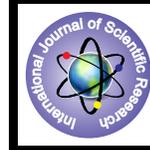


Relationship between Quality of Sleep and Psychological Well-Being in Border Security Force



Psychology

KEYWORDS: Sleep quality, psychological well-being (PWB), BSF, life satisfaction

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ABSTRACT

The aim of the present study was to find the relationship between sleep quality and psychological well-being among Border Security Force (BSF) Personnel. Poor sleep quality can be an early symptom of many sleep and medical disorders. BSF personnel face acute shortage of sleep due to long hours of work. Studies conducted on defence personnel suggest that their perception of their well-being affect their performance on the job. Studies show, sleep deprivation beyond 16 hrs can lead to measurable changes in alertness, attention capacity and fatigue. Two self-rated questionnaires, the Pittsburgh Sleep quality Index (Buysse, 1988) and Psychological Well-Being Scale (Sisodia & Choudhary, 2012) were administered on 30 constables and 30 sub-inspectors (aged 20-40 years). Correlations among the two variables were carried out. Sleep quality was significantly correlated with life satisfaction domain of PWB ($\rho = -.292, p = 0.024$). Both groups rated themselves as having poor sleep quality, however constables differ significantly from sub-inspectors on sleep quality ($p = .000$ at $Z = -5.250$) but not on psychological well-being. The results indicate that there is a need to employ methods to improve the sleep quality of the personnel as it impacts their PWB and may impact performance on the job.

Introduction

Nathaniel Kleitman in the 1930's showed through his studies that cognitive functions decline as the day progresses to night. He pointed out that even if an individual gets the amount of sleep that he or she requires, there would still be fluctuations in the individual's functional ability (Czeisler, 2007).

Sleep deprivation leads observable changes in the levels of brain activity as measured by an EEG, that correspond to a decreased level of alertness, negative impact on the person's mood, attention, focussing on a task and reduced higher mental functioning. Ratcliff and Dongen in 2009 showed that the pathway through which sleep deprivation affects cognitive functioning is via attentional arousal and impaired central processing. This reduces the efficiency with which an individual can process information and overall decline in the individual's cognitive functioning.

A conference on "Sleep, Fatigue and Medical Training" in military personnel, presented statistics regarding how much sleep affected complex mental operations. It stated that, 72 hours of sleep loss leads to a 60 % decline in the complex mental operations. Measurements were done using PET scan showed changes in the PFC (prefrontal cortex), thalamus and multimodal association cortex following sleep loss (Buysse et.al, 2001). However individual differences exist.

The bio-psycho-social theory of sleep helps to explain the link between sleep and psychological well-being of the person. Along with circadian rhythms, environmental cues, social interactions, work schedules, meal times and other stressors have a great impact on sleep cycle (Morin, 2003).

Sleep quality is an important clinical construct as poor sleep quality is a symptom of a number of sleep and medical disorders (Kripke et al., 1979). "Sleep quality" includes quantitative aspects such as the duration of sleep and sleep latency including the completely subjective elements such as depth of sleep (Buysse et al., 1988).

Psychological Well-being involves thriving in the face of existing challenges in life such as pursuing meaningful goals, growing and developing as a person, and establishing quality ties to others (Chen et al; 2012).

A government sponsored study conducted in IIM-A in 2012 showed that troops of both CRPF and BSF, which are the country's largest paramilitary forces are suffering from acute short-

age of sleep due to long hours of work, causing discontentment among the workforce (Sharma, 2012). Also, there is an acute shortage of manpower in the BSF.

Review of Literature

Sleep has long been associated with health and well-being. Pilcher, June, Elizabeth, (1998) studied the relationships between sleep, subjective well-being (SWB) and subjective health (SH) of 87 college student volunteers with the mean age of 18.9 years and found that measures of SH and SWB were more closely related to sleep quality rather than to sleep quantity. Average sleep quality, measured by PSQI and not the daily sleep quality was significantly correlated with the measures of subjective health and subjective well-being. Decrease in average sleep quality was significantly correlated with increase in feelings of tension, fatigue, irritability and decrease in positive affect (Pilcher, 1998).

A study conducted by Choi, Terrel, Pohl, Redman & Duffy (2013) studied factors affecting sleep quality among operating engineers on a sample of 143 engineers. The researchers concluded that young age, depressive symptoms, risky health behaviours (such as smoking and alcohol consumption), physical inactivity and obesity are related to poor sleep quality. According to the researchers modifying health behaviours may promote sleep quality. This study is relevant, particularly in terms of the effect of physical activity in the context of improving the sleep quality of paramilitary force personnel who are involved in sedentary shift work like working as "sentries".

Most studies related to the connection between sleep and PWB has been related to the clinical population. A study conducted on insomnia and Excessive Day Time Sleepiness (EDS) concluded that insomnia and excessive sleepiness significantly impacted a person's PWB. The results were significant even after controlling for socioeconomic status and perceived health factors (Kao, Huang, Wang, Tsai, 2008).

Shift workers are particularly vulnerable to the effects of sleep deficiency, resulting in a decline of sleep quantity and quality. Khaleque (1998) conducted a study on 60 male workers employed in a cigarette factory. The study suggests that night shifts and afternoon shifts are the most disruptive, however individual differences persist. The study also suggests that reducing night shifts and adjusting the work schedules, keeping in mind the 'morningness' and 'eveningness' characteristics of the workers might improve their adaptability and tolerance to shift work and their quality of life. This study has particular relevance to the

paramilitary force personnel who are often engaged in night duties and patrolling duties.

A study on the Indian Air Force pilots found that their PWB is important because they have to deal with harsh conditions on a daily basis and these are inevitable circumstances. Therefore how they view their health and well-being will determine their performance on the job (Chaturvedula, 2007).The study involved 50 military aircrew. This study demonstrates one of the few attempts to understand the psychological well-being of the Indian air force.

A review conducted by Joseph (2007) of the various psychological factors involved in air combat operations in India, evaluated the certain stressors that are intrinsic to military operations. Chief among them were a) sleep deprivation b) fatigue c) workload d) temperature extremes e) physiological disruptions and f) environmental disruptions. Some factors that were highlighted as necessary for mental health included optimising sleep habits and family support for those combatants whose families are stationed elsewhere. Even for those who are stationed at secure bases and aren't deployed for combats, stress levels tend to be high due to compensatory duties for those who are deployed. Such tasks involve repair and maintenance activities (Joseph, 2007). For those who are deployed some everyday stressors involves overcrowding of living space, inadequate rest, high work load, domestic worries, personal problems and these accumulate overtime and result in sleep deprivation and depression. Such conditions are also prevalent in other strategic operations such as during anti-Naxalite operations by the BSF guarding the strategic Indian frontiers along neighbouring countries (Sharma, 2012).

A recent study conducted in Taiwan by Chou, Tzeng, Chou, Yeh, Chang, Kao, Tzeng (2014) on quality of life and self-rated health measures in military personnel compared these variables among different classes of military personnel. The measures used were QOL instrument BREF, Taiwan version, the visual analogue scale (VAS) – a self-reported measure of mental health, the GHQ (general health questionnaire) -12 Chinese version. The study stated that military personal faced stressors such as sleep deprivation due to shift work, additional non-combat assignments such as peacekeeping operations, disaster relief, other humanitarian actions, deployment and separation from their families. The results of the work projected that non-commissioned officers (NCOs) who formed 38 percent of the sample and enlisted men who were 42.2 percent of the sample rated themselves as mentally unhealthy on the GHQ-12. On Item 5 (poor sleep quality), both NCOs' and enlisted men scored higher when compared to officers. Overall it was found that 55% of the subjects taken reported themselves to be unhealthy and this percentage was higher when compared to the general population, in which only 18-33 % reported themselves to be unhealthy (as cited in Chou et al, 2014). The study elaborates that the NCOs had more sleep problems than officers and this may be due to demands of shift work and other burdensome demands of military services loaded on the enlisted persons and the NCOs (Chou et al, 2014). In BSF a similar scenario may be anticipated where in the constabulary may be compared to the enlisted men and subordinate officers (SOs) to the non-commissioned officers.

Methodology

The research design in this study is a correlation design based on the quantitative paradigm of research. Convenience sampling method was used. 30 male constables and 30 sub-inspectors between the ages of 20-40 years were chosen. Each participant was on duty for at least a month. The sample was chosen from one of the BSF organizations in Bangalore. All participants belonged to SHAPE – I medical category ascertained by their health cards. This category rules out the presence of neurological physiologi-

cal, psychological disorders as well as substance abuse.

Objectives

- To find the level of sleep quality among Border Security Force personnel
- To find the level of psychological well-being among Border Security Force Personnel.
- To find the relationship between sleep quality and Psychological well-being along all 5 domains of PWB.
- To compare the degree of Psychological well-being among the two different groups of personnel-Constabulary and Subordinate Officers.

Data Analysis

The data for both groups was tested for normality. The correlation between the two variables was analysed using Spearman's Rank Correlation method as data for sleep quality among sub-inspectors was not normal.

Since the data of sub-inspectors was not normal, Mann-Whitney U test was used to test whether there was a significant difference between the means of two groups (Constables and Sub-Inspectors) with regard to sleep quality.

Independent sample T test was used to test whether there was significant difference between the two groups (Constables and Sub-Inspectors) of participants with regard to psychological well-being.

Major findings

Table 1

Matrix showing correlation between sleep quality and all domains of PWB

		PSQI	LS	Ef	So	Mh	IpR	PWB TS
PSQI	rho	1.000	-.292'	-.215	-.006	-.223	.010	-.201
	p	.	.024	.099	.966	.087	.938	.124
	N	60	60	60	60	60	60	60

*p<.05

PSQI: Pittsburgh Sleep Quality Index LS: Life Satisfaction Ef: Efficiency So: Sociability,

Mh: Mental Health IpR: Interpersonal Relationships PWB TS: Psychological Well-Being Total Score.

As seen from the table, PSQI is significantly correlated with life satisfaction domain of psychological well-being, $p = .024$ at $\rho = -.292$. Thus p is significant at 95% significance level. Thus the hypothesis 1 that stated that there will be a significant relationship between sleep quality and each of the 5 domains of psychological well-being was accepted only for the domain of life satisfaction.

The correlation between PSQI and LS is shown to be negative. This is because a higher score on PSQI indicates poor sleep quality, whereas a higher score on PWB indicates high psychological well. Hence, the negative correlation presented above indicates that better the sleep quality, higher will be the psychological well-being.

For hypothesis 2, Mann-Whitney U test was used to find if there was a significant difference in the means of sleep quality scores between constables and sub-inspectors.

	N	Mean	SD	Min	Max	Mann-Whitney U	Z	P
PSQI	60	10.87	4.753	2	19	96.000	-5.250	.000*
Rank	60	1.50	.504	1	2			

* $p < .05$

As seen from the table, the mean of the sleep quality differ significantly by rank.

$p = .000$ at $Z = -5.250$ & $U = 96.000$. Thus p is significant at 95 % significance level. Thus the hypothesis that there will be a significant difference between the levels of sleep quality among Constables and Sub Inspectors was accepted.

For hypothesis 3, Independent Sample T-test was used to check whether there was a significant difference in the means of psychological well-being scores between constables and sub-inspectors.

Table 3
Comparing means of psychological well-being scores between ranks

PWB total score	Equal variances assumed	Levene's test for equality of variances		t test for equality of means		
		F	p	t	df	P
		1.661	.203	-.606	58	.547

As can be seen from the table, means of PWB do not differ by rank as $t = -.606$, $df = 58$, $p = .547$ is not significant at 95% confidence interval. Hence hypothesis which stated that there will be a significant difference in the levels of psychological well-being between Constables and Sub Inspectors was rejected.

Discussion

One of the primary objectives was to study the relationship between sleep quality and the five domains of PWB. Results indicate that sleep quality was significantly correlated with the life satisfaction domain of psychological well-being. This result is consistent with a study by Pilcher et al (1998) in which Subjective well-being (SWB) were significantly correlated with average sleep quality, measured using Pittsburgh Sleep Quality Index (PSQI) rather than sleep quantity and daily sleep quality. A significant decrease in satisfaction with life and vigour was also seen when there was low sleep quality. There is a strong temporal relationship between sleep quality and life satisfaction. A longitudinal study conducted by Paunio, Korhonen, Hublin, Partinen, Kivimäki, Koskenvuo & Kapiro (2008) found poor sleep quality to be a significant predictor of life dissatisfaction even after 6 years. Moreover it was found that total number of hours the participants slept had only a modest impact on life dissatisfaction. i.e., those who slept fewer than 7 hours per night had slightly higher chances of being dissatisfied with life subsequently. This result was significant when scores for sleep quality was also included in the model. However, the converse relationship i.e., life dissatisfaction influencing sleep quality was not found in the study (Paunio et al, 2008). This correlation between sleep quality and life satisfaction can have important implications for administrators managing the forces. A research aimed at finding a better predictor of job performance between 'job satisfaction' and 'life satisfaction'; found that life satisfaction was a stronger predictor of performance on the job (Jones, 2006). Work done on the same lines by Judge and Watanabe (1993) used lagged correlation and found that life satisfaction is a strong predictor of job satisfaction even after a time lag of five years. This indicates

that the higher authorities can improve performance on the job by enhancing life satisfaction of the troops, which in turn is associated with sleep quality.

The reason behind significant difference between sleep quality of constables and sub-inspectors is multi-factorial. One possible reason is the difference in work schedules among both the groups. Sub-inspectors are one among the mid-level managers in the BSF, which comes under the non-gazetted ranks in BSF (BSF Act & Rules, 2004, p. 4). Their duty entails managing and supervising the duties of personnel who are sub-ordinate to them such as the Head constables, Senior Constables and Constables. On the other hand the rank of the Constable is the lowest in the rung. The nature of their duty mainly pertains to sentry duty, patrolling duty and other operational duties that are the charter of their duties that their seniors have to enforce on these ranks in normal course on a daily basis (The Border Security Force Act, 1968, Chapter 1, p.2). Patrolling duties generally requires the constables to take on shift duties. The difference in the scores of sleep quality is consistent with previous research on 60 male factory workers that found that sleep quality and sleep quantity declined as sleep deficiency increased in the shift workers (Khaleque, 1998). Moreover the participants of both groups reported that there had been erratic work schedules and long working hours, which include night shifts of patrolling in sentry duties of 4 hours duration. The hazards of regular shift duties coupled with erratic night shifts in the force personnel disrupts the sleep pattern of the individual, biological rhythm and social life. (Pati, Chandrawanshi & Reinberg, 2001).

The age of the participants may also play a role in explaining the poor sleep quality. In the present study 43.33 % Constables were 25 years old, or younger. Whereas, only 16% of Sub-Inspectors fall in that range. Adolescents and young adults in their mid- 20's require 0.50 to 1.25 hours more sleep than their adult counterparts. This is due to the delayed release of melatonin which consequently delays bed time (Carskadon, 2002; Carskadon, Wolfson, Tzischinsky, & Acebo, 1995; Wolfson & Carskadon, 1998, 2003 as cited in Miller et al, 2011). This difference in the quantity of sleep requirement is one possible reason behind the decreased sleep quality among the Constables. Those Constables who are in their mid-20's or younger have the same duty timings as their older counterparts who have a much more stabilized sleep pattern. Hence, the natural sleep requirements of the young Constables are not being met adequately. Younger Constables are also more likely to have fewer resources to cope with the stress related to their job as well as their training (Choi et al, 2013).

No significant difference was found in the levels of PWB of constables and sub-inspectors. The mean scores of both the groups indicated that, they had moderate PWB. One possible explanation is that there are other factors that can have an influence on PWB other than Sleep quality. A study conducted on the Indian Air Force by Chaturvedula & Joseph (2007) compared psychological well-being in fighter pilots and helicopter pilots. Helicopter pilots are continuously exposed to real life problems during peacetime such as in rescue operations, whereas the fighter pilots got exposed to real life problems only during war time operation or during simulated situations of war during practice. Hence, constantly dealing with Operations like situations during peacetime enhanced their sense of meaning in life as they felt they were helping the poor. It also helped the helicopter pilots adjust to the demands of the job, thereby enhancing their sense of PWB. The situations of helicopter pilots can be compared to the daily work schedules of the BSF personnel as they are also involved in Internal Security Duties (ISD), Peace-keeping operations, Counter-Insurgency operations (CI Ops) and operations related to Disaster Management ('Role of the BSF', Information technology wing, New Delhi) that brings them in contact with

the locals on a daily basis, adds meaning to their life and helps them adjust to the job. The deployment at the Borders is an ongoing process, which entails absolute vigilance and therefore the participants probably engage in positive thinking and acceptance of the situation, as was also shown among air force pilots (Chaturvedula et al. 2007). Therefore, it is very likely, that this is one of the factors for having moderate PWB in both the groups, rather than low PWB in the constables, as could be expected from their poor sleep quality compared to the Sub-Inspectors.

It is important to note here that the PWB level of the personnel was 'moderate'. This indicates that there are factors that help maintain their PWB. However, there are other factors that prevent them from reaching a high level of PWB and one among these factors is the sleep quality of the personnel, as the present study has substantiated.

Conclusion

Sleep quality is significantly correlated with life satisfaction domain of psychological well-being.

The sleep quality among both groups of personnel is poor; however the Constables have a significantly poorer sleep quality.

Both groups do not differ significantly in terms of their psychological well-being, as their scores indicate that they have 'moderate' level of psychological well-being.

Although these results are not generalizable to the entire organization, results indicate the necessity to take steps in the direction of improving the sleep quality of the forces, in the interest of the organization.

Implications of the study

Since life satisfaction (a domain of PWB) is associated with sleep quality, the organization will benefit from incorporating certain practices into the training of personnel.

- Formal education on sleep hygiene (Brown, Berry & Schmidt, 2013). Such practices may include relaxation exercises just before sleep for example muscle relaxation, avoiding caffeine containing products in the evening etc.
- Implementing specific sleep / rest plans based on which regions in the country face higher stress (e.g. Areas where Anti-Naxalite operations are ongoing) since higher stress is associated with poor sleep quality.
- Intervention plans based on cognitive behavioural therapy (CBT) which helps by changing dysfunctional beliefs about sleep.
- Education programmes like nutritional guidance and impact of physical exercise on sleep quality.
- The deleterious consequences of shift work can be optimized by incorporating short naps of about 20-40 minutes as several studies have found it helpful in improving sleep quality, mood and performance.

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