Psychological Disorders Affects Sickness Absenteeism in Software Industries

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Abstract— *The software industries give employment opportunity to more than 5 trillion people. They are working more hours per day than in any other profession. The prolong working hours including night shifts of employees working in software industries makes them prone to develop psychological disorders. The study conducted to explore the prevalence of psychological disorders like stress, anxiety and depression among IT professionals. Studies have not been conducted to find out the association between these disorders and Sickness absenteeism. To find out the prevalence of Psychological disorders, its association with Sickness absenteeism among Software professionals. Randomly selected 310 subjects from 20 IT companies at Techno Park, Trivandrum, Kerala. Semi-structured questionnaire, Depression Anxiety Stress Scale (DASS) was used for the study. Chi² test, t test were done to compare continuous variables. Binary logistic regression was used to test the strength of associations of independent variables. The odds ratio (OR) with 95% confidence interval (CI) was obtained. Anxiety was the most prevalent psychological disorder among software professionals followed by depression and stress. Those who had taken sick leaves above 70% had anxiety 64.2 %, had depression 57.8 % and stress 55.3%. In logistic regression only anxiety and depression were found to be the predictors of significant sickness absenteeism which was quantified with help of Bradfords Factor score. The result showed that anxiety was the most prevalent psychological disorder followed by depression and stress. Psychological disorders like stress, anxiety and depression were also seen more among female employees than males.*

Keywords— *Psychiatric disorders, Sickness absenteeism, Software industries*

I. INTRODUCTION

Software professional is defined as the technology that is used to acquire, store, organize, process and disseminate processed data that can be used in specified applications with the help of computers or computer networks or any other type of computing devices. [1] The high demand for the services provided by this industry has created a large number of fast-growing and high paying jobs. The Information Technology (IT) industry is the largest among computer-related industries, employing more than 5 trillion people; these occupations are projected to add about 557,100 new jobs. The key skills of IT professional should be good computer competency, problem solving abilities, critical thinking, clear written and spoken communication skills and time management.[2] Taking into account the complicated work pattern, many IT professionals are bound to work more hours per day than in any other profession. They have shift works including night shifts, as many IT industries outsource their services to countries in different time zones. The works they do over computers require immense knowledge and skill in the field which they are working which make them prone to develop psychological disorders. [3] Psychological issues in this context have been defined as the overall feeling of anxiety, depression, and stress. Workplace stress can arise due to both workplace and employee factors, but workplace factors play the primary role. The fear of losing the job, as lot of graduates enter into the field every year and lack of being

updated about the latest skills makes them anxious about the job security.

Techno stress is a phenomenon of stress that arises due to use of computers; it is due to the inability to cope up with the new computer technologies. The older generation is also facing stress from using computers called Techno stress. [4] The health related issues make them anxious about their wellbeing and relies on internet for finding out a possible cause for their symptoms. This phenomenon of doing internet search for health related information by people who are having a tendency of health anxiety is known as Cyberchondria.[5] The informal and unauthentic information found through internet search pushes those with health related anxiety into more anxiety and distress. According to a cross sectional study conducted among 205 IT employees in Chennai found that prevalence of Cyberchondria to be 55.6% among IT professionals. It has been noted that the general mental health was inversely related to severity of Cyberchondria, ie; lower mental health, greater the Cyberchondria and the study concluded that poor mental health in the form of anxiety disorder[5].

Absenteeism contributes largely to loss of productivity, reduced quality of service and huge economic loss, [6] especially in developing country like India. Sickness absenteeism is not just a factor of ill health but it includes psychological factors like adjustment disorders, coping up behavior, and type of personality. [7]

As Information Technology plays a crucial role in this era, the mental health of the employees working in this field should be given proper consideration. Various studies have been done to explore the prevalence of occupational disease among IT professionals, but none has been done to find out the association between these occupational diseases and sickness absenteeism. This study aims to find out such disorders and its prevalence and how far is it associated with sickness absenteeism among IT professionals.

Objectives

1. To find out the prevalence of psychological disorders among software professionals.

2. To determine the contribution of these diseases towards sickness absenteeism.

II. MATERIAL AND METHODS

Study design

Sampling method used in the study is multi stage random sampling. Techno park Trivandrum has three sectors, Phase 1, Phase 2 and Phase 3. Out of which Phase 1 was randomly selected using lottery method. Phase 1 houses for more than 400 IT companies each company with an approximate 100 IT employees, addressing for the non-responders and

companies those not giving permission for conducting the study, assuming it to be 25%, effective sample size of was assumed to be 400 from which 20 IT companies were randomly selected from phase 1 using random number table and 20 subjects satisfying the inclusion criteria were selected from each company by lottery method, the process continued until the desired sample size of 310 has been obtained.

Inclusion criteria

Employees who have been working in IT field for at least one year were included **Exclusion Criteria**

Other blue collar employees who do not have a sedentary style of work and those who are not using computers on daily basis will be excluded from the study.

Study Tools

1. *Semi-structured questionnaire* about basic socio demographic profile, work pattern, number of sick leaves taken.

2. *Depression Anxiety Stress scale (DASS21)* Henry & Crawford (2005) [8] to seek information regarding psychological disorders. It is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress.

Data Collection Technique

Data was collected by visiting the IT companies at Techno park Trivandrum after doing the random sampling method. After getting permission from the head of the institution Employees of the company who satisfied the inclusion criteria were identified. The participants of the study and were given the self-administered questionnaire. Prior to beginning of the study the information on the study and the consent form was given to the participant. Confidentiality was maintained throughout the study.

Data Analysis

DASS21 was calculated accordingly and the participant's psychological status. Proportions of psychological disorders like depression, anxiety and stress are being calculated and its association with sickness absenteeism is estimated.

Bradford Factor (BF) is a tool that provides the pattern and rate of absenteeism by an employee. The Bradford's Factor score thus obtained will guide the employer in what action to be taken towards the employee on behalf of his sickness absenteeism. The trigger point on BF score scale has been set at a BF score of 50 in many references.[9] So in this study we have considered those with a BF score of 50 or above to be having significant sickness absenteeism that is to be noticed by the employer and to take necessary actions

Bradford's formula is used to quantify sickness absenteeism and by using the reference scale for Bradford's factor, a cut off of Bradford's score 50 has been set. Participants scoring a score above 50 were counted as having significant sickness absenteeism.

The comparison between groups of qualitative variables was performed using a Chi² test and t test was done to compare continuous variables. Binary logistic regression model was used to test the strength of associations of independent variables. The odds ratio (OR) with 95% confidence interval (CI) has been obtained. The significance level was considered as *P* < 0.05.

III. RESULT AND DISCUSSION

In this study majority (58.7%) of the study participants were males, this finding was consistent with most of the studies conducted among IT professionals.[9,10,11,12] This finding could be mainly attributed by the culture and social factors of our country, where women are having more responsibilities in family life than in professional life and consider opting for professions which are less stressful and hectic unlike IT profession,[13] but studies done among IT professionals in Europe and US also found significantly lesser proportion on females working in IT industries. [14]

Out of the total 310 study participants 182(58.7%) were males and 128(41.3%) were females. The mean age of the study participants were 28.93 (SD±5.3) years. Majority (58.1%) of them belonged to the age group 26-30yrs, with the youngest aged 20yrs and oldest aged 48yrs.The percentage of employees who were married was 45.5%.The age group 23-29yrs, this young age group dominating the IT field could be due to fact that IT profession is fairly a new, emerging and promising profession and youngsters are attracted more and are having more computer related knowledge than the older age group. Another relevant yet unsettling reason for youngsters dominating the IT sector could be the high prevalence of occupational diseases and stress from work, which in turn results in early voluntary retirement. Majority (80%) of the study participants had a work experience of 1-3 years this result was found to be consistent with similar studies done on IT professional in India. [11], [15] Majority (70.9%) had a daily work time of 6-9hrs which is similar to other studies [11]

Stress

The levels of stress and found that 54.2% had stress out of which 24(7.7%) were having extreme stress, 48(15.5%) were having severe stress, same percentage (15.5%) was having moderate stress, 38(12.3%) were having mild stress. Among the participants with stress

majority were females (60%)than males (49.5) p=0.043.

IT professionals are prone to develop stress due to the nature of their work with long work shifts, target achievements, work overload and night shifts. In this study stress was found to be present in 54.2% of the study participants, this result is comparable with the study done by *Darshan et al* on IT professionals.[12] Stress was found more in females than males (60.% vs 49.5%), similar results were found in studies conducted by *Alireza Bolhari* et al on IT professional in Iran and by *Sathiyakala* on IT professionals in India, [16,17] the reason for females having more stress could be due to more responsibility they have than males. Stress was found to be more among unmarried professional than married (55% vs 44.9%) this result is consistent with the findings by *Saurabh R Shrivastava et al* on IT professionals in Mumbai.[10] The decreased prevalence of stress among those who are married could be due to fact that, married employees are able to wind down their stress at home by spending time with their family members whereas unmarried employees had no such option so they had a tendency to work over time, and working overtime leads to more stress. Among those who having stress, a large proportion (79.2%) was working in the IT industry for 1- 3 years, similar finding was found by *Naveen Remesh et al*.[23] The mean (SD) number of sick leaves taken by those with stress were comparatively more than those without stress (6.7±5.8 vs 5.3±5.5) and was found statistically significant (p=0.036). This could be due to the misuse of sick leaves by the employees who are having high levels of stress and might consider skipping from workplace a potential relief from stress. In this study it has been found that among those with significant sickness absenteeism (BF score >50) majority (71.9%) were having stress, as the association between stress and BF score was found to be statistically significant (P=0.001 OR=2.7 95%CI-1.6-4.5). Studies have shown that greater levels of stress has greater risk of development of metabolic syndromes. [17,18] So it is important to access the workplace stress and interventions like stress management programs should be conducted for the betterment of the employees.

Anxiety and depression

Using DASS 21 questionnaire found that 63.5% were having anxiety, out of which 24.2% were having extreme anxiety,22.3% were having moderate anxiety 8.4% were having severe anxiety and 7.4% were having mild anxiety.Among the study participants, anxiety was found more in females than in males (64.5% vs 62.7%, p=0.60).

Using DASS 21 found 61.3% were having depression, and out of those with depression 18.4% had moderate depression, 15.5% had extreme depression, 14.2%

had mild depression, 12.6% had severe depression. Among the study participants with depression females were more than males (65.7% vs 58.3%, p=0.189).

Anxiety and depression are the most common mental disorders being reported globally.[33] In this study the prevalence of anxiety was 63.5%, and among those with anxiety majority were males (57%) similar result was reported by *Archana Ghatule et al*. [9] Among those with significant sickness absenteeism (BF score>50) majority (75.4%) were found to have anxiety, and was found to be statistically significant (P=0.023).IT professionals may have greater levels of anxiety compared to other professions due to fact that IT industry is a rapidly developing one, there are changes to the software they are working on, changes to the platform of operating systems, even mobile platforms are updated frequently nowadays, the inability to cope up with these changes makes them anxious about their job security because those who are not talented enough to adapt to these changes and develop new skills are vulnerable to be laid off from his job.[10]

Depression was found to be present in 61.3% of the study participants, which is comparable with the results of study done by Padma *et al*. [4]Among those with depression males were higher in proportion than females (55.3% vs 44.7%) which is in par with the findings of study done by *M.S Darshan et al* on IT professionals in India.[12] Among those with sickness absenteeism majority (78.9%) had depression. There are roots for depression in every workplace, but in a place like IT industry the cause of depression is mainly due to lack of human interactions. IT Employees have a much monotonous and isolated life at workplace, which in turn results in development of depression.

Sickness absenteeism among the study participants

The mean number of sick leaves (SD) taken in a year by each employee has been calculated and found to be 6.12(±5.7) days. Females tend to take more sick leaves than males (6.5days ±5.4 vs 5.8days ± 5.9), however this difference was not found to be statistically significant.

Bradfords factor (BF)

Majority of the employees 253(81.7%) had a BF score of less than 50 and no actions were considered to be taken on behalf of the sick leaves they have taken in the past one year. 20(6.5%) employees were having BF score within the range 50-124 and were considered of giving a verbal warning by employer for the amount of sick leaves they have taken. 21 (6.8%) had a BF score within the range of 125-399 and were considered to be given first written warning, 8(2.6%) had BF score 400-649 and were considered to be given the final written warning and another 8(2.6%) participants had a BF score of more than 650 and were considered to be dismissed.

Sickness Absenteeism

In a study done on industry workers found that females had a 2.6 times Odds of sickness absenteeism than males, this is in consistent with our study report that the mean (SD) number of sick leaves taken by females were more than that of males (6.5days ±5.4 vs 5.8days ± 5.9).[19,20] The current study also reported that 64.2% of those who had taken sick leave had anxiety, 63.1% had depression and 55.3% had stress. In order to find the independent factors influencing significant sickness absenteeism which is considers as a BF score of more than 50 in this study, a logistic regression model was made which was adjusted for age and gender. And the factors found associated with significant sickness absenteeism were, Anxiety OR=2.2 (1.1-4.7), p=0.026 and depression OR= 2.3 (1.2-4.7) p=0.019, those with these factors have around 2 times the risk of having significant sickness absenteeism. The model was adjusted for potential confounders like age and gender. Psychological factors like anxiety and depression, study done by *Kim et al* have shown that a high proportion of computer use at work may be associated with depressive and anxiety disorder.[21] it could also be an important contributor for sickness absenteeism.

Correlation between BF score and other factors

Upon doing bivariate Pearson correlation, the BF score had a correlation with stress score (0.29p=.001), anxiety score (0.263 p=0.001) and depression score (0.312 p=0.001). Depression score had a moderate correlation with BF score, whereas stress score and anxiety score had weak correlation with BF score as given in Table 1.

Stress and associated factors

Stress was found to be present in 168(54.1%) of the study participants Stress was found more in females than in males(60.9% vs 49.5%), this difference was found to be statistically significant (p=0.043, OR= .6, 95% CI 0.3 -0.9). Bradford's score also showed statistical significance with stress status p=0.001 with an odds ratio of 2.7 (95% CI 1.6 -4.5). Those with significant sickness absenteeism (BF score>50) majority (70.3%) had stress. All other factors were not found to be statistically significant with stress status as indicated in Table 2.

Anxiety and associated factors

Anxiety was found among 197(63.5%) of the study participants. Anxiety was found more among males than females (57% vs 43%).Statistical significance was found between Bradford's score and status of Anxiety with p value =0.023 OR=2.1, 95% CI 1.09 -4.0). Those with significant sickness absenteeism (BF score>50) majority (75.4%) had anxiety. Other factors were not statistically significant with anxiety status as given in Table 3.

Depression and associated factors

Depression was found among 190(61.3%) of the study participants. Bradford's score was found statistically significant with status of depression with a p value =0.002 and an ODDS ratio of 2.8, 95% CI 1.4 -5.7). Among those with significant sickness absenteeism (BF score >50) majority (78.9%) had depression as given in Table 4.

Factors associated with Sickness Absenteeism

Bivariate analysis between those who have taken sick leaves and those who have not taken sick leaves with various psychological factors indicates that those with anxiety majority (91.9%) had taken sick leaves, whereas those without anxiety 89.9% had not taken sick leaves (p=0.46). Those participants who had taken sick leaves higher proportion had stress as compared to those who haven't taken sick leaves (55.3% vs 44.7% p=0.27). Those with depression majority had taken sick leaves than those without depression (63.1% vs 36.9%) and this difference was found to be statistically significant with p=0.036 as given in Table 5.

Mean number of sick leave

Considering the psychological factors like stress, anxiety and depression number of sick leaves taken by those with stress was 6.7(5.8) and those without stress was 5.3(5.5) days, this difference was found to be statistically significant (p=0.036), those having anxiety the mean (SD) number of sick leaves taken were 6.5(5.4) and those without anxiety it was 5.3(6) days, this difference was not found statistically significant (p=0.62) and those with depression the mean (SD) number of sick leaves taken was 7(5.9) days and was higher than those without depression which was 4.8(5.2) days, this difference was found to be statistically significant (p=0.001) as given in Table 6.

Regression model for factors affecting significant sickness absenteeism (BF score>50)

The Bradford score (BF) which was used as a surrogate marker to access the sickness absenteeism, on bivariate analysis had shown statistically significant association with stress (p=0.001), anxiety (p=0.023) and depression (p=0.002). Upon using Binary logistic regression model adjusted for age and gender we found the independent variables associated with significant sickness absenteeism (BF score >50) as anxiety and depression. The model was able to explain 25.5% of variance in significant sickness absenteeism (BF score>50) as given in Table 7.

IV.   CONCLUSION

IT professionals are subjected to work under strict deadlines and long working hours which make them exposed to risk factors that lead to various psychological problems. Majority of the employees at IT industry are at their young age. Anxiety was the most prevalent (65%) psychological disorder present among the IT professionals followed by depression (60.7%) and stress (51%). Psychological disorders like stress, anxiety and depression were also seen more among female employees than males and 64.2% had anxiety 63.1% had depression. and 55.3% had stress, however anxiety and depression were found to be the predictors of significant sickness absenteeism which was quantified with help of Bradfords Factor score. Health of the employees is a major factor contributing to the productivity of an industry, healthy employee's offers better performance and thereby increasing the productivity. Therefore priorities should be given to the IT employee's health and welfare.

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Table 1: Correlation between BF score and other factors

Variable	Mean(SD)	Pearson correlation*	Significance
Daily work time	8.8(1.3)	.043	**.453**
Stress score	16.3(10.9)	0.295	**.001**
Anxiety score	12.1(9.5)	0.263	**.001**
Depression score	**14.5(11.6)**	**0.312**	**.001**

*Correlation is significant at the level 0.001

Table 2: Stress and associated factors

Variables	Stress Present	Stress Absent	P value	(95% CI)
Gender				
Male	90	92		*OR= 0 .6*
	(49.5%)	(50.5%)		
			P=0.043	
Female	78	50		*(95%CI, 0 .3-0 .9)*
	(60.9%)	(39.1%)		
Marital Status				
Married	75	66		
	(53.2%)	(46.8%)		
			P=0.746	
Unmarried	93	76		
	(55%)	(45%)		
Daily work time				

1-6hrs	6 (3.8%)	8 (5.6%)		
6-9hrs	114 (71.3%)	106 (74.6%)	p=0.211	
9-12hrs	36 (22.5%)	28 (19.7%)		
>12hrs	4 (2.5%)	0		
Bradford score				
<50	97 (46.4%)	112 (53.6%)		OR= 2.7
			P=0.001	
>50	**71 (70.3%)**	**30 (29.7%)**		(95% CI 1.6-4.5)

Chi² test

Table 3: Anxiety and associated factors

Variables	Anxiety Present	Anxiety Absent	P value*	ODDS ratio* (95% CI)
Gender				
Male	110 (57%)	72 (61.5%)		
			P=0.431	
Female	83 (43%)	45 (38.5%)		
Marital Status				
Married	83 (43%)	58 (49.6%)		
Unmarried	110 (57%)	59 (50.4%)		
Daily work time				
1-6hrs	10 (5.2%)	4 (3.4%)		
6-9hrs	136 (70.5%)	84 (71.8%)		
9-12hrs	4 (22.3%)	29 (24.8%)		
Bradford score				
<50	**150 (59.2%)**	**103 (40.8%)**	P=0.023	OR= 2.1 (95% CI 1.09-4.0)

>50	**43(75.4%)**	**14(24.6%)**	

Table 4 Depression and associated factors

Variables	DepressionPresent	Depression Absent	value*	ODDS ratio* (95% CI)
Gender				
Male	104 (55.3%)	78 (63.9%)		
Female	84 (44.7%)	44 (36.1%)		
Marital Status				
Married	85 (45.2%)	56 (45.9%)		
Unmarried	103 (54.8%)	66 (54.1%)		
Daily work time				
1-6hrs	10(5.3%)	4(3.3%)		
6-9hrs	124(66%)	96(78.7%)		
9-12hrs	50(26.6%)	22(18%)	P=0.063	
Bradford score				
<50	**143**	**110**		*OR=2.8*
>50	**(56.5%)**	**(43.5%)**	*P=0.002*	*95% CI, 1.4 - 5.7)*
	45(78.9%)	**12(21.1%)**		

*Chi² test

Table 5: Factors associated with sick leave

Variable		Sick leave	No sick leave	P value*	(95%CI)
Anxiety	Present	181 (91.9%)	16 (8.1%)		**1.34 (.6-2.9)**
	Absent	101 (89.4%)	12 (10.6%)	0.460	
Stress	Present	156 (55.3%)	12 (42.9%)	0.207	**1.65 (73.61)**
	Absent	126 (44.7%)	16 (57.1%)		
Depression	Present	178 (63.1%)	12 (42.9%)		
	Absent	**104 (36.9%)**	**16 (57.1%)**	0.036	**2.2 (1.03-5)**

Table 6: Mean number of sick leaves

	Variable	Mean (SD) No. of sick leaves	P value*
Stress	With stress	6.7(5.8)	
	Without stress	5.3(5.5)	0.036
Anxiety	With anxiety	6.5(5.4)	
	Without anxiety	5.3(6)	**0.62**
Depression	With depression	7(5.9)	0.001
	Without depression	**4.8 (5.2)**	

* Independent sample t test

Table 7: Regression   model for factors affecting significant sickness absenteeism

(BF score>50)

Variables	**Crude Odds ratio**	**Adjusted Odds ratio**	**95% Confidence Interval**	**Significance**
Anxiety	3.2	2.2	1.1-4.7	**0.026**
Stress	2.7	0.8	0..39-1.6	0.54
Depression	3.7	2.3	1.2-4.7	**0.019**