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NATURE OF WORK AND FATIGUE: ROLE OF YOGA TRAINING

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This study investigates the presence of various dimensions of fatigue in different work groups. The sample consisted of software professionals, executives, academicians, students and clinical sample (N=222). These groups were assessed for their general fatigue, physical and mental fatigue level. The level of activation and motivation were also assessed using Multi Dimensional Fatigue Inventory. The multiple comparisons of the means of the subgroups imply the nature of work and job related factors influencing the fatigue experience.

A sub sample of the above group (n=51) underwent training in yoga posture and breathing exercises. The pretest and posttest scores on the multidimensional fatigue inventory reveal the significant reduction only in general fatigue level. The findings are discussed in relation to the methodological approach and the sensitivity of the tools used in this study.

Fatigue is an everyday experience of people commonly acknowledged. This can result from over activity and exertion. Acute fatigue is a protective symptom often observed in a healthy population. Stress or strain response mainly includes physical or mental fatigue. Fatigue may be as transient that it may last few hours or sometimes it can last for days. Majority of people feel relief from fatigue once they rest or take a good night's sleep. Proper diet, relaxation and exercise play an important role in relieving people from mental and physical exertion. Many times in day-to-day life fatigue is resolved quickly. But, when the symptoms continue and persist even after sleep, it hampers person's efficiency and the person may gradually slip into distress.

Fatigue is a major clinical symptom in chronic fatigue condition. Many psychosomatic diseases are strongly associated with fatigue. Appels, Williams and Scouten (2000) have demonstrated that feeling of fatigue and loss of energy as a strongest predictor of myocardial infarction. The depression and irritability components could predict disease only after controlling for the fatigue components. Thus fatigue or vital exhaustion emerged as strongest clinical sign.

Overwork of specific muscle group, type of occupation, emotional changes, daily hassles, changes in energy production can cause fatigue and influence human performance (Piper, 1986). One of the major issues related to fatigue is its association with the quality of life of the patients. In general population, the degree of work motivation, major life achievements may get reduced due to generalized tiredness. Pollution, use of stimulants, smoking, inadequate diet, impaired digestion, even improper breathing are implicated in the gradual onset of fatigue. An

increased level of energy, stamina and motivation is reported once the individual resumes some form of energization exercise.

Smets, Garssen, Bonke and De Haes (1995) have developed a multi dimensional fatigue inventory, which assesses the generalized fatigue, along with physical fatigue, mental energy, activation and motivation level. This brief, yet reliable inventory is found to be highly sensitive and can be used on general population. It is free from somatically loaded items, hence reduces a "sensitivity bias" in the respondents. A higher score indicates higher level of fatigue, reduced interest in activity and motivation. The present study aims to identify the fatigue level of a cross section of the people in different work status and evaluate the role of yogic relaxation and awareness training in reducing the generalized fatigue experience.

Table 1

Mean age and gender wise distribution of the sample

Work status	N	Mean Age	SD	Male	Female
Managers	41	35.63	7.67	41	0
College teachers	79	32.87	8.34	26	31
Cancer patients	31	46.48	13.90	19	11
Software engineers	31	28.25	4.25	28	3
College students	40	18.09	0.80	0	40
Total	222	31.86	12.21	114	87

METHOD

The subjects for the initial survey on fatigue were purposively taken from different occupational groups. Occupational groups included were software professionals (n=31), production managers (n=41), college lecturers (n=79), college students (n=40), and a clinical group (n=31). These groups were included because they represented different nature of work and time schedules. Software professional and managers from manufacturing industry had long working hours, whereas the academicians had fixed working hours. Each occupational group was identified and subjects were randomly selected within each group. After obtaining the consent of the subjects, they were assessed on Multi Dimensional Fatigue Inventory (MDFI). This questionnaire was administered in a group setting to all the subjects, except to the clinical patients, to whom it was individually administered.

The data on 222 subjects were analysed using Duncan's Multiple Range Test and independent group t test.

RESULTS AND DISCUSSION

The sample included 114 males(58.16%) and 87 (44.38%) females. The mean age of the males was 36.28 ± 10.30 years and that of the females was 26.49 ± 11.84 years. There was no significant difference between genders with respect to age. However, the mean age across the profession and clinical group differed significantly. The cancer patients (clinical group) were significantly older (46.48 ± 13.90 years) than any other group. Managers, teachers and software professionals were in middle age and the college students were the youngest (18.09 ± 0.80 years).

Duncan's Multiple Range Test was applied to analyze the subgroups that markedly differ from others based on their mean scores in different dimensions of fatigue.

Table 2

Mean scores across the groups on MDFI and significant mean range

Groups	Mean general fatigue level	Mean mental fatigue level	Mean physical fatigue level	Mean reduced activity	Mean reduced motivation
Managers	9.40	9.42	8.93	8.82	6.42
College teachers	10.46*	8.70	9.26	8.32	7.43
Cancer patients	9.77	7.22	12.41*	13.25*	10.29
Software engineers	8.77	8.96	8.93	7.16	6.00
College students	10.76*	11.54*	10.90*	10.61*	7.38

*(p >.05)

The ***general fatigue*** refers to the global fatigue level irrespective of physical or mental dimension. Though the between group differences are marginal, the range of means indicate that the software professionals are least fatigued than the teachers and students. Academic jobs are prone to be more demanding than the others. The clinical patients and managers are found to be closer to that of software workers. Keeping in view the smaller numbers in each sub group, the generalization of the findings is limited. The results reveal overall mean fatigue level to be higher in those working as academicians (10.46) and those pursuing academics (10.76).

Mental fatigue is characterized by tiredness due to mental exertion. Tasks involving thinking, reflection, analysis can create more mental fatigue. Information overload, lack of support systems can heighten the stress on mental activities. Mental fatigue level indicates a stress at emotional and cognitive level. The students are found be highest in their mental fatigue and significantly differed from all other groups and formed a sub group.

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On the other hand cancer patients were lowest in their experience of mental fatigue and thus significantly differed from other sub groups.

It was evident that students at graduate courses in India are under great pressure to achieve. Their career options and employment to a large extent depend upon their academic success. The burden of competition, the examination patterns etc., put great strain on these students and reduce their mental energy. Further, lack of monetary compensation, material support that is available to other groups (salaried people) is not there for the students. Research on stress and strain reveal that lack of control and decision latitude can aggravate the strain response. Mental fatigue in this group may be indicative of such a strain.

The cancer patients of this study experienced least mental fatigue, as majority of them were not working and were on medication. There was obvious dependence on doctors and a resigned attitude among these patients. Other than the challenge of combating the disease these people had little mental tasks to put a strain at the psychological level. However, this low score on mental fatigue cannot be interpreted as low stress or strain.

Physical fatigue is an indicator of somatic tiredness in daily activities, movements and stamina. Software engineers, teachers and managers form a directly a sub group having similar physical fatigue level. However the clinical group and students form another subset having higher physical fatigue. Typically, the clinical groups are demonstrating pathology and are exposed to invasive treatments such as chemotherapy and radiation. These procedures to a large extent sap the physical energy of the patients. Hence higher score on this dimension is justifiable. A similar trend is reported in earlier studies with cancer patients using the same questionnaire.

College students are comparatively younger than the cancer patients and are found to be similar to clinical group. These findings show that use of multidimensional scale for assessing fatigue may be too reductionistic and reduce the clinical experience of cancer patients to numerical values similar to that of college students. However, the measuring of this fatigue for clinical patients may vary from that of college students. Descriptive meanings as suggested by Minir Krishnaswamy (2000) can give a better understanding of physical fatigue of the two groups. As it is evident in the earlier dimensions, the college students have consistently experienced greater mental and generalized fatigue. Likewise, it is obvious at physical level also. The experience of fatigue when qualitatively analyzed through interviews can give a better sense and meaning to deal with the stress. The physical exhaustion of cancer patients may reflect a dysfunction at physical level characterized by pain and effort. Whereas the physical fatigue of young students may represent exhaustion due to academic pressure.

Activation refers to the energy level and the rate of work interest in an individual. Fatigue may result in lethargy, procrastination, inertia and a reduced speed. There is again a significant difference between groups. Clinical group is found to be least active than any other group followed by college students. The most active, dynamic and energized group is found to be software workers; the managers and teachers form part of this subset. The cancer group and academic students form a separate subset. A higher score (13.25 and 10.61) indicate a difficulty in maintaining energy and enthusiasm in daily activities.

Motivation is strongly influenced by the fatigue whether it is physically induced or caused by mental fatigue. Energy, interest can wane due to other 4 factors. The highest motivation is observed in software group. The cancer patients are least motivated. The academicians and students are similar in their experience of motivational fatigue. In spite of higher scores in other dimensions, students motivation level seems to be sustained (mean =7.38). whereas the cancer patients exhibit a low enthusiasm(mean = 10.29).

In general, the software workers are found to be least fatigued. The college students were most fatigued. It can be inferred that the fatigue as a psychophysiological symptom is not only related to clinical condition, but is more influenced by the life style and work status. Economic independence, social support and recognition and work atmosphere to a large extent reduce the stress. The burden of achieving and academic pressure may make the students more vulnerable.

Gender Differences in Fatigue

The data on multidimensional fatigue inventory was analyzed for gender differences in the experience of fatigue. The male subjects and females of the study only differed in the generalized fatigue. The women were more generally tired than men. In all other sub components they were very similar. Though it is expected that working women are vulnerable to more strain due to dual role life style, this study shows that they are equally energetic and motivated as men even though they report a little higher level of fatigue.

Table 3
Gender differences in fatigue level

Dimension	Males n=116		Females n=87		t-value	Significance
	Mean	SD	Mean	SD		
GF	9.53	3.06	10.35	3.84	3.98	0.01**
MF	9.07	3.48	9.56	3.95	0.04	0.480.
PF	9.45	4.34	10.43	3.74	1.74	0.18

RA	9.22	4.25	9.65	3.79	1.74	0.18
RM	7.22	2.94	7.51	2.81	0.12	0.32

** P>.01

GF = General Fatigue, MF = Mental Fatigue, PF = Physical Fatigue, RA = Reduced Activity, RM = Reduced Motivation

It is not only factors like noise, pollution or temperature, which are considered stressful, but many aspects of work life can be hard to tackle which taxes individuals' stamina. Political, administrative structure of the organizations, lack of sensitivity, strained relationships can be major sources of stressors. However, it was not in the purview of this study to analyze the causes of fatigue.

STUDY 2

YOGA TRAINING AND FATIGUE LEVEL

Earlier studies have revealed the positive effect of yoga training in enhancing stamina, mental concentration and activity level (Harvey, 1983; Berger, & Owen, 1992; Wood, 1993).

Randomly 25% of the total sample was selected for the training purpose. This sample (n=57) was given exposure to ten session of yoga training. Yoga training included asana practice, pranayama and recitation of 'om' mantra. Each session was for a period of 1 to 1½ hours. Training started with the general instructions about the yoga practice and postures were executed in coordination with breath. The postures were taught using *viniyoga* principles i.e., modification and adaptations to suit the needs of individuals. The participants were taught *sitali* and *nadishodhana* pranayama and there were no fixed ratios of inhalation or exhalation. Emphasis was on practice according to the capacity of the individual. The subjects were asked to focus and sustain the focus on 'om' recitation. The subjects were given written course sheet as guidelines for practice at home. The investigator and three demonstrators who helped the subjects in their practice supervised each session. After the completion of the supervised training, the participents were reassessed on Multi Dimensional Fatigue Inventory .

The pre training mean scores of the subjects on all dimensions of fatigue and post training mean score were compared using paired 't' test.

Table 4

Mean differences and SD of trained subjects on pre-post measures

Variable	Time	Mean	SD	r	t	Probability
General	Before	9.92	3.19	0.38	2.16	0.03
Fatigue	After	8.92	2.70			

Physical Fatigue	Before	9.50	4.12	0.33	1.08	NS
	After	8.84	3.44			
Reduced Activation	Before	9.07	3.84	0.61	1.21	NS
	After	8.52	3.48			
Reduced Motivation	Before	9.00	3.88	0.15	0.94	NS
	After	8.35	3.63			
Mental Fatigue	Before	7.56	2.63	0.42	1.15	NS
	After	8.01	2.54			

NS - Not significant statistically

There was a significant reduction in the general fatigue level after the training. The subjects in the group reported an overall improvement in their energy level characterized by feeling of fitness and relaxation. Similar trend was noticed in the physical fatigue level, motivation and activation level. But the intensity of the change was not marked enough to show a statistical significance. The mental fatigue level of the subjects has been found to be elevated but this increase was not statistically significant.

There were no gender differences at the base line level on any of the components of fatigue. However, the female subjects in this sub sample have showed a significant gain in their motivational level after the yoga training. Women had a mean score of 8.83± 3.29 on this dimension at baseline and their scores reduced to 7.54±2.97 after training showing significant gain in motivation level ($t = 2.02 > 0.04$). Thus showing that women have responded to training slightly better than men.

Yoga practice can induce a sense of freshness and well being as a simple form of relaxation procedure. The findings in this study partially confirm the above statement. The general fatigue component of the MDFI is stated to be the most sensitive dimension for changes in the fatigue levels (Smets et al., 1995). The results in the study confirm this sensitivity. On all other components the changes are not noticeable. The findings do partially support the fact that training in yoga reduces the fatigue, tension etc. But, it must be noticed that the assessment were carried out after the completion of training, not immediately after the practice. The insignificant changes can be attributed to many factors. One is the reported lower sensitivity of reduced activity scale, mental fatigue scale as stated by the authors. Secondly, the heterogeneity of the group and their motivation and compliance with the practice. In any of the evaluative studies apart from having a control group there is also a need for continuous training and assessments. This study being a single group experimental design had only one-shot assessment. In the light of the limitations the following conclusions can be drawn.

CONCLUSION

Training in breathing and simple postures can reduce the general fatigue level.

The short term yoga training could not demonstrate any reduction in mental fatigue and physical fatigue. Similarly, changes in motivation and activity were also not seen.

It appears that to ascertain the effectiveness of the technique it is essential to use a more controlled long-term intervention.

Use of positive mood states as a sensitive outcome measure along with fatigue scale is warranted. Inclusion of a larger sample can answer the contribution of individual factors to the effective and positive changes.

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