Assessments

The assessments were done on the day before beginning the intervention and on the day after completing the intervention. The following variables were assessed using tests which have been standardized for use in an Indian population:

2.3.1. Vigilance and sustained attention

The digit vigilance test (DVT) was used to measure vigilance and sustained attention which has

proven test-retest reliability ($r=0.91$) and alternate form reliability ($r=0.90$) [20]. The DVT is not culture sensitive and has been used in an Indian population earlier [4]. The DVT consisted of an A4 size sheet with 1500 digits from 1 to 9 randomly arranged on it in 50 rows with 30 digits in each row. The participants were instructed to cancel the target digits (i.e., 6 and 9) as accurately as possible. Missing any target digits and cancellation of other digits were counted as errors. The score obtained was the total number of digits cancelled minus the errors. The total time given to complete the test was eight minutes.

2.3.2. State anxiety

State anxiety was measured using Spielberger's state-trait anxiety inventory (STAI-S) which has been standardized for use in an Asian population (of which 6.5% was an Indian population) with test-retest reliability ($r=0.60-0.94$) and Cronbach's alpha score of 0.86 [21]. It is a 4-point Likert scale and comprises 20 items to describe the feelings of anxiety at the moment of testing [22]. The STAI-S The participants had to choose one out of the four options provided for each item i.e., not at all, somewhat, moderately so, and very much so. The scores ranged from 20 to 80.

2.3.3. Self-rated sleep quality

The sleep rating questionnaire (SRQ) was used to self-rate the participants' quality of sleep [23]. The SRQ has been standardized for use in an Indian population with test-retest reliability ($r=0.20-0.85$) and internal consistency ($r=0.58-0.69$) [23]. The SRQ consisted of one open-ended and six close-ended items which were: (1) Approximately how long in minutes does it take you to fall asleep? (2) How many hours do you sleep each night? (3) How many times (if any) do you wake up during the night? (4) What are the usual reasons for waking up if you do so? (5) Do you feel rested in the morning (yes/no)? (6) Do you sleep in the day time (yes/no)? (7) If your answer to question 6 was 'yes', for how long do your daytime naps last?

2.4. Intervention

2.4.1. Yoga

The yoga intervention was for 240 minutes in each day. The yoga sessions included a universal prayer, yoga postures (*asanas*), voluntarily regulated breathing techniques (*pranayamas*), loosening exercises and guided relaxation. Yoga practices were derived

from teachings in traditional texts (Hatha Pradipika Circa 1500 C.E., Gheranda Samhita Circa 1700 C.E.) [24]. The timings for yoga sessions were between 05:00–07:00 hours and 16:00–18:00 hours daily for nine days. The details of the yoga session are given in Table 1.

2.4.2. Physical training

Physical training (PT) was between 13.00 hours to 14.00 hours each day. The participants attended three PT sessions during nine days. The PT sessions included drill and marching. The details are provided in Table 2.

2.5. Data analysis

Data were analyzed using SPSS (Version 24.0). A repeated measures ANOVA with Bonferroni adjusted multiple *post-hoc* comparisons was performed. The ANOVA had one Within subjects factor i.e., States, with two levels (pre and post) and one Between subjects factor i.e., Groups which were (i) BSF and (ii) SIS. Two items of the SRQ (i.e., number 5 and number 6) were measured on a nominal scale (i.e., yes = 0, no = 1) and analyzed with Pearson's chi-square test.

3. Results

The group mean values \pm SD for different values are given in Tables 3 and 4 and ANOVA values are given in Table 5.

3.1. Repeated measures ANOVA

There was a significant difference between groups for vigilance ($p<0.001$), state anxiety ($p<0.001$), time taken to fall asleep ($p=0.02$), number of arousals during the night ($p<0.001$), and duration of daytime naps ($p<0.001$). A significant difference within groups was noted in vigilance ($p<0.001$), state anxiety ($p<0.001$), arousals during the night ($p<0.01$), and duration of daytime naps ($p<0.001$). A significant interaction between groups and states was seen in state anxiety ($p<0.001$), time taken to fall asleep ($p<0.01$), numbers of arousals during the night ($p<0.001$) and duration of daytime naps ($p<0.001$); suggesting that these variables were interdependent with respect to the groups (i.e., BSF and SIS) and states (i.e., pre and post).

Table 1
Details of a yoga practice session

S. No		Yoga Practice	Duration
1	Starting	Mantra chanting	3 minutes
2	Warming up	Sun salutation (<i>Surya namaskara</i>)	10 minutes
3	Standing postures	Swaying palm tree pose (<i>Tirryaktadasana</i>)	3 minutes
		Tree pose (<i>Vrikshasana</i>)	3 minutes
		Feet and hands posture (<i>Padahastasana</i>)	2 minutes
	Sitting postures	Frog posture (<i>Mandukasana</i>)	3 minutes
		Rabbit posture (<i>Sasakasana</i>)	3 minutes
		Sitting lateral twisting posture (<i>Vakrasana</i>)	5 minutes
		Cow face posture (<i>Gomukhasana</i>)	5 minutes
5	Prone postures	Crocodile posture (<i>Makarasana</i>)	5 minutes
		Cobra posture (<i>Bhujangasana</i>)	3 minutes
		Half-locust posture (<i>Salabhasana</i>)	3 minutes
6	Supine postures	Half-plough posture (<i>Ardhhalasana</i>)	3 minutes
		Rotating leg pose (<i>Padavritasana</i>)	6 minutes
		Leg circling pose (<i>Dwichakrasana</i>)	6 minutes
7	Relaxation	Supine relaxed posture (<i>Shavasana</i>) with breath awareness	5 minutes
8	Yoga breathing series (<i>pranayamas</i>)	Yoga bellows type breathing (<i>Bhastrika</i>)	3 minutes
		High frequency yoga breathing (<i>Kapalabhati</i>)	10 minutes
		External breath holding (<i>Bahyavriti pranayama</i>)	3 minutes
		Victorious breath (<i>Ujjayi</i>)	3 minutes
		Alternative nostril yoga breathing (<i>Anlom- vilom</i>)	10 minutes
		Bee breathing practice (<i>Bhramari</i>)	3 minutes
		Om chanting (<i>Udgeeth</i>)	3 minutes
9	Relaxation	Supine relaxed posture (<i>Shavasana</i>) with breath awareness	5 minutes
10	Loosening exercises	Neck rotation	3 minutes
		Knee & ankle rotation	3 minutes
		Shoulder rotation	3 minutes
		Butterfly pose	1 minute
11		Conclusion prayer	2 minutes

Total duration of the session was 120 minutes and the same practices have been repeated during the evening session too.

Table 2
Details of a physical training session

S No		Practices	Repetitions	Duration
1	Marches	Marching with instructions		10 minutes
2	Stretching exercises	Exercise 1(lateral stretch)	8–10	2 minutes
		Part 1. Bending to the left with right hand extended upwards.		
		Part 2. Bending to the right with left hand extended upwards.	8–10	2 minutes
		Exercise 2.(backward stretch)		
		Bending backward with both hands extended upwards.	10–15	3 minutes
		Exercise 3.(forward stretch)		
		Bending forward with both hands stretched downwards.	10–15	3 minutes
3	Whole body exercises	Exercise 1.		3 minutes
		Arms extended laterally and feet moved apart with a jump, then bringing the feet together and arms to the thighs.		
		Exercise 2.	20	3 minutes
		Arms extended laterally, feet apart. Jumping and bringing the feet together and hands together above the head with a clap.		
		Exercise 3. Jumping and bringing right leg forward and left leg backward with arms akimbo. Then jumping again with bringing left leg forward and right leg backward.	20	
		Exercise 4. Arms extended to the front with feet slightly apart, then twisting to the right, coming back and twisting to the left.	20	3 minutes
		Exercise 5. (simple squat)		
		Hands stretched in front, sitting with knees bent.	10	3 minutes
4	Running	Running in a 750 meters track with medium pace	2	15 minutes
5	Ending	Sitting with eyes closed	–	10 minutes

Total duration of the session was 60 minutes.

Table 3
Scores of DVT and STAI-S, values are group mean \pm SD

Variables	BSF (<i>n</i> = 112)			SIS (<i>n</i> = 112)		
	Pre	Post	Cohen's d	Pre	Post	Cohen's d
Vigilance	283.5 \pm 41.6	309.9 \pm 14.2 [♠]	0.85	257.8 \pm 60.5 [♠]	287.5 \pm 42.6 ^{♠,•}	0.56
State anxiety	40.3 \pm 10.9	31.3 \pm 9.0 [♠]	0.89	41.5 \pm 9.8	42.4 \pm 7.9 [•]	0.10

[♠]*p* < 0.001 *post-hoc* within groups analyses with Bonferroni adjustment, post compared with pre.

[♠]*p* < 0.001 *post-hoc* between groups analyses with Bonferroni adjustment, pre compared with pre.

[•]*p* < 0.001 *post-hoc* between groups analyses with Bonferroni adjustment, post compared with post. BSF = Border Security Force group, who received 9 days of yoga; SIS = Security and Intelligence Services group, who received 9 days of physical training; DVT = digit vigilance test; STAI-S = Spielberger's state-trait anxiety inventory.

Table 4
Scores of sleep rating questionnaire, values are group mean \pm SD

	BSF (<i>n</i> = 112)				SIS (<i>n</i> = 112)			
	Pre	Post	χ^2	Cohen's d/Cramer's V	Pre	Post	χ^2	Cohen's d/Cramer's V
Time taken to fall asleep (minutes)	30.7 \pm 19.3	21.0 \pm 13.9 [*]	–	0.57 ^d	30.0 \pm 19.9	35.2 \pm 48.9	–	0.14 ^d
Duration of sleep (minutes)	275.2 \pm 53.8	304.2 \pm 48.0 [♠]	–	0.57 ^d	359.7 \pm 48.2	347.6 \pm 59.0	–	0.23 ^d
Number of arousals during night	1.4 \pm 0.9	0.8 \pm 0.9 [♠]	–	0.62 ^d	1.5 \pm 1.0	1.6 \pm 0.9	–	0.09 ^d
Duration of daytime naps (minutes)	66.7 \pm 37.5	40.3 \pm 36.6 [♠]	–	0.71 ^d	7.2 \pm 29.4 [♠]	7.5 \pm 25.3 [•]	–	0.01 ^d
Feeling of rest in the morning (number of participants reported 'Yes') ^a	79	102 [#]	15.23	0.26 ^v	98	101	0.41	0.04 ^v
Sleep in daytime (number of participants reported 'Yes') ^a	93	67 [#]	14.79	0.25 ^v	77	96	1.43	0.08 ^v

^{*}*p* < 0.01, [♠]*p* < 0.001 *post-hoc* analyses with Bonferroni adjustment, post compared with pre.

[♠]*p* < 0.001 *post-hoc* between groups analyses with Bonferroni adjustment, pre compared with pre.

[•]*p* < 0.001 *post-hoc* between groups analyses with Bonferroni adjustment, post compared with post.

[#]*p* < 0.001 Pearson's chi-square test.

^aRest of the participants reported 'No'. ^dCohen's d. ^vCramer's V.

BSF = Border Security Force group, who received 9 days of yoga; SIS = Security and Intelligence Services group, who received 9 days of physical training.

Table 5
Details of the Repeated Measures ANOVA

Sl. no.	Factors	Variables	F	df	Huynh-Feldt ϵ	<i>p</i> -value
I	Within Subjects	Vigilance	90.06	1, 222	1	<0.001
		State anxiety	35.98	1, 222	1	<0.001
		Time taken to fall asleep	0.75	1, 222	1	0.388
		Number of arousals during night	9.27	1, 222	1	0.01
		Duration of daytime naps	28.29	1, 222	1	<0.001
II	Between Subjects	Vigilance	23.75	1, 222	1	<0.001
		State anxiety	32.57	1, 222	1	<0.001
		Time taken to fall asleep	5.35	1, 222	1	0.05
		Number of arousals during night	18.91	1, 222	1	<0.001
		Duration of daytime naps	164.36	1, 222	1	<0.001
III	States \times Groups	Vigilance	0.291	1, 222 (States) \times 222 (Groups)	1	0.590
		State anxiety	54.13	1, 222 (States) \times 222 (Groups)	1	<0.001
		Time taken to fall asleep	8.68	1, 222 (States) \times 222 (Groups)	1	0.01
		Number of arousals during night	10.62	1, 222 (States) \times 222 (Groups)	1	<0.001
		Duration of daytime naps	29.67	1, 222 (States) \times 222 (Groups)	1	<0.001

3.2. Post-hoc analyses

There were two *post-hoc* comparisons i.e., between groups and within groups.

3.2.1. Between groups post-hoc comparisons

The scores obtained in the digit vigilance test were significantly higher for the BSF group at pre assessment ($p < 0.001$) and post assessment ($p < 0.001$) compared to the SIS group. The post scores of Spielberger's state-trait anxiety inventory were significantly higher for the SIS group ($p < 0.001$). The BSF group reported significantly more frequent daytime naps compared to the SIS group at both pre ($p < 0.001$) and post assessments ($p < 0.001$).

3.2.2. Within group post-hoc comparisons (post-pre)

The BSF group showed a significant increase in DVT scores ($p < 0.001$) and a significant decrease in STAI-S scores ($p < 0.001$) at post assessment. Also a significant increase in total duration of sleep ($p < 0.001$) and a significant decrease in time taken to fall asleep ($p < 0.01$), number of arousals during the night ($p < 0.001$) and duration of daytime naps ($p < 0.001$) was noted. The SIS group showed a significant increase in DVT scores ($p < 0.001$) at post assessment.

3.3. Pearson's chi-square test

In the BSF group, 'feeling of rest in the morning' ($\chi^2 = 15.23$, $p < 0.001$, Cramer's $V = 0.261$) and 'daytime naps' ($\chi^2 = 14.79$, $p < 0.001$, Cramer's $V = 0.257$) differed significantly after yoga compared to before.

4. Discussion

Border Security Force (BSF) personnel showed improved performance in a vigilance test, self-rated sleep and reduced state anxiety after practicing yoga for nine days. A control group of private security personnel (SIS) who received physical training improved their performance in the vigilance task, with no change in their sleep or anxiety.

The two groups did not differ at baseline with respect to their levels of state anxiety or self-rated sleep with one exception, i.e., more frequent daytime naps in the BSF group. Also, the BSF group had better vigilance at baseline. This was possibly due to the

heightened vigilance required at night by the BSF. Despite the other changes in self-rated sleep after 9 days of yoga, the BSF group continued to have more frequent daytime naps than the SIS group. Also their DVT scores remained higher compared to the SIS group after nine days.

The Border Security Force guard the country's borders, a job which involves considerable responsibility as well as remaining in a state of hyper vigilance most of the time. In psychology and cognitive science, vigilance is used to describe the ability to sustain attention to a task [25]. When a person attends to a task for a prolonged period it requires alertness and sustained attention which could influence several underlying brain processes including the sleep-wakefulness cycle [6]. Alertness and sustained attention influence parts of the brain which promote wakefulness as well as those which are required for actively inducing sleep [4]. To sustain alertness for long periods the neural systems which are essential include thalamic projections from the upper brainstem, sub-cortical cholinergic nuclei and specific hypothalamic nuclei [26]. Hence sleep-wake pathways are distinct and during tonic alertness, the activity of pathways involved in actively generating sleep may be inhibited [27].

In the Border Security Force personnel who practiced yoga there was an improvement in various aspects of sleep. These improvements included falling asleep in a shorter time (average decrease in time taken to fall asleep = 9.7 minutes), fewer episodes of day time sleep, less awakenings in the night and the feeling of being more rested in the morning.

The reasons for the improvement in sleep are probably many and complex. Dam et al. reported an association between low levels of oxygen saturation (less than 90%) while awake and poor quality of sleep [28]. Yoga practice is believed to improve the respiratory functions with resultant better tissue perfusion and improved oxygen saturation [29]. A particular yoga program (60 minutes/day for 60 days) helped Indian military personnel acclimatize sooner to altitudes of more than 3000 meters [30]. The better acclimatization could be due to an improved ability to adapt to lower levels of atmospheric oxygen at that height, possibly related to better tissue perfusion and oxygen saturation.

The yoga program in the present study included postures (*asanas*), regulated breathing (*pranayama*) and guided relaxation. Considering that BSF personnel are most often based at high altitudes, an

improvement in their adaptation to rarefied oxygen may have contributed to their better sleep after yoga. In addition the yoga breathing practices used in the present study have been associated with reduced sympathetic activity and lower frequencies in the EEG [31]. Yoga postures are associated with an increase in central nervous system gamma-aminobutyric acid (GABA) levels measured through Nuclear Magnetic Resonance Spectroscopy (NMRs) [32, 33] which would promote cortical inhibition and hence facilitate sleep. Guided relaxation is associated with better relaxation than lying supine without instructions and this could also facilitate sleep [34].

Yoga and meditation based interventions which influence the lifestyle reduce the severity of major depressive disorder and increase systemic biomarkers associated with positive changes in the brain [35]. The physical activity component of yoga could also be beneficial. This was observed in military personnel in Iran, in a comparison between physically active versus inactive persons showing higher cardiovascular risk factors in those who were inactive [36]. While a systematic review did not report sufficient evidence to consider yoga as a definite treatment for diagnosed anxiety disorders the result of the eight studies reviewed was considered encouraging [37]. As mentioned above, the practice of yoga postures (*asanas*) increases the level of GABA in the cortex, while yoga breathing and guided relaxation have been separately shown to reduce sympathetic nervous system activity [34, 38]. Hence yoga practice can be said to reduce physiological arousal both centrally and in the autonomic nervous system. This reduced arousal would facilitate a decrease in anxiety.

Despite reducing arousal certain yoga breathing practices especially alternate nostril yoga breathing have been found to improve performance in the vigilance task used in the present study [19], without the expected rise in sympathetic nervous system activity which is associated with increased vigilance [4]. The present results also show that the BSF personnel performed better in the vigilance task with a decrease in state anxiety. The SIS group in contrast improved performance in the vigilance task but showed no significant change in state anxiety. The results in the BSF group suggest a possible benefit of introducing yoga for persons whose job requires prolonged periods of hyper-vigilance and periodic night shifts or disruption of sleep due to day time heightened vigilance.

The main difference between the BSF and the SIS groups was the duration of yoga practice (i.e., 2160

minutes and 180 minutes over the period of nine days respectively). Hence comparisons with earlier studies which assessed sleep, state anxiety and vigilance using the same questionnaires but where the duration of yoga was considerably less are cited here.

The BSF group showed an improvement of 31.6 percent in the time taken to fall asleep and 10.5 percent improvement in the duration of sleep after 9 days. Similarly an improvement of 8.7 percent in the time taken to fall asleep and 20.1 percent improvement in the duration of sleep occurred after 60 minutes of yoga practice over three months in a geriatric population [23]. After 240 minutes of yoga practice there was a reduction of 22.3 percent in state anxiety in the BSF personnel while in an earlier study on army personnel there was a 10.1 percent reduction in state anxiety after a single session of 45 minutes of yoga practice [19]. Vigilance was improved by 8.5 percent in the BSF personnel who practiced yoga for 240 minutes, while a single session 18 minutes of yoga improved performance in the same vigilance task by 9.4 percent [4].

5. Limitations

The main limitation of the study is in the design. It would have been ideal to randomize the BSF personnel to yoga and control (or an alternate intervention) groups. However the BSF personnel were especially deputed for intensive training in yoga for their stress-related health problems. Hence all of them had to receive the yoga intervention. As an alternative, age matched male security personnel (i.e., the SIS group) whose jobs also required vigilance were selected for comparison. This was not ideal as the levels of vigilance required for the BSF and SIS groups were not comparable. Also the BSF group received 240 minutes of yoga training a day compared to physical training for 60 minutes a day thrice in 9 days for the SIS group. It is impractical to suggest 240 minutes of yoga practice in a day. In order to make the present findings applicable to everyday situations examples are cited from the literature, where single and repeat sessions of 45 to 60 minutes duration also improved sleep, vigilance and reduced anxiety even though the magnitude of change was less than for 240 minutes of yoga.

These limitations suggest guidelines for future studies keeping in mind the regulated tight schedule and job requirements of Border Security Force personnel.

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Conflict of interest

Authors declare no competing interests with respect to the research, authorship, and/or publication of this article.

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