

Smartphone Excessive Use, Sleep, and Beliefs about Well-being in University Students who Practice Yoga Compared with Those with No Experience of Yoga

Sushma Pal, Sachin Kumar Sharma, Aditi Singhal, Shirley Telles

Department of Patanjali Research Foundation, Haridwar, Uttarakhand, India

Abstract

Background: Addictive behavior can be effectively managed with yoga. This study compared smartphone use, self-rated sleep, and beliefs about well-being in university students who practiced yoga regularly with those who did not. **Materials and Methods:** One hundred and forty-two university students (average age \pm standard deviation: 20.2 ± 2.2 ; male: female = 1:1) who practiced yoga (90 min a day, 6 days a week, and 29.7 months) were compared for smartphone excessive use, self-rated sleep, and beliefs about well-being, with an equal number of comparable age- and gender-distributed university students who did not practice yoga. **Results:** The yoga group had lower scores on the short version of the Smartphone Addiction Scale with fewer nocturnal episodes of checking their smartphone. The nonyoga group reported longer nocturnal sleep time compared to the yoga group, whereas there was no significant difference in the beliefs about well-being scores between the two groups. **Conclusions:** University students who practice yoga may be less likely to use a smartphone excessively as well as have uninterrupted sleep than students who do not practice yoga.

Keywords: Beliefs about well-being, excessive smartphone use, self-rated sleep, university students, yoga

INTRODUCTION

Excessive use of a smartphone has detrimental effects on health and overall functioning^[1] with features in common with addictive behaviors.^[2] In university students, high levels of smartphone use and poor sleep quality correlated positively with levels of depression.^[3]

University students who practiced 1 h of mindfulness-based cognitive-behavioral intervention (MBCBI) for 8 weeks showed less desire to use a smartphone, compared to a control group.^[4] Yoga practice like MBCBI also includes suggestions for awareness.^[5] Yoga was an effective strategy to manage chemical addictive behavior and substance abuse.^[6] In addition, yoga practice influenced well-being^[7] and the perceptions about well-being,^[8] which can influence the recovery from addiction.^[9]

The present study compared two groups of university students, of whom one group practiced yoga regularly whereas the other group did not practice yoga and continued their routine activities. The yoga practices included asana (*posture*), yoga

breathing (*pranayama*), meditation (*dhyana*), and guided relaxation. The two groups were compared for (i) smartphone excessive use, (ii) beliefs about well-being, and (iii) self-rated quality of sleep.

MATERIALS AND METHODS

A cross-sectional study design was used to administer questionnaires to two groups of students. The study was approved by the institutional ethics committee (approval number: YRD-018/02). One hundred and forty-two university students from North India formed the yoga group. Students practiced yoga between 05:30 and 07:00 h in the morning. An

Address for correspondence: Dr. Shirley Telles,
Patanjali Research Foundation, Patanjali Yogpeeth Phase 1, Haridwar,
Uttarakhand 249405, India.
E-mail: office@prft.co.in

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equal number of students from a nearby university formed the nonyoga group. The groups had comparable socioeconomic backgrounds and leisure interests. All students used a smartphone to communicate but not for studies. Students were included in the research if they (i) used a smartphone and (ii) had at least 3 months of yoga practice (yoga group) and no prior experience of yoga (nonyoga group). Students were excluded from the study if they did not complete the questionnaires. Both groups of students were informed about the study and its aims. The students were asked to fill in their details in a sociodemographic form to indicate individual consent, and permission to conduct the study was obtained from registrars of the universities.

Yoga practice

The yoga group had an average of 29.7 months of experience of yoga. Students practiced yoga in group classes on 6 successive days in a week for 90 min per day between 05:30 and 07:00 h in the morning. The yoga practice included loosening exercises,^[10] yoga postures (*asanas*), yoga breathing (*pranayamas*), and guided relaxation. The session was conducted by a yoga teacher with a minimum of 5 years of experience of teaching yoga.

Assessments

Demographic information

Students were asked the following: (i) their name, date of birth, gender, and number of years of education completed and (ii) duration of yoga practice in months (yoga group alone).

Smartphone use

Smartphone addiction scale-short version

The Smartphone Addiction Scale–Short Version (SAS-SV) assesses levels of smartphone use.^[11] This scale consists of ten items with six possible response options to each item which are strongly disagree, disagree, weakly disagree, weakly agree, agree, and strongly agree. The scale has been used in an Indian population.^[12] The total scores of SAS-SV lie between 10 and 60, with 10 being “low”, and 60 being “high” level of smartphone addiction. According to Kwon *et al.*,^[11] high level of addiction was defined by a score between 34 and 60 in females and 32 and 60 in males.^[12]

Self-rating about smartphone

(i) Use of a smartphone or not, (ii) the chief purposes of smartphone use, and (iii) whether they woke up at night to check their smartphone.

Sleep rating questionnaire

The sleep rating questionnaire (SRQ) assessed the quality of sleep of preceding week. The questionnaire has been used in an Indian population.^[13] It has seven questions, of which the response to four questions was given as quantitative data (i.e., how long does it take you to fall asleep (in minutes)?, how many hours do you sleep each night?, how many times do you wake up during the night?, and how long do your day time naps last (in minutes)?). The responses to the remaining two questions (i.e., do you feel rested in the morning? and do

you sleep in day time?) provided nominal data, whereas one provided qualitative data as it was an open-ended question (i.e., the usual reasons for waking up if you do so?).

The beliefs about well-being scale 16 (BWBS)

The Beliefs about Well-Being Scale consists of 16 items measured on a seven-point Likert scale in which three points are described as 1 = “strongly disagree”, 4 = “neutral”, and 7 = “strongly agree.”^[14] BWBS assesses four domains of mental well-being. These four domains are (i) the experience of pleasure, (ii) avoidance of negative experience, (iii) self-development, and (iv) contribution to others. All four are positively correlated with well-being and higher scores indicate better well-being.^[14]

Data analysis

Two statistical tests were performed using SPSS (Version 24.0) (IBM SPSS statistics City: Armonk State: New York Country: United States), i.e., independent *t*-test and Chi-square test. The two groups were compared with multiple independent *t*-tests which were Bonferroni corrected. The following four items were compared with Chi-square test, (i) from SRQ (a) a feeling of being refreshed in the morning and (b) daytime sleep, (ii) number of addicted students in yoga and nonyoga group based on SAS scores which were categorized as high and low scores to classify excessive smartphone users,^[8] and (iii) self-reported checking of smartphone at night.

RESULTS

Results are presented under the three categories, i.e., smartphone excessive use, self-rated sleep, and beliefs about-wellbeing with details about the participants and group average values \pm standard deviation values which are presented in Table 1.

SAS scores and self-rated smartphone use

A whole group comparison: SAS-SV scores were higher in the nonyoga group compared to the yoga group ($P < 0.001$). (ii) A gender-wise comparison: the difference of SAS-SV scores was higher among males ($P < 0.001$) compared to females. The mean scores of SAS-SV are presented in Table 2.

The number of students with high SAS scores was significantly different between the yoga (i.e., 34 out of 142) and

Table 1: Baseline characteristics of the students

Baseline characteristics	Yoga (n=142)	Nonyoga (n=142)
Average age (years)	20.2 \pm 2.2	19.7 \pm 1.5
Gender ratio (female:male)	1:1	1:1
Education range (years)	12-17	12-17
Yoga experience (months)		
Mean \pm SD	29.7 \pm 27.3	NA
Yoga practice per day (min)	140.0 \pm 55.8	NA
Experience of physical activity (months)	40.1 \pm 34.5	52.6 \pm 44.4
Time spent in physical activity in a day (min)	107.6 \pm 81.6	90.47 \pm 60.8
Physical activity per week (days)	5.8 \pm 1.2	5.4 \pm 1.8

SD: Standard deviation, NA: Not available

nonyoga (i.e., 61 out of 142) groups ($\chi^2 = 11.53, P = 0.001$, Cramer's $V = 0.201$). The details of the scores are provided in the following Table 3.

Fewer students of the yoga group (37 out of 142) woke up at night one or more times to check their smartphone for messages compared to the nonyoga group (48 out of 142) ($\chi^2 = 5.66, P = 0.0173$, Cramer's $V = 0.15$).

Self-rated sleep

The duration of nocturnal sleep in minutes was significantly higher in the nonyoga group compared to the yoga group ($P < 0.001$).

A greater number of students of the yoga group (105 out of 142) reported daytime sleep compared with the nonyoga group (87 out of 142; $\chi^2 = 5.209, P = 0.022$, Cramer's $V = 0.134$).

The beliefs about well-being

There was no significant difference between yoga and nonyoga groups for components of the beliefs about well-being.

DISCUSSION

One hundred forty-two yoga practitioners (age range 16–28 years; average age 20.2 ± 2.2 years; M:F = 1:1) had lower smartphone addiction than yoga naïve (age range 18–25 years; average age: 19.7 ± 1.5 years, M: F = 1:1). The differences between groups were considered to be an effect of yoga practice since the groups were of comparable ages, gender ratio, years of formal education, social support (most students of both groups stayed in a student hostel), and leisure interests (both groups were from the same town). Yoga practice includes several dimensions considered relevant in managing substance abuse and chemical addictions.^[6] These include: (i) stress reduction, (ii) positive affect, (iii) improved self-awareness, (iv) improved self-esteem, and (iv) a chance to experience feelings of transcendence through yoga. Similar factors may help students regulate smartphone use.

In the present cross-sectional study, the two groups were not recruited from the same university. Students who practiced yoga regularly were enrolled for a course in yoga. All students of the course were required to join yoga practice sessions. The

Table 2: Unpaired t-test for smart phone addiction, beliefs about well-being, and sleep quality in yoga and yoga naïve students

Variables	Mean±SD		T	P#
	Yoga	Nonyoga		
Smartphone addiction scale				
Group as whole	25.8±10.2	30.3±11.0	3.7	<0.001
Males	26.1±10.4	33.4±10.8	4.2	<0.001
Females	25.4±10.0	27.0±10.2	1.0	0.34
Sleep rating questionnaire				
Time taken to fall asleep (min)	22.8±25.4	26.3±27.4	1.1	0.26
Duration of sleep in each night (min)	375.5±61.5	411.1±71.0	4.5	<0.001
Times wakes up during the night	0.9±1.0	1.0±1.1	0.4	0.69
Time taken for naps in daytime (min)	78.3±41.7	85.9±52.5	1.3	0.18
The beliefs about well-being scale 16				
Sub component				
Total well-being	80.5±12.1	82.9±10.8	1.7	0.08
Components				
Experience of pleasure	20.1±4.5	21.1±4.0	2.0	0.05
Avoidance of negative experience	15.9±4.7	15.9±4.9	0.0	0.97
Self development	21.5±3.9	22.5±3.9	2.2	0.03
Contributions to others	23.0±4.3	23.4±3.7	0.8	0.43
Derived components				
Eudaimonic	44.5±7.3	45.9±6.8	1.7	0.10
Hedonic	36.0±7.6	37.0±6.6	1.2	0.24

#Bonferroni adjusted statistical significance level for different variables: Smartphone addiction ($\alpha=0.05$); the seven subdomains of the beliefs about well-being ($\alpha=0.007$); four subdomains of quality of sleep ($\alpha=0.0125$). SD: Standard deviation

Table 3: Details of Chi-square for level of addiction

Groups	Level of addiction		χ^2	P	Cramer's V
	Low addiction	High addiction			
Yoga (n=142)	108	34	11.53	0.001	0.201
Nonyoga (n=142)	81	61			

students who had no experience of yoga were recruited from a university in the same locality as the students of the yoga group. While the two groups had comparable ages, gender ratios, hours of study, social support in student hostels, and possibilities for leisure activities in the area, there were other factors which could have influenced the students' smartphone addictive behavior. These include personality-related factors and levels of physical activity. Personality-related factors associated with predicted smartphone addiction.^[15]

Yoga practice increases the level of physical activity while modifying the breath and the mental state.^[16] Increased physical activity can serve as a rehabilitation for Internet addiction by improving physical health and increasing confidence, satisfaction, and well-being.^[17] Hence, yoga practice may have reduced students' smartphone use by increasing their feelings of confidence and self-esteem which were not assessed in this study. However, even though perceptions about gratification, reward, and factors contributing to well-being influences susceptibility to addictive behavior,^[18] the two groups did not differ in their beliefs about well-being.

The university students of the yoga group spent significantly less time asleep in the night than the group who did not practice yoga (with average values of 375 and 411 min, respectively), with fewer nocturnal awakenings to check their smartphone. Previously, yoga practice was associated with better quality of self-reported sleep, especially in the elderly.^[19] The yoga group in the present study may have experienced better quality of nocturnal sleep hence reducing their nocturnal sleep requirement, while they did have more daytime sleep.

Limitation

Ideally all students should have been recruited from the same university, with random assignment of one group to yoga and other students to an observation control group. In the present study, the cross-sectional assessment of two student groups from different universities makes it difficult to rule out confounding factors, especially since students who practiced yoga were enrolled in a study program on yoga. A longitudinal, interventional study would address these concerns.

CONCLUSIONS

The present study suggests that university students who practice yoga have lower SAS-SV as well as have uninterrupted nocturnal sleep, compared to university students from the same geographical region, age, and gender distribution who did not practice yoga. However, the perception of well-being did not differ between the two groups.

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Conflicts of interest

There are no conflicts of interest.

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