

Common Health Problems and risk of MSD's amongst telephone operators working in MTNL office, in Mumbai, India

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ABSTRACT

Background: Telephone operators face unique occupational hazards – mental, physical and psychosocial.

Material & Method: A sample 100 female telephone operators and from Dadar in Mumbai, and Thane were surveyed by both qualitative and quantitative methods for the risk of above health problems. Quantitative analysis of risk of work related musculoskeletal disorder was assessed using RULA.

Results: A high proportion of 32% of telephone operators have RULA index of 4 and 27% have RULA index of 3 representing Action Level 2 indicating that further investigations are needed and modifications in their posture at workplace may be required. 19% of telephone operators presented with RULA index 7 indicating that further investigations and changes are required immediately. 10% of telephone operators presented with RULA index of 5 and 12% represented with RULA index 6.

A large population of 81% of operators suffered from vision problems due to prolonged use of computers, 51 % felt they were physically stressed, 27% complained of dry skin due to prolonged use of air conditioner, 26 % had hearing problems due to prolonged use of head phones and on an average only 25 % of the operators complained of Musculoskeletal problems. 23 % faced sleep disturbances and associated mental stress and anxiety

Conclusion: Better personal management, health education and more research is indicated to study the health problems in this emerging occupation.

Key words: Telephone operators, musculoskeletal disorders (MSD's) RULA, Mumbai

Introduction

The development of computer and information technology is perhaps one of the most dominating factors in the ever-changing working life of today. (1) Computer technology has affected the work environment and the users in different ways, resulting for example in more constrained sedentary

work.(1) With the help of technology activities are no longer confined to a particular place or time, a phenomenon that is clearly illustrated by call centres (CCs). The basis of this study is to describe characteristics of work, physical and health related outcomes, for CC operators in Mumbai.

For many employed in the tele-communication sector, “the daily experience is of repetitive, intensive and stressful work, which frequently results in employee “burnout”. Call centers are established to create an environment in which work can be standardized to create relatively uniform and repetitious activities so as to achieve economies of scale and consistent quality of customer service. This weakens employee autonomy and enhances the potential for management control. Loss of control is generally understood to be an important indicator of work related stress. Besides, the stress, the working hours of these centers may cause sleep disturbances and disturbances in biological rhythm. Physical health also may adversely affect because of irregular and sedentary working hours and unhealthy lifestyles. Job pressure at call centers also may adversely affect social health.

Telephone operators (also known as call centre operator, customer service advisor/agent/handler) is an individual whose job requires them to spend a significant proportion of their working time responding to calls on telephone whilst simultaneously using computers. Before a few decades telephone operators had to use switchboard equipment to receive, transfer and transmit calls. Now their work has become progressively more computerized over the last few decades.(1)

Profile of MTNL (Mahanagar Telephone Nigam Limited)

Mahanagar Telephone Nigam Limited (MTNL) is a state-owned telecommunications service provider in the metro cities of Mumbai and New Delhi in India and in the island nation of Mauritius in Africa. The company had a monopoly in Mumbai and New Delhi until 1992, when the telecom sector was opened to other service providers. "Transparency makes us different" is the motto of the company.(2)

MTNL was setup on 1st April, 1986 by the Government of India to upgrade the quality of telecom services, expand the telecom network, introduce new services and to raise revenue for telecom development needs of India's key metro cities of Delhi & Mumbai. MTNL is the principal provider of fixed-line telecommunication service in the two Metropolitan Cities of Delhi and Mumbai. It offers mobile services in the city of Delhi including four peripheral towns Noida, Gurgaon, Faridabad & Gaziabad and the Mumbai city along with the areas falling under the Mumbai Municipal Corporation, New Mumbai Corporation and Thane Municipal Corporation. MTNL is licensed to provide telecom services in Mumbai, Navi Mumbai, Thane, Mira Bhayandar Municipal areas with a population of about 1.8 crores. MTNL Mumbai is having around 32 lakh telephone connections with a telephone density of 17.26 telephones per hundred populations. MTNL has a strong financial base and has shown consistent improvement in performance over the years. (3)

Limitations of the study

1. Since there is a huge employee base and because of limited resources and time constraints available with the researcher, it was practically not possible to cover all the exchanges of MTNL in Mumbai city. Therefore, the research was restricted to the exchanges placed in Mumbai and Thane.
2. The postponements of the responses were time consuming and tiresome due to busy schedule or unwillingness to disclose certain information by the respondents.

Job analysis

Telephone operators job includes repetitive movements and prolonged static sitting postures, where communications skills, responsibility and efficiency are expected from them.(1) They have to work for 7-8 hours in static sitting posture with only 2 breaks of 20 and 40mins. Intensive and sedentary work with a computer is often associated with work related musculoskeletal problems, eye discomfort and headache. The continuous use of headsets to attend almost 200-250 calls lead to hearing problem. They provide information about any type of enquiries, help in locating telephone numbers and addresses. In offices there are no possibilities for the operators to adjust the indoor air conditioned environment and lighting to an individual level, which could lead to further problems like dry skin, sore throat etc. The working hours of telephone operators may cause sleep disorders disturbances in biological rhythm (4)

Job demands

Telephone operators job demands less amount of physical activity and air conditioned environment of work place and use of headset and computer, which leads to postural impairments, hearing, vision and other problems. Various faulty postures are adopted by these operators throughout the day. Some of the pictures of the participants during work are shown in figure 1.



Figure 1: Some of the employees and their postures at work

Assessment of these health problems is necessary to identify the aetiology and spread awareness regarding the same among operators and at same time intervention is necessary to help them to deal with this difficult occupation.

Assessment of Risk of Musculoskeletal Disorders:

Rapid Upper Limb Assessment (RULA) method was first developed by Dr.McAtamney and Corlett (5) of the University of Nottingham's Institute of Occupational ergonomics in 1993. RULA is a postural targeting method for estimating the risks of work-related upper limb disorders. A RULA assessment gives a quick and systematic assessment of the postural risks to a worker. The analysis

can be conducted before and after an intervention to demonstrate that the intervention has worked to lower the risk of injury. The RULA action levels give you the urgency about the need to change how a person is working as a function of the degree of risk of injury. The four main applications of RULA are to:

1. Measure musculoskeletal risk, usually as part of a broader ergonomic investigation.
2. Compare the musculoskeletal loading of current and modified workstation designs
3. Evaluate outcomes such as productivity or suitability of equipment
4. Educate workers about musculoskeletal risk created by different working postures.

The procedure for using RULA is in three steps:

1. The posture or postures for assessment are selected.
2. The postures are scored using the scoring sheet, body-part diagrams, and tables.
3. These scores are converted to one of the four action level.

Action levels of RULA:

- Action level 1 Score of 1 or 2 indicates that the posture is acceptable if it is not maintained or repeated for long periods.
- Action level 2 Score of 3 or 4 indicates that further investigation is needed, and changes may be required.
- Action level 3 Score of 5 or 6 indicates that investigation and changes are required soon.
- Action level 4 Score of 7 indicates that investigation and changes are required immediately.

Hypotheses of the study

Null hypothesis:The telephone workers working at MTNL neither have neither any risk of MSD's nor any other health related problems.

Alternate hypothesis:There exists an element of risk of MSD's and other health related problems.

Research methodology

Data Collection

In order to meet the above mentioned objectives, data was collected from primary as well as secondary sources. In order to attain the first hand information, accidental quota sampling method was administered at Telephone Exchanges in Prabhadevi and Thane branches. . A total sample size of 100 respondents was administered with the questionnaire.

Sources of Primary Data

Primary data was collected by administering a questionnaire on a sample size of 100 respondents. And calculation of RULA index was done by taking photographs and videos of the participants at work.

Sources of Secondary Data

Secondary data was collected by visiting various libraries, websites and universities in the city of Mumbai.

Aim: To find out the common health problems in telephone operators working in Mumbai.

Objectives: 1. To evaluate risk of musculoskeletal injuries in telephone operators using the scale RULA. 2. To find out other disorders related to their workplace in telephone operators.

Methodology

This study was carried out at MTNL, consisted a sample of 100 female telephone operators. The sample was drawn from Prabhadevi branch, Dadar and Thane branch. The range of age of the selected sample was between 33 to 59 years and the mean age was 50 years (n=100). The work experience ranged between 3 years to 33 years with a Mean of 23.8 years.

The measures used:

The study used assessment tool RULA (Rapid Upper Limb Assessment) which was developed earlier by McAtamney and Corlett, 1993, to provide a rapid objective measure of musculoskeletal risk caused by mainly sedentary tasks where upper body demands were high; where work related upper limb disorders are reported.

Videos of the telephone operators showing different movements during an activity was recorded via a camcorder. Snapshots of 100 workers working in different positions were obtained. The snapshots were analyzed to fill the scores in RULA.

A. Demographic data and other health related problems

A validated questionnaire was used to gather the demographic information and assess the affection of the other health problems like, vision, hearing problems, sleep disorders, physical stress etc. It was 42 point scale with majority of the questions with YES and NO options. The questionnaire was validated on face value after a thorough peer review.

B. Risk of Work related Musculoskeletal Disorder-- RULA Method

The RULA method evaluate the ergonomics risk factor by observation the posture of employees while they working at their workstation directly . Postural and biomechanical loading were assessing on the upper limbs by valid RULA method. We used several score in this method with the help of RULA score sheet, that the scores evaluate the posture of different body parts Upper Arm, Lower Arm, Wrist, and Wrist twist give the posture score A with the help of standard Table and Neck, Trunk and Legs give posture score Bwith the help of standard Table.

These scores are added to posture scores A and posture score B to obtain scores A and B, respectively (5). Combination of scores A and score B give the Grand score with the use of standard Table. The range of Grand scores1 to 7 and reflects the musculoskeletal loading associated with the worker's posture. Whereas low grand scores (of 1 or 2) indicate that the work posture is acceptable if not maintained or repeated for long time (action level 1), For grand score of 3 or 4, further investigation is needed and changes may be required (action level 2). Investigation and changes are required soon for scores of 5 or 6 (action level 3). Further investigation and changes are required immediately for grand score of 7 (action level 4) (Massaccesi et al. 2003 (6). RULA action levels are shown in Table -1. RULA score 1 to 2 shows the negligible risk level, RULA score 3 to 4 shows the low level risk, RULA score 5 to 6 shows the medium level risk, RULA score 7 shows the high level risk.

RULA SCORE	ACTION LEVEL
1 to 2	Posture is acceptable if not maintained or repeated for long time
3 to 4	Further investigation is needed and changes may be required
5 to 6	Investigation and changes are required soon
7	Investigation and changes are required immediately

Duration of the Study:

The duration for the study was from 1st December, 2014 till 30th May, 2015.

Statistical Tools:

Simple statistical tools like the construction statistical tables, weighted average method percentage and inferences were deduced with the help of pie diagrams.

Ethical issues:

Purpose of the study was explained to all the participants and a written informed consent was obtained from them. The study protocol was accepted and passed through the ethics committee of D. Y. Patil University, Nerul, Navi Mumbai, India.

Observations and Results:

1. Demographic data:

Parameters	Mean (n=100)
Age	49.68
Number of years of experience	23.8

It is evident from table 2 that the mean age of the participants was 49.68 years and the mean experience was that of 23.8 years.

2. Posture:

Out of 100, 55 subjects adopted an unsupported sitting posture and 45 adopted a supported sitting posture.

Posture	No.of professionals
supported	45
unsupported	55

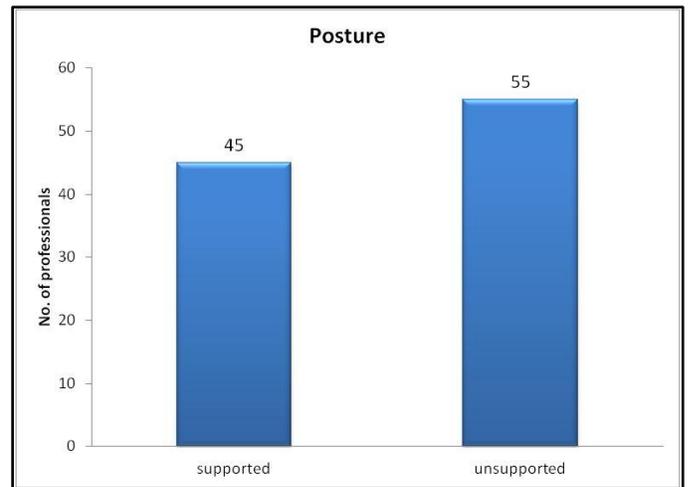


Figure 2- Graph showing telephone operators sitting in supported and unsupported postures.

3. Complaints of pain:

Out of 100, 51 professionals complained of pain during working hours.

Pain	No. of professionals
Yes	51
No	49

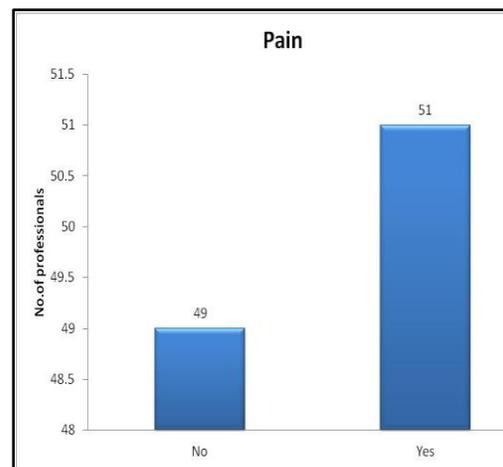


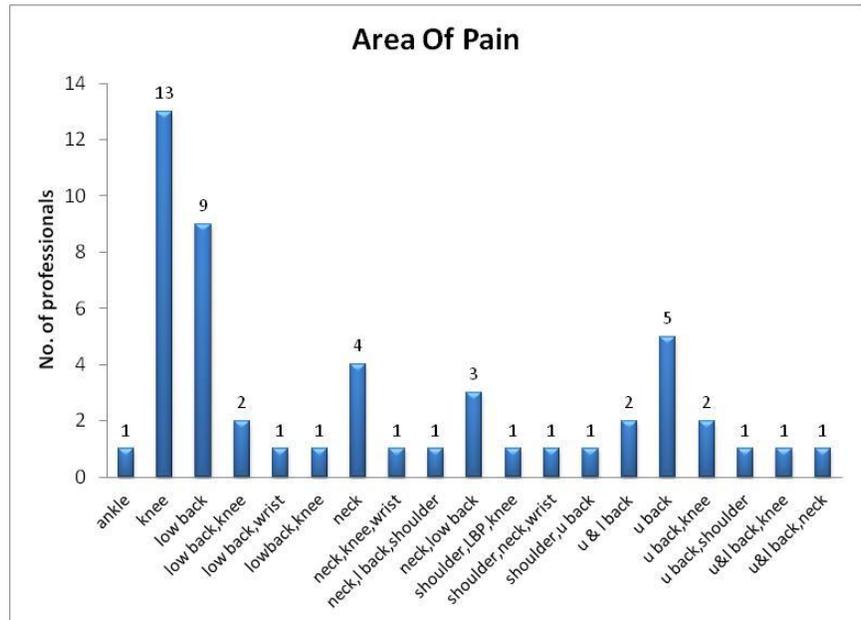
Figure 3- Graph showing the number of telephone operators complaining of pain during working hours

4. Common areas of pain:

Most of the professionals have knee pain (21 operators) and low back pain (22 operators). Few have upper back pain (13 operators) and neck pain (11 operators). Very few professionals have ankle, wrist and shoulder pain.

Figure 4- Graph showing the various painful areas as complained by the telephone operators.

Area of pain	No. of professionals
Knee pain	21
Low back pain	22
Upper back pain	13
Neck pain	11

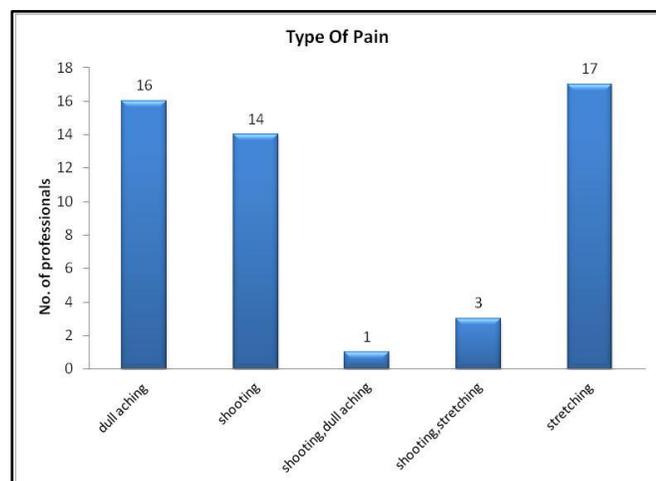


5. Type of pain:

Most of the professionals have stretching pain (17 operators) and dull aching pain (16 operators). Few complained of shooting pain.

Figure 5- Graph showing the type of pain that the telephone operators would complaint of.

Type of pain	No. of professionals
Stretching	17
Dull aching	16
Shooting	14



6. Quantity of pain:

pain was quantified by assessing the visual analogue scale measurement where, 13 professionals had a VAS score of 5, 12 had a VAS score of 6, 7 had a VAS score of 7 and 6 professionals had a VAS score of 3 and 4.

Table 7	
VAS score	No. of professionals
2	4
3	6
4	6
5	13
6	12
7	7
8	2
9	1

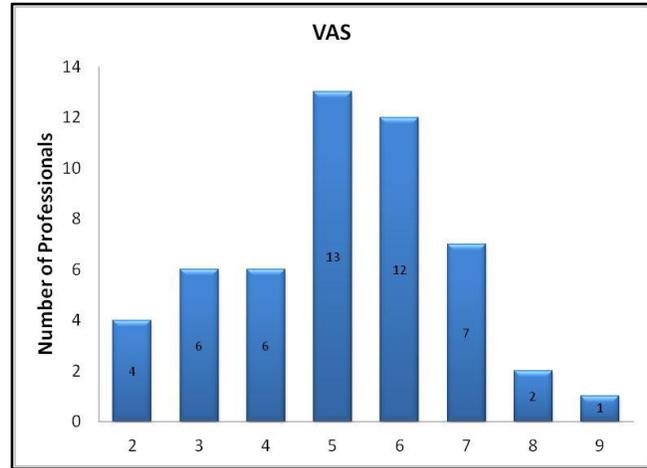


Figure 6- Graph showing the quantity of pain mentioned by the telephone operators

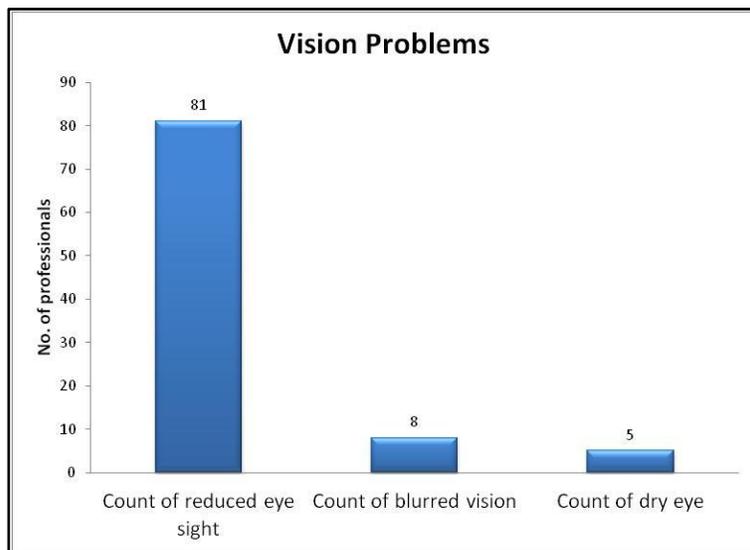
II. Other health related problems:

1. Vision:

Out of 100, professionals 81 had the vision problem of reduced eye sight. Few had blurred vision and dry eye.

Figure 7- Graph showing sum of vision problems in the telephone operators

Table 8	
Vision problems	No. of professionals
Reduced eye sight	81
Blurred vision	8
Dry eye	5

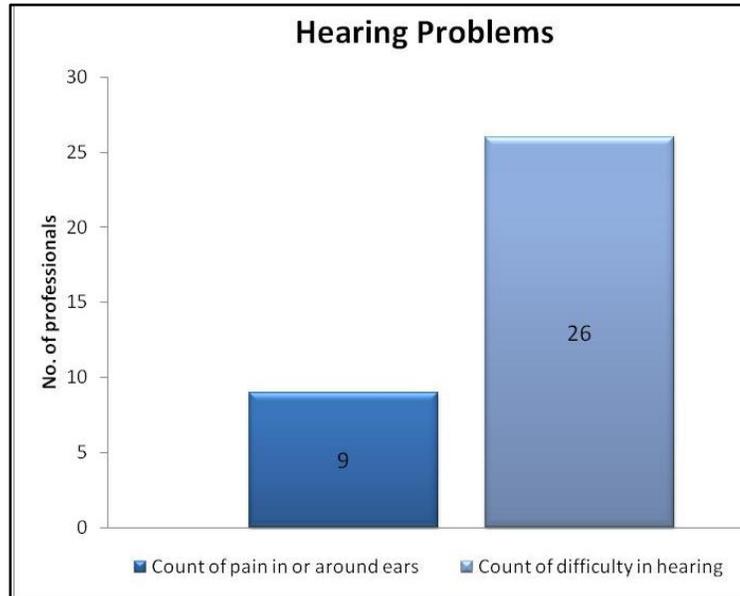


2. Hearing:

Out of 100, 26 difficulty in hearing and 9 have pain in or around ears.

Figure 7- Graph showing sum of hearing problems in the telephone operators

Table 9	
Hearing problems	No.of professionals
Pain in or around ears	9
Difficulty in hearing	26



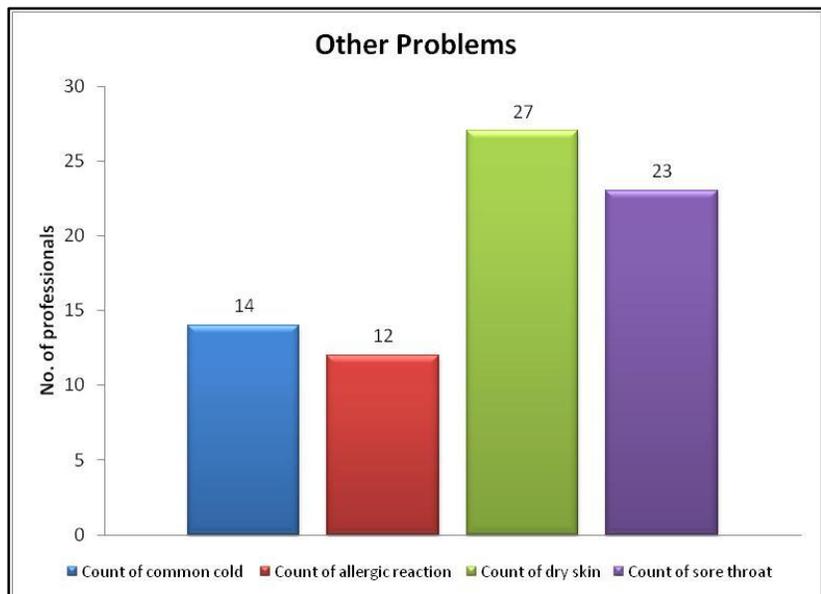
3.Common other problems:

Out of 100, 27 professionals had the problem of dry skin, 23 had sore throat.

14 professionals had the problem of common cold and 12 allergic reactions.

Figure 8- Graph showing sum of other common problems in the telephone operators

Table 10	
Other problems	No.of professionals
Common cold	14
Allergic reaction	12
Dry skin	27
Sore throat	23

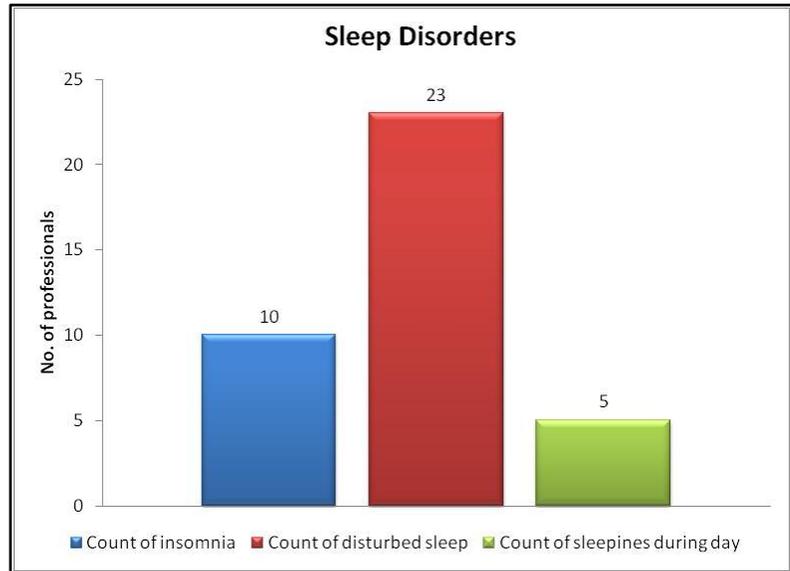


4. Sleep Disorders

Out of 100, 23 professionals had sleep disorder of disturbed sleep 10 have insomnia. Very few (5 operators) had excessive sleepiness during the day.

Figure 9- Graph showing sum of affection of sleep in telephone operators

Table 11	
Sleep disorders	No.of professionals
Insomnia	10
Disturbed sleep	23
Sleepiness during day	5

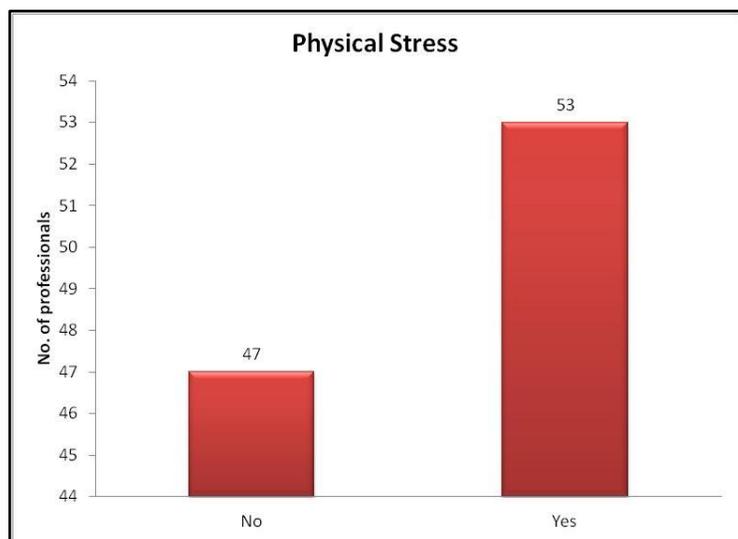


5. Physical stress:

Out of 100, 53 professionals mentioned that they suffer from physical stress.

Figure 10- Graph showing sum of physical stress in telephone operators as complained by them

Table 12	
Physical stress	No.of professionals
Yes	53
No	47

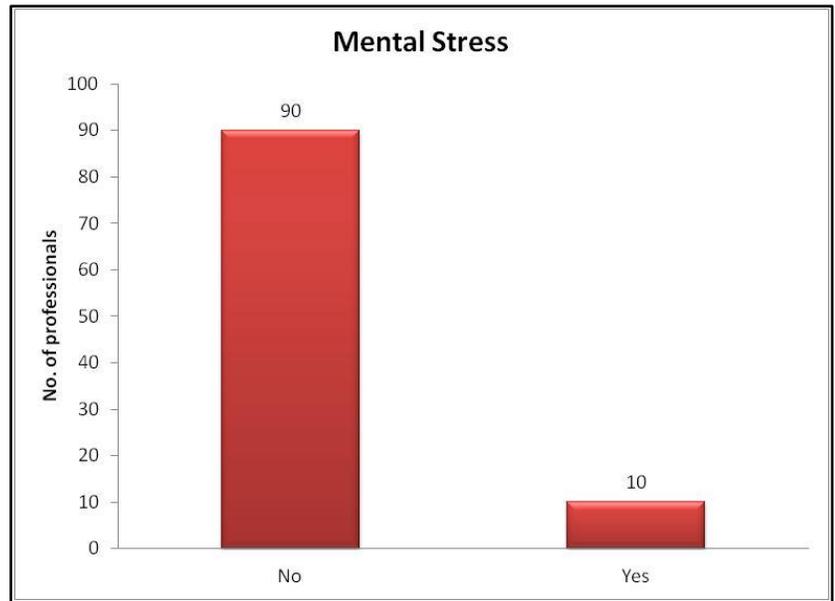


6. Mentalstress:

Not many complained of mental stress. Only 10 telephone operators mentioned that they felt mentally stressed.

Figure 11- Graph showing sum of mental stress in telephone operators as complained by them

Table 13	
Mental stress	No.of professionals
Yes	10
No	90



7. Recreational activity:

When the telephone operators were quizzed about whether they indulge in any form of recreational activities, it was found that very few professionals were involved in recreational activity like yoga.

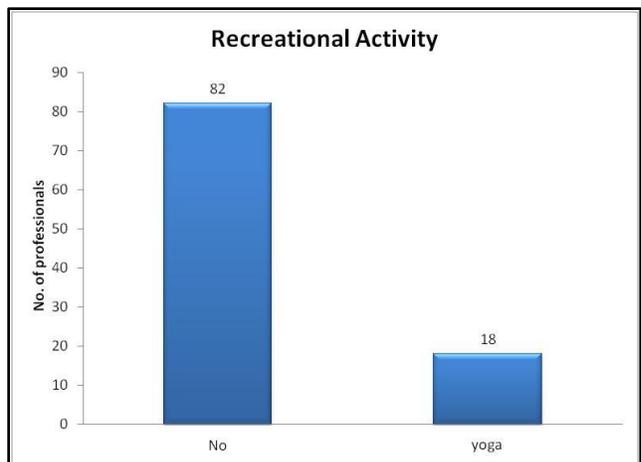
Figure 12- Graph showing sum of recreational activity that the telephone operators would engage in

Table 14	
Recreational activity	No.of professionals
Yes(Yoga)	18
No	82

III. Risk of MSD's— RULA Scores

32

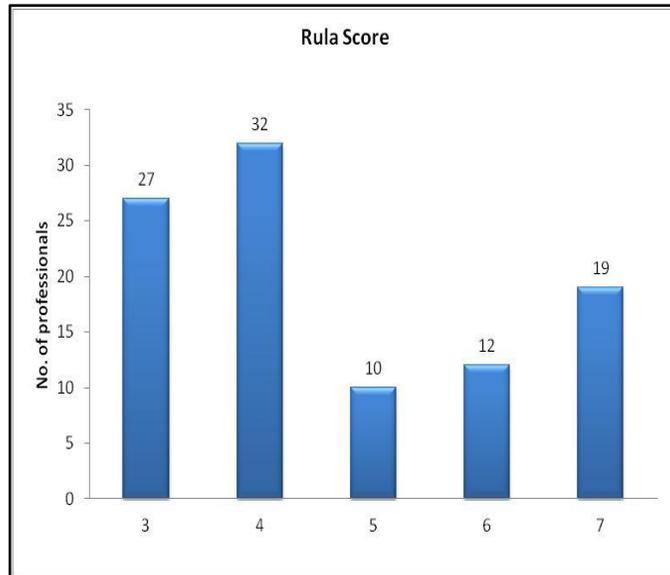
professionals exhibited a RULA score of 4 and



27 had a RULA score of 3 i.e. Action level 2. 19 have the score 7 i.e. Action level 4. And 10 have the score 5 and 12 have score 6 i.e. Action level 3.

Figure 13- Graph showing sum of RULA scores in the telephone operators

Table 15	
RULA score	No. of professionals
3	27
4	32
5	10
6	12
7	19



Validity of hypothesis:

Since the findings of the present study shows that telephone operators do suffer from health related problems as well they pose a risk of acquiring MSD’s at their workplace, We reject the null hypothesis and accept the alternative hypothesis.

Discussion:

Symptoms and health problems caused or aggravated by work are common (7).Other investigators have also employed the methods of self assessed health status of employees as used inthe present study in industrial health research (7, 8). In emerging occupations such as offshoring which is just the tip of the iceberg in how globalization can transform industries (9), for preliminary and rapid assessments of health hazards self reported stress and ill health can provide “quick and dirty” data on the basis of which more refined studies can be planned.

1. Musculoskeletal Problems:

Several studies have shown that long period of constrained sitting or computer work are associated with musculoskeletal symptoms (10, 11, 12, 13, 14, 15). From the present study we can interpret that 51% of telephone operators have pain in one or more areas during working hours which could be because majority of them (55%) adopt an unsupported sitting posture during their working hours. It was observed that 21% of telephone operators have knee pain and 22% have low back pain as their major problems. Few have upper back pain and neck pain and very few have shoulder, ankle and wrist pain. Telephone operators use computers interactively during telephone calls. Ferreira and co-workers showed that CC workers often spend 90 per cent of their working time on the telephone and in front of the computer (16). Repetitive movements of upper extremities and prolonged constrained static sitting posture contribute to their physical discomfort.

This leads to increased compressive forces on the lumbar discs and knee joint further leading to early degenerative changes in the same. Upper back and neck pain usually arise because of repetitive flexion and extension of the neck and probable causes of it seems to be inappropriate height of the computer screen or inappropriate chairs. Risk factors for upper extremity musculoskeletal disorders include biomechanical factors (force, repetition, posture and psychosocial factors (job stress) as stated by Morse et al (17). In office work, static loading of the neck coupled with dynamic repetitive movements of the wrists and hands are common triggering factors for neck-shoulder complaints particularly among VDT users due to prolonged muscular isometric contraction (18,19). We performed RULA of telephone operators to find out the increased risk of musculoskeletal injury. We observed that 32% of telephone operators have RULA index of 4 and 27% have RULA index of 3 representing Action Level 2 indicating that further investigations are needed and changes may be required. 10% have RULA index of 5 and 12% have RULA index of 6 representing Action Level 3 indicating that investigations and changes are required soon. 19% telephone operators have RULA index of 7 representing Action Level 4 indicating that investigations and changes are required immediately.

2. Vision Problems

In open offices there are no possibilities for the operators to adjust the indoor climate (temperature, draught) or quality (humidity and dust) and lighting to an individual level, which could lead to negative effects e.g. tiredness and eye discomfort (20,21,22). From the present study we can interpret that 81% of telephone operators have reduced eye sight. 5% suffer from dry eye and 8% suffer from blurred vision. 24% people experience frequent headaches. The probable causes could be prolonged use of computers, focusing at the same distance for long time, position too close or far from the screen, reflection and glare on the screen and no use of screen filters. 81% of telephone operators wear glasses and 20% have a change in their glasses number. Many researchers (23, 24, 25) consider eye - related symptoms as more frequently occurring health disorder among computer users (26).

3. Hearing Problems

From the present study we can interpret that 26% of telephone operators have difficulty in hearing and 9% have pain in or around ears. The probable causes could be inappropriate headsets and continuous use of it to answer calls. Other causes could be sudden spike and unexpected noises in the background of the workplace.

4. Sleep Disorders

From the present study we can interpret that 23% of telephone operators have disturbed sleep. 10% have insomnia and 5% have excessive sleepiness during the day. The probable causes for sleep disorders may be work related stress and anxiety. They have their biological clock changed due to night shifts. The resetting of the biological clock is draining physically as well as psychologically (27, 28). Besides, the stress, the working hours of call centers may cause sleep disturbances and disturbances in biological rhythm. Eksdelt M et al (29) suggested that impaired sleep may play a role in the development of exhaustion in burnout. Burnout patients may show pronounced sleepiness and mental fatigue at most times of the day for weekdays without reduction during weekends. (30)

5. Other Health Problems

From the present study we can interpret that 27% of telephone operators have the problem of dry skin, 23% suffer from sore throat. 14% suffer from common cold and 12% suffer from allergic

reaction. The probable causes could be continuous exposure to the air conditioned environment of the workplace.

We observed that 53% of the telephone operators suffer from physical stress and the factors contributing to it could be their age, working posture and lack of recreational activity. We also observed that only 10% of telephone operators suffer from mental stress.

Conclusion

From the present study we can interpret that 32% of telephone operators have RULA index of 4 and 27% have RULA index of 3 representing Action Level 2 indicating that further investigations are needed and modifications in their posture at workplace may be required. 10% of telephone operators presented with RULA index of 5 and 12% represented with RULA index 6 representing Action Level 3 indicating that they need to get investigated and make appropriate workplace modifications at the earliest. 19% of telephone operators presented with RULA index 7 indicating that further investigations and changes are required immediately.

The other common health related disorders in telephone operators are, Msk problems- low back pain(22%) and knee pain(21%)Vision problems- reduced eye sight (81%)Hearing problems- difficulty in hearing (26%)Sleep disorders- disturbed sleep (23%)Other problems- dry skin(27%) and sore throat(23%)And 53% of telephone operators suffer from physical stress.

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