



## STUDY OF CRI PROBLEMS AMONG IT PROFESSIONALS

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### **Abstract**

*Along with the great opportunity that IT industry has brought with it, there is also a serious threat to those employed. We find that employment in IT industry on one hand is very remunerative, challenging and high-fly at the same time it poses serious threat to the long-term welfare of the employees. It causes stress at two levels, one is at physical and the other is at intellectual. The paper illustrates the existence of CRI (Computer Related Injuries) among IT Professionals. Total 535 IT Professionals have been surveyed. The paper also checks two hypotheses one is regarding association of CRI problems and sleep hours, other is regarding association of it with exercise*

### **Introduction**

The huge employment potential in IT sector and the interest it evokes among young and talented aspirants is both an opportunity and threat to those who are seeking employment and also to those who are already offers employed. On one hand it affords tremendous opportunity to the cream of the society to get employment in full. The job is exciting to the young, craving for achievement. It gives them opportunity to interact with the international communities and joy of travel world-wide. Thus there is a feeling of world-citizens among these people. It is achievement with commensurate remuneration too. The trained IT-Professionals get salaries and perquisites that are about the best in any industry. In fact, it is not difficult to find people with higher slab of five figures or even six figure take-home salary.

Along with the great opportunity that IT industry has brought with it, there is also a serious threat to those employed. Almost all the IT projects work with a very tight and hectic schedule. As the entry barrier is not very constraining, there is severe competition. So it is imperative that IT industries stick to the pre-decided time-frame, failing which, they may be out of the business. The whole pressure of completing a task within a specified time is felt both by the employers and the employees. While the regular working hours per day are nine, the system developers on their own, work for ten to fifteen hours a day regularly. Day-in and day-out this continues. They get hardly four or five hours of sleep. Even this is not worry-free period at all, though they may be physically resting on bed, their thoughts would invariably take them to the problems they would have encountered in the systems development. Thus, the body does not get the rest it badly needs as the mind is still at work. This rest does not fresh them up. Thus, almost for twenty four hours a day, these people would be haunted by their work pressure. A person could tolerate this situation only for year or two, but after all a human mind and body is subject to certain natural rules which have to be honored. When these are repeatedly violated, a time would come, when the human body and mind would refuse to obey the natural commands and would ultimately break-down.

Thus, we find that employment in IT industry on one hand is very remunerative, challenging and high-fly at the same time it poses serious threat to the long-term welfare of the employees. It causes stress at two levels, one is at physical and the other is at intellectual.

- i. Physical stress is caused by long hours of mentally stressful work. The nature of work demands that the employees occupy their seat during their office hours. They sit in a unique pose without giving sufficient movement to their body as a whole. This leads to rigidity of various joints and a host of other physical problems like piles, visual impairment, backaches, joint pains and even spondylitis. It has been reported that in severe cases, a few persons have become permanently bed-ridden. In medical terminology it is called as Computer Related Injuries (CRI). These could be debilitating.
- ii. Mental stress is caused due to combination of various factors. Continuous exertions of mind leads to tension that no one can tolerate for long. This type of stress can lead to physical ailments like blood pressure, headaches, diabetes. More importantly, it can lead to various mental illnesses that might call for constant attention by psychologists and psychiatrists.

It shows that various problems, physical and psychological afflict the IT-Professionals. The social life of individuals consisting of relatives and friends could very well be affected. One has to allot some time to those who matter in his or her life. Only then social bondage becomes strong. Negligence on this front could lead to social attrition. Relatives and friends could lose meaning. During times of need, these people might not be available. This could lead to a feeling of loneliness among the IT-Professionals and other related problems could crop up. These problems are called as psycho-somatic. The above-cited problems could devastate the affected serious physio-psychological problems might induce suicidal tendencies.



There is relation between CRI Problems and sleeping habits of IT Professionals. There is also relationship between CRI and exercise.

### **Literature Review**

Study conducted by Dr. ShrutinUlman, et. al. [1] in Goa shows that 66% are suffering from visual fatigue, 27% have stress problems, 27% and 9% are facing neck pain and wrist pain respectively and 18% are suffering from Carpel Tunnel Syndrome (CTS). They also suggest that the most effective and cost efficient method to solve a health problem is to find its root cause and change the conditions, which gives rise to the problem at its source. Action to prevent the health hazards will increase employees' productivity and decrease long term costs incurred by having to deal with illness, absenteeism and public discontent, hence giving the workers a good environment to work, wherein the worker will be happy, and healthy giving in his best for better productivity of the industry.

Kiti Muller [2] focuses on visual ergonomics while working with information technology tools. She says the design of lighting in the work environment should take into account the special characteristics of VDU work, ensuring that any disturbing reflections are minimized. Light can also diminish the image contrast on the screen. Attention should thus be given to screen quality, overall lighting in the work environment and reducing on-screen reflections. This may lead to Computer Vision Syndrome (CVS).

Rob Kling [3] concentrates on Critical Professional Education about Information and Communications Technologies and Social Life.

"We pray with our hands and often communicate with them to eat, work and make love. We employ them as marvelously sophisticated instrument of flexibility and strength and when they are damaged, we anguish" – Keith L. Moore quoted by Paul Marxhausen [4]. However, the same hand is getting spoiled with abuse as reported by the author in this article. CRI which began to be reported in India few years back are now developing into an epidemic among computer users.

Piali Banerjee [5], writes an article in Times News Network. She focuses on problems faced by continuous usage of mouse. In the same article, Dr. Deepak Sharan, an orthopedic surgeon, says that of the 900+ computer professionals, 75% were found to have at least one type of CRI.

Shah P. B. et.al. [6] proved that duration of work and computer-related problems are positively correlated by considering -

1. Carpel Tunnel Syndrome
2. Repetitive Strain Injury
3. Computer Vision Syndrome
4. Electromagnetic Radiation

According to K. Suparna, et. al. [7], who have made study among 200 IT-Professionals in the National Capital Region, 93% professionals are found to have computer related morbidity, 76% has visual problems, 77.5% are suffering from musculoskeletal disorders and 35% are found to have stressful symptoms. It is evident that very high morbidity attributed to computers has already taken roots in IT-Professionals and is a matter of great concern. The study has also focused on ergonomic factors contributing to the occurrence of these problems. The study has also brought forth that all aspects of workstation appear to be acting in cohesion in relation to computer related health problems.

According to N. S. Ramnath [8], IT-Professionals find it very difficult to concentrate on any off-screen object, "even the faces of their loved ones". In his article, he gives views of Dr. Mohan Rajan. Dr. Mohan Rajan, a Medical Director, RajanEyeCareHospital, Chennai, recounts that when his institute conducted an eye checkup for about 1000 IT-Professionals, about 750 of them had 'eye dry' problem.

The literature available points that there is need to check whether the IT-Professionals are facing physical problems and whether there is relationship between CRI and Sleeping Habits, CRI and exercise..

### **The Problem**

A careful analysis of the CRI problems created up by employment in IT sector needs immediate attention. A deep scientific study and analysis of these problems is called for.

### **Objectives**

1. To identify the CRI problems faced by IT-Professionals.



- To identify the effect of these problems with sleep and exercise.

### Scope of the study

The research work is carried out under the following confined conditions.

- The researcher has confined the study to some selected IT industries in Pune (Maharashtra-India) city.
- The study had focused on the CRI problems among IT-Professionals.

### Research Question

- Do IT-Professionals are facing CRI Problems?
- If yes, which problems are seen more?

### Hypothesis

- $H_0$ : There is no association between CRI problems and sleep hours.  
 $H_1$ : There is association between CRI problems and sleep hours.
- $H_0$ : There is no association between CRI problems and exercise.  
 $H_1$ : There is association between CRI problems and exercise.

### Research Methodology

Sr.No.	Description	Details
1.	<i>Type of Study</i>	Quantitative Descriptive
2.	<i>Population</i>	IT-Professionals from PUNE city
3.	<i>Sampling Unit</i>	Pune(India) City
4.	<i>Sampling Technique</i>	Non-probability snowball sampling
5.	<i>Sampling Size</i>	535 IT-Professionals in Pune(India) city (Male-339, Female-196)
6.	<i>Data Collection Technique</i>	Questionnaire, Scheduled Interviews, Circulation of questionnaire through mail
7.	<i>Data Analysis</i>	Tables and graphs using MS Excel.
8.	<i>Hypotheses testing technique</i>	Chi Square Test

### Data Analysis

The data is collected through 535 Pune(India) IT-Professionals. The questionnaire of 26 questions was made and circulated among IT-Professional physically and through mail. To identify the existence of CRI problems there was 13-item 5 point scale (No, rarely, occasionally, frequent and continuous). This section gives analysis and interpretation of this data.

Table 1 gives statistics of demographic characters.

**Table 1: Demographic Characters**

Sr. No.	Character	Option-Frequency (Number/Percentage)
1.	Gender and Martial Status	Male-339 / 63.36 Female- 196 / 36.64
2.	Age	20-25- 165 / 30.84 25-30- 183 / 34.21 30-35- 115 / 21.50 35-40- 61 / 11.40 >40 – 11 / 2.06
3.	Occupation	Project Manager- 40 / 7.48 Project Leader- 42 / 7.85 Team Leader- 47/8.79 Software Engineer- 189/35.33 Software Designer- 42/7.85 Coder- 33/6.17 Tester- 66/12.34



		Trainee- 28/5.23 Maintainer- 3/0.56 Configuration Manager- 6/1.12 Other than this- 39/7.29
4.	Working Years	<1- 91/17.01 1-3- 191 /35.70 3-5- 123 / 22.99 5-7- 70/13.08 >7- 60/11.21

Table 2 gives the details of frequency and details of CRI problems faced by IT Professionals.

**Table 2: Frequency and details of CRI problems**

Q.No.	Question	Responses				
		No	Rarely	Occasionally	Frequent	Continuous
1.	Do your hands or arms hurt when typing?	232 (43.36%)	160 (29.91%)	90 (16.82%)	26 (4.86%)	27 (5.05%)
		(56.64%)				
2.	Do your shoulders hurt?	153 (28.60%)	188 (35.14%)	104 (19.44%)	47 (8.79%)	43 (8.04%)
		(71.4%)				
3.	Does your neck hurt?	108 (20.19%)	138 (25.79%)	184 (34.39%)	54 (10.09%)	51 (9.53%)
		(79.81%)				
4.	Do your back hurt?	85 (15.89%)	159 (29.72%)	155 (28.97%)	80 (14.95%)	56 (10.47%)
		(84.11%)				
5.	Do you feel tingling, numbness or cold fingers?	195 (36.45%)	115 (21.50%)	122 (22.80%)	57 (10.65%)	46 (8.60%)
		(64.55%)				
6.	Do you have pain in the thigh, knees, legs or feet?	170 (31.78%)	148 (27.66%)	117 (21.87%)	59 (11.03%)	41 (7.66%)
		(68.22%)				
7.	Do you find yourself stretching/massaging after a few hours of keyboard work?	126 (23.55%)	146 (27.29%)	109 (20.37%)	107 (20.00%)	47 (8.79%)
		(76.45%)				
8.	Have you been woken up by hand numbness or pain while sleeping?	257 (48.04%)	117 (21.87%)	82 (15.33%)	44 (8.22%)	35 (6.54%)
		(51.96%)				
9.	Do you ever have trouble falling asleep because of pain?	226 (42.24%)	148 (27.66%)	89 (16.64%)	34 (6.36%)	38 (7.10%)
		(57.76%)				
10.	Does lifting your hand over your head (e.g., while combing) make symptoms worse?	302 (56.45%)	96 (17.94%)	82 (15.33%)	27 (5.05%)	28 (5.23%)
		(43.55%)				
11.	Do you get strain/fatigue of the eyes when you work?	83 (15.51%)	118 (22.06%)	117 (21.87%)	131 (24.49%)	86 (16.07%)
		(84.49%)				
12.	Have you had to take time off work because of any of the above complaints?	255 (47.66%)	147 (27.48%)	51 (9.53%)	54 (10.09%)	28 (5.23%)
		(52.34%)				
13.	Has your productivity or quality of work deteriorated because of your symptoms?	282 (52.71%)	123 (22.99%)	47 (8.79%)	42 (7.85%)	41 (7.66%)
		(47.29%)				



The table indicates that there is considerable percentage of shoulder pain, neck pain and back i.e. 71.4%, 79.81% and 84.11% respectively. It clearly shows that more than three fourth of the professionals are facing shoulder, neck and back problems. Although they may be rarely suffering the problem, problem is there. Severe and frequent shoulder neck or back pain may result into CRIs like RSI. The percentage of feeling numbness or cold fingers is also more i.e. 63.55% which is one of the symptoms of CTS. Many professionals (76.45%) are suffering from another symptom of CTS that is stretching / massaging after a few hours of keyboard work. 56.64% say that their hands or arms hurt when typing which may be the starting of CTS. 84.49% that is more than two fifth professionals say that they have eye strain or fatigue. It is the indication of CVS. Question number 8, 9, 10, 11 and 12 indicate more severe symptoms of CRIs. Table indicates that half of the professionals are coming across these problems.

Table 3 describes frequency of CRIs in IT-Professionals. It concentrates on overall response to CRI related thirteen questions. All thirteen questions are divided into four parts: any zero to three questions (0-3), any four to six questions (4-6), any seven to nine questions (7-9) and any ten to thirteen questions (10-13). Table gives number of professionals who have said either rarely, occasionally, frequent or continuous to 1/4th number of questions, 1/2nd number of question, 3/4th number of questions and more than 3/4th number of questions.

The aim of deriving this table is to find percentage of IT-Professionals who are suffering from more number of CRI problems. As per table data, the percentage of IT-Professionals who suffer from more than 3/4th problems is more i.e. 41.68%. IT-Professionals who suffer from 3/4th of the problems are 29.91%.

From the table, it is clear that more number of IT-Professionals show the symptoms of CRI. Summary of CRI problems is graphically shown in Graph 4.11.

**Table - 3: Summary of CRI**

Gender	Range of Questions of CRI			
	0-3	4-6	7-9	10-13
	1/4th	1/2nd	3/4th	> 3/4th
<b>Female</b>	23	35	51	87
<b>Male</b>	38	56	109	136
<b>Total→</b>	<b>61(11.40%)</b>	<b>91(17.01%)</b>	<b>160(29.91%)</b>	<b>223(41.68%)</b>

Table 4 describes the habits of doing exercises among IT-Professionals. Table indicates that most of the IT-Professionals are not doing exercise (29.53%), 28.97% professionals do exercises rarely. Only 7.29% professionals have habit to do exercises. Table also describes the frequency of CRI symptoms with respect to exercise habits. Professionals who do not do exercise are victims of CRI symptoms in more percentage (13.64%). Professionals who do exercises regularly are not more habitual to CRI symptoms (1.31%).

**Table - 4: Tendency of CRI with respect to exercise**

Sr. No.	Exercise	Range of Questions of CRI				Total
		0-3	4-6	7-9	10-13	
		1/4th	1/2nd	3/4th	> 3/4th	
1.	No	11(2.06%)	13(2.43%)	61(11.40%)	73(13.64%)	158(29.53%)
2.	Rarely	10(1.87%)	26(4.86%)	49(9.16%)	70(13.08%)	155(28.97%)
3.	Occasionally	4(0.75%)	16(2.99%)	24(4.49%)	40(7.48%)	84(15.70%)
4.	Frequent	24(4.49%)	22(4.11%)	20(3.74%)	33(6.17%)	99(18.50%)
5.	Regular	12(2.24%)	14(2.62%)	6(1.12%)	7(1.31%)	39(7.29%)
<b>Total→</b>		<b>61(11.40%)</b>	<b>91(17.01%)</b>	<b>160(29.91%)</b>	<b>223(41.68%)</b>	<b>535(100%)</b>

Table 5 describes tendency towards CRI with respect to sleep hours. IT-Professionals who sleep for less than 5 hours show more symptoms of CRI (22.43%). The table indicates that people who take sufficient sleep face less problems of CRI. Graphical representation of tendency of CRI with respect to sleep hours is shown in Graph4.20.



**Table - 5: Tendency of CRI with respect to sleep hours**

Sr.No.	Night Shifts	Range of Questions of CRI				Total
		0-3	4-6	7-9	10-13	
		1/4th	1/2nd	3/4th	> 3/4th	
1.	< 5 hours	21(3.93%)	21(3.93%)	73(13.64%)	120(22.43%)	235
2.	5 to 7 hours	25(4.67%)	35(6.54%)	46(8.60%)	62(11.59%)	168
3.	7 to 9 hours	15(2.80%)	34(6.36%)	38(7.10%)	39(7.29%)	125
4.	> 9 hours	---	1(0.19%)	3(0.56%)	2(0.37%)	6
<b>Total→</b>		<b>61(11.40%)</b>	<b>91(17.01%)</b>	<b>160(29.91%)</b>	<b>223(41.68%)</b>	<b>535(100%)</b>

**Hypothesis Testing**

There are two hypotheses set for checking relation between CRI problems, sleep hours and exercise. For testing both the hypotheses, Chi-square test is used.

1.  $H_0$ : There is no association between CRI problems and sleep hours.

$H_1$ : There is association between CRI problems and sleep hours.

Table 6 show the worksheet of Chi-square test conducted to check this hypothesis.

**Table 6: Worksheet for Chi-square test**

	Oij	Eij	(Oij-Eij)	(Oij-Eij) <sup>2</sup>	(Oij-Eij) <sup>3</sup> /Eij
1,1	21	26.79	-5.79	33.57	1.25
1,2	21	39.97	-18.97	359.94	9.00
1,3	73	21.83	51.17	2618.19	119.93
1,4	120	97.95	22.05	486.06	4.96
2,1	25	19.16	5.84	34.16	1.78
2,2	35	28.58	6.42	41.27	1.44
2,3	46	50.24	-4.24	18.00	0.36
2,4	62	70.03	-8.03	64.42	0.92
3,1	15	14.25	0.75	0.56	0.04
3,2	34	21.26	12.74	162.26	7.63
3,3	38	37.38	0.62	0.38	0.01
3,4	39	52.10	-13.10	171.68	3.30
4,1	0	0.68	-0.68	0.47	0.68
4,2	1	1.02	-0.02	0.00	0.00
4,3	3	1.79	1.21	1.45	0.81
4,4	2	2.50	-0.50	0.25	0.10
Chi-Square Value					152.22

Source- Table No.5

Chi-square value for 1% level of significance and 6 degrees of freedom is 16.82. Thus, Table Chi-square < Calculated Chi square. So Null hypothesis is rejected and alternate hypothesis is accepted at 1% level of significance. So, it can be said that there is association between CRI and sleep hours.

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**Table 7: Worksheet for Chi-square test**

	Oij	Eij	(Oij-Eij)	(Oij-Eij) <sup>2</sup>	(Oij-Eij) <sup>3</sup> /Eij
1,1	11	18.01	-7.01	49.21	2.73
1,2	13	26.87	-13.87	192.51	7.16
1,3	61	47.25	13.75	189.00	4.00
1,4	73	65.86	7.14	51.01	0.77
2,1	10	17.67	-7.67	58.87	3.33
2,2	26	26.36	-0.36	0.13	0.01
2,3	49	46.36	2.64	7.00	0.15
2,4	70	64.61	5.39	29.08	0.45
3,1	4	9.58	-5.58	31.11	3.25
3,2	6	14.29	-8.29	68.69	4.81
3,3	24	25.12	-1.12	1.26	0.05
3,4	40	35.01	4.99	24.87	0.71
4,1	24	11.29	12.71	161.60	14.32
4,2	22	16.84	5.16	26.63	1.58
4,3	20	29.61	-9.61	92.30	3.12
4,4	33	1.30	31.70	1005.19	776.01
5,1	12	4.45	7.55	57.05	12.83
5,2	14	6.63	7.37	54.26	8.18
5,3	6	11.66	-5.66	32.08	2.75
5,4	7	16.26	-9.26	85.67	5.27
					851.48

Source- Table No.4

Chi-square value for 1% level of significance and 6 degrees of freedom is 26.28. Thus, Table Chi-square < Calculated Chi square. So Null hypothesis is rejected and alternate hypothesis is accepted at 1% level of significance. So, it can be said that there is association between CRI and exercise.

### Observations and Conclusion

The research reveals that there are Computer Related Injuries seen among IT Professionals. Particularly, there is considerable percentage of IT-Professionals afflicted with shoulder pain, neck pain and back pain. The observed percentage of feeling numbness or feeling of cold fingers is high. The problems regarding arms are also seen in IT-Professionals. Their arms hurt while typing, they find themselves massaging after few hours of working. The problem of eye fatigue or eye strain is rampant in these professionals. Regarding the ergonomics, 60% professionals are observed to be following tips like keeping monitor screen at eye level, having monitor directly in front. Regarding the problem of CTS, it is observed that they are not victims of CTS. However, they are suffering from the main symptoms of it like feeling numbness or cold fingers or stretching or massaging after few hours of working. At one hand, the problems faced by IT Professionals due to CRI are affecting on the sleep and on other hand exercise are positively affecting on CRI.

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