

# Occupational Risk Factors of Common Psychiatric Disorders among Railway Employees: A Descriptive Study

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**Abstract**— There is a dearth of research work and scarcity of availability of data on psychiatric morbidity among railway employees in India. Present hospital based observational descriptive study was carried out at medical OPD of Central Hospital of Northern Western Railway, Jaipur with the specific aims to study occupational attributes of common psychiatric disorders. Total 450 randomly selected individuals were screened for psychiatric morbidities by using Mini-international neuropsychiatric interview-PLUS. Psychiatric diagnosis confirmed by two psychiatrists separately using the ICD, 10th revision (diagnostic and research criteria). A self designed, pre-tested & semi-structured detailed Performa was used to elicit demographical and occupational attributes. Univariate analysis was carried out initially to identify risk factors. The data was analyzed in terms of descriptive statistics, Chi-square test and stepwise binary logistic regression by using SPSS and Primer Version '6'. Most common diagnosed psychiatric disorders were Neurotic, stress related and somatoform disorders (28%), followed by mood disorders (25.56%). Common Psychiatric Disorders (CPD) i.e. depression, anxiety and somatoform disorders were the most common diagnosed psychiatric morbidities (49.78%). Working in rotatory shifts, perceived problems related to shift duties and stress in the working environment, work experience more than 20 years and non-executive type job were observed as the occupational risk factors for common psychiatric disorders. The present observations suggest that there is scope for psychiatric intervention for the management of perceived stress at work place, problems related to shift duties and other occupational challenges.

**Key words:** Common Psychiatric Disorders, Occupational Risk Factors, Shifts Duties, Medical Comorbidity

## I. INTRODUCTION

Work environments are known to influence the psychological functioning of the individuals.<sup>1-2</sup> In comparison with the general population, industrial workers have the added risk of physical, chemical, biological and other specific psychosocial factors of their occupational environment.<sup>3</sup> The reported prevalence rates of psychiatric morbidity in the Indian industrial population range from 14-37%; whereas, it can be up to as high as 74% in Western reports.<sup>4-6</sup> About 15% of all occupational disabilities reported are stress related.<sup>7</sup> Minor psychiatric morbidity (Common Psychiatric Disorders) is the most common cause for sick leave in industrial occupations.<sup>8</sup>

Existing literature indicates that almost all railways employees, except a very limited managerial / administrative cadre, are exposed to health hazards on a daily basis. Broadly, they are exposed to five

categories of environmental stressors: a) mechanical injuries and accidents; b) noise and vibration; c) diesel exhaust; d) electric and magnetic fields; e) other hazards, including stress at work place.<sup>9</sup> Railway's working environment also possesses all of the fundamental ingredients of occupational health scenario along with a supplementary punch of dearth of services & research in the field of mental health.

The medical out-patient department has been chosen because it closely resembles a general practice and draws a sizeable proportion of the total first attendance at the out-patient clinic. Indian researchers reported a low prevalence 38.6%<sup>10</sup> to much higher prevalence 61%<sup>11</sup> of psychiatric morbidity in medical outpatients.

Keeping in the view of all mentioned concerns, the present study was conducted at Central Hospital, North Western Railway, Jaipur- a referral secondary care centre catering to entire North Western zone of Railway (Comprising four divisions i.e. Jaipur, Ajmer, Bikaner and Udaipur), with specific aim to identify occupational attributes of common psychiatric disorders in the vision of developing the suitable interventions for patients in order to improve their care and preventing serious health economic consequences to the organization.

## II. METHODOLOGY

A hospital based observational descriptive study was conducted at medical outdoor department of Central Hospital of Northern Western Railway, Jaipur, during the period of one year (from 1<sup>st</sup> June 14 to 30<sup>th</sup> May 15). This study was carried out with the specific aims to study occupational attributes of common psychiatric disorders.

Sample size was calculated 374 subjects at 95% confidence limit and 10% relative allowable error with an expected average 51.7% prevalence of psychiatric morbidity in medical outpatients and industrial population.<sup>12</sup> Simple random technique was used to select cases, which has design effect '1'. So, for the study purpose 450 employees attending medical OPD of Central Hospital, North Western Railway, Jaipur were taken with 20% the contingency addition.

Among medical OPD attendees, permanent Railway employees who can read and understand and willing to participate in this study were included in study but those who had either h/o head injury or mental retardation or if patient is unable to communicate were excluded from study.

### 2.1 Ethical Consideration:

Study was approved by research review board & ethical committees of the concerned institutions. An informed written consent was obtained from the subject prior to participation in the study and confidentiality was assured.

### 2.2 Procedure:

After taking formal written consent in an informed consent form (Formatted in Hindi language) from 450 randomly selected eligible subjects, were screened for psychiatric as well as medical morbidities. Clinico-socio- occupational and demographical profile of study subjects were collected on a self designed, pre-tested & semi-structured detailed Performa. The participants were asked to dichotomously (Yes/No) reflect their global impressions on job satisfaction, job stress, interpersonal relationships, perceived support at the workplace and other concerns related to their duties. B.G. Prasad's socio-

economical status scale (updated for 2014)<sup>13-14</sup> for Indian's families was used to assess socio-economic status of participants.

These subjects were screened by the Mini-International Neuropsychiatric Interview-Plus (MINI-PLUS). It is a short structured clinical interview which enables researchers to make diagnoses of psychiatric disorders according to DSM-IV or ICD-10.<sup>15</sup> Psychiatric diagnosis was confirmed by two psychiatrists (Jain S. and Rajender G.), separately using the International Classification of Diseases, 10th revision (ICD-10) (diagnostic and research criteria).<sup>16</sup>

As per the type of morbidity they have, these subjects were divided in to three groups as follows:

1. Patients with only medical disorders (Group-I).
2. Patients with only psychiatric disorders' (Group-II).
3. Patients with co-morbidity of medical disorders & psychiatric disorders'' (Group-III).

### 2.3 Statistical Analysis:

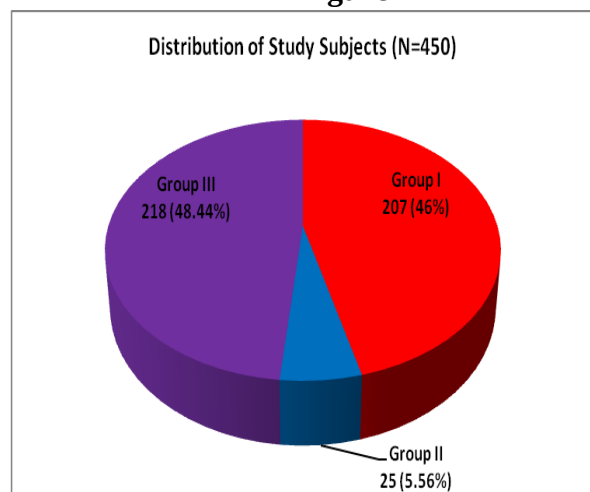
Data were summarized and analyzed with the help of MS Excel 2007 and statistical software Primer Version '6'. To assess association Chi Square test and Odd's ratio were used. The level of significance was set at a standard of  $p < 0.05$ . Univariate analysis was carried out initially to identify risk factors. Furthermore, stepwise binary logistic regression analysis was carried out to identify independent predictors.

## III. RESULTS

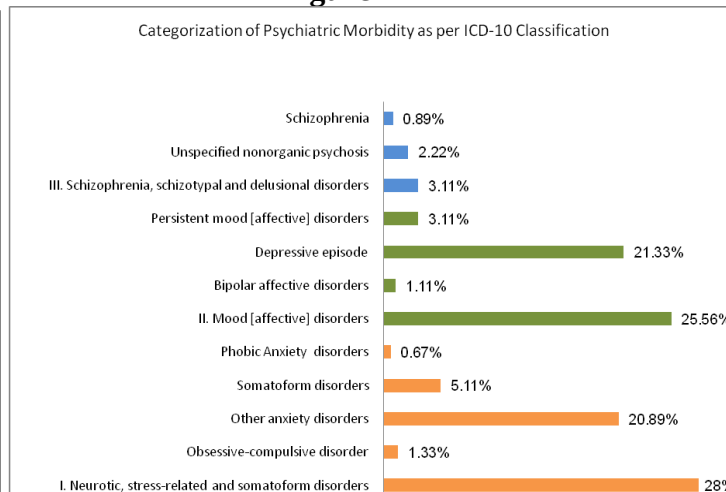
Among total 450 study individuals, 5.56% of patients were suffering from purely psychiatric problems (Group-II) and an additional 48.44% to have associated psychiatric disorders (Group-III), bringing the overall psychiatric morbidity to 54%.(Table 1) (Figure 1)

According to ICD-10 classification, frequently diagnosed psychiatric disorders were Neurotic, stress related and somatoform disorders (28%), followed by mood disorders (25.56%), schizophrenia (0.89%) and unspecified nonorganic psychosis (2.22%). Common Psychiatric Disorders (CPD) i.e. depression, anxiety and somatoform disorders were the most common (224/450, 49.78%) diagnosed psychiatric morbidities amongst patients attending medical OPD. (Figure 2)

**Figure 1**



**Figure 2**



Study sample had an age range of 25-59 years with mean of  $44.64 \pm 20.06$  (Mean  $\pm$  2SD) years; while the maximum of individuals were from the age group of 51 to 60 years (37.11%). An overwhelming majority of the study sample consists of males (90.89%), Hindus (92.89%), married persons (84.89%), living in nuclear families (75.11%), hailed from urban areas (80.22%), educated up to post graduation/professional degrees (68.22%) and belonged to two upper socio-economic classes (96.66%).(Table 1)

**Table 1**  
**Demographic Associates of Study Group**

| Variables              | Group-I (N=207) |         | Group-II (N=25) |     | Group-III (N=218) |       | Total (450) |       | $\chi^2$ (df)<br>p value |
|------------------------|-----------------|---------|-----------------|-----|-------------------|-------|-------------|-------|--------------------------|
|                        | No.             | %       | No.             | %   | No.               | %     | No.         | %     |                          |
| <b>Age Group (yrs)</b> |                 |         |                 |     |                   |       |             |       |                          |
| 21-30                  | 36              | 17.39   | 00              | 00  | 22                | 10.09 | 58          | 12.89 | 22.577 (6)<br>P = 0.00   |
| 31-40                  | 35              | 16.91   | 10              | 40  | 39                | 17.89 | 84          | 18.67 |                          |
| 41-50                  | 74              | 35.75   | 05              | 20  | 62                | 28.44 | 141         | 31.33 |                          |
| 51-60                  | 62              | 29.95   | 10              | 40  | 95                | 43.58 | 167         | 37.11 |                          |
| <b>Sex</b>             |                 |         |                 |     |                   |       |             |       |                          |
| Male                   | 199             | 96.14   | 20              | 80  | 190               | 87.16 | 409         | 90.89 | 14.128 (2)<br>P = 0.00   |
| Female                 | 08              | 3.86    | 05              | 20  | 28                | 12.84 | 41          | 9.11  |                          |
| <b>Religion</b>        |                 |         |                 |     |                   |       |             |       |                          |
| Hindu                  | 194             | 93.72   | 20              | 80  | 204               | 93.58 | 418         | 90.89 | 22.14 (4)<br>P = 0.000   |
| Muslim                 | 13              | 6.28    | 05              | 20  | 06                | 2.75  | 24          | 5.33  |                          |
| Jain                   | 00              | 0.00    | 00              | 00  | 08                | 3.67  | 08          | 1.77  |                          |
| <b>Residence</b>       |                 |         |                 |     |                   |       |             |       |                          |
| Urban                  | 181             | 87.44   | 15              | 60  | 165               | 75.69 | 361         | 80.22 | 16.064 (2)<br>P = 0.000  |
| Rural                  | 26              | 12.56   | 10              | 40  | 53                | 24.31 | 89          | 19.88 |                          |
| <b>Education</b>       |                 |         |                 |     |                   |       |             |       |                          |
| Middle School          |                 | 17.39   | 05              | 20  | 67                | 30.73 | 108         | 24    | 32.404 (8)<br>P = 0.000  |
| High School            | 36              | 16 7.73 | 00              | 00  | 19                | 8.72  | 35          | 7.77  |                          |
| Intermediate           | 37              | 17.87   | 05              | 20  | 09                | 4.13  | 51          | 11.33 |                          |
| Graduation             | 53              | 25.60   | 10              | 40  | 58                | 26.61 | 121         | 25.60 |                          |
| P.G./Professional      | 65              | 31.40   | 05              | 20  | 65                | 29.82 | 135         | 31.40 |                          |
| <b>Marital Status</b>  |                 |         |                 |     |                   |       |             |       |                          |
| Unmarried              | 30              | 14.49   | 00              | 00  | 38                | 17.43 | 68          | 84.89 | 5.427 (2)<br>P = 0.066   |
| Married                | 177             | 85.51   | 25              | 100 | 180               | 82.57 | 382         | 15.11 |                          |
| <b>Family</b>          |                 |         |                 |     |                   |       |             |       |                          |
| Nuclear                | 174             | 84.06   | 20              | 80  | 144               | 66.06 | 338         | 75.11 | 23.822 (4)<br>P = 0.000  |
| Joint                  | 33              | 15.94   | 05              | 20  | 64                | 29.36 | 102         | 22.67 |                          |
| Three Generation       | 00              | 0.00    | 00              | 00  | 10                | 4.59  | 10          | 2.22  |                          |
| <b>SES</b>             |                 |         |                 |     |                   |       |             |       |                          |
| I                      | 76              | 36.71   | 10              | 40  | 109               | 50.00 | 195         | 43.33 | 10.193 (2)<br>P = 0.006  |
| II                     | 127             | 61.35   | 15              | 60  | 98                | 44.95 | 240         | 53.33 |                          |
| III                    | 04              | 1.93    | 00              | 00  | 11                | 5.05  | 15          | 3.33  |                          |

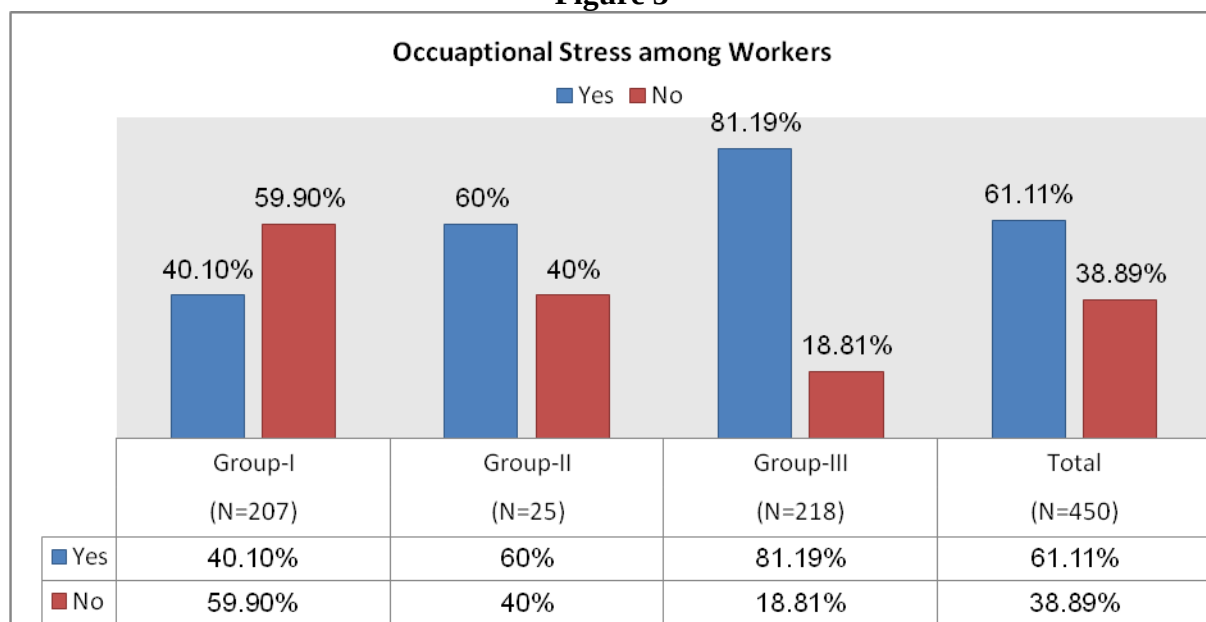
When occupational attributes were compared in these various category of subjects it was found that non executives (86.89%) and shift workers (32.89%) were significantly ( $p<0.05$ ) more suffered from psychiatric morbidity than their counterparts; while. (Table 2)

**Table 2**  
**Distribution of Study Individuals as per their Work Types**

| Variables               | Group-I (N=207) |       | Group-II (N=25) |     | Group-III (N=218) |       | Total (N=450) |       | $\chi^2$ (df)<br>p value |
|-------------------------|-----------------|-------|-----------------|-----|-------------------|-------|---------------|-------|--------------------------|
|                         | No              | %     | No              | %   | No                | %     | No            | %     |                          |
| <b>Category of Work</b> |                 |       |                 |     |                   |       |               |       |                          |
| Safety Category         | 99              | 47.83 | 10              | 40  | 119               | 54.59 | 228           | 50.67 | 3.22 (2)<br>p = 0.207NS  |
| Non-safety Category     | 108             | 52.17 | 15              | 60  | 99                | 45.41 | 222           | 49.33 |                          |
| <b>Nature of Work</b>   |                 |       |                 |     |                   |       |               |       |                          |
| Shift workers           | 28              | 13.53 | 10              | 40  | 110               | 50.46 | 148           | 32.89 | 30.864 (6)<br>p< 0.001S  |
| Running staff           | 26              | 12.56 | 05              | 20  | 37                | 16.97 | 68            | 15.11 |                          |
| Train operating staff   | 9               | 4.35  | 00              | 00  | 00                | 0.00  | 9             | 2.00  |                          |
| Others                  | 144             | 69.57 | 10              | 40  | 71                | 32.57 | 225           | 50.00 |                          |
| <b>Type of Work</b>     |                 |       |                 |     |                   |       |               |       |                          |
| Executive               | 39              | 18.84 | 00              | 00  | 20                | 9.17  | 59            | 13.11 | 12.703 (2)<br>p = 0.002  |
| Non-executive           | 168             | 81.16 | 25              | 100 | 198               | 90.83 | 391           | 86.89 |                          |

In present study sample, a significant ( $p=0.000S$ ) higher proportions (61.11%) of workers were encountered with stress at their work place, while furnishing their duties; whereas, perceived stress at work place by employees also had a highly statistically significant ( $\chi^2=75.469$ ;  $df=2$ ,  $P=0.000S$ ) detrimental influence upon distribution of psychiatric morbidity among three study groups. (Figure 3)

**Figure 3**



Proportion of psychiatric cases was significantly higher in persons with work experience more than 20 years ( $OR=3.541$ ,  $CI=2.395-5.234$ ;  $p<0.001S$ ), non-executive type job ( $OR=2.12$ ,  $CI=1.198-3.778$ ;  $p=0.013S$ ), shift workers ( $OR=8.159$ ,  $CI=5.075-13.119$ ;  $p<0.001S$ ), and those who perceived problems related to rotatory shifts ( $OR=15.314$ ,  $CI=6.483-36.174$ ;  $p<0.001S$ ) and stress in the working

environment (OR=4.919, CI=3.246-7.453;  $p < 0.001$ S); while, perceived support at work place (OR=0.194, CI=0.128-0.295;  $p < 0.001$ S) and satisfaction with current job (OR=0.54, CI=0.326-0.893;  $p=0.022$ S) have statistically significant protective influence upon occurrence and distribution of psychiatric disorders among the participants of the index study. (Table 3)

**Table 3**  
**Work Related Risk Factors for Common Psychiatric Disorders (CPD)**

| Variables                              | Total<br>(N=450) | CPD (N=224) |       | Statistics |                |                   |
|----------------------------------------|------------------|-------------|-------|------------|----------------|-------------------|
|                                        |                  | (No)        | %     | OR         | 95% CI         | P Value<br>(df=1) |
| <b>Work Experience</b>                 |                  |             |       |            |                |                   |
| >20 years                              | 247              | 157         | 70.09 | 3.541      | 2.395 to 5.234 | <0.001S           |
| <20 years                              | 253              | 67          | 29.91 |            |                |                   |
| <b>Shift Workers</b>                   |                  |             |       |            |                |                   |
| Yes                                    | 148              | 120         | 53.57 | 8.159      | 5.075-13.119   | <0.001S           |
| No                                     | 302              | 104         | 46.43 |            |                |                   |
| <b>Perceived Shift Problems</b>        |                  |             |       |            |                |                   |
| Yes                                    | 77               | 71          | 31.70 | 15.314     | 6.483-36.174   | <0.001S           |
| No                                     | 373              | 153         | 68.30 |            |                |                   |
| <b>Safety Category</b>                 |                  |             |       |            |                |                   |
| Yes                                    | 228              | 120         | 53.57 | 1.261      | 0.871-1.826    | 0.257NS           |
| No                                     | 222              | 104         | 46.43 |            |                |                   |
| <b>Type of Job</b>                     |                  |             |       |            |                |                   |
| Non-Executive                          | 391              | 204         | 91.07 | 2.12       | 1.198-3.778    | 0.013S            |
| Executive                              | 59               | 20          | 08.93 |            |                |                   |
| <b>Perceived Support at Work Place</b> |                  |             |       |            |                |                   |
| Yes                                    | 175              | 46          | 20.54 | 0.194      | 0.128- 0.295   | <0.001S           |
| No                                     | 275              | 178         | 79.46 |            |                |                   |
| <b>Perceived Stress at Work Place</b>  |                  |             |       |            |                |                   |
| Yes                                    | 275              | 177         | 79.02 | 4.919      | 3.246-7.453    | <0.001S           |
| No                                     | 175              | 47          | 20.98 |            |                |                   |
| <b>Satisfaction with Current Job</b>   |                  |             |       |            |                |                   |
| Yes                                    | 373              | 176         | 78.57 | 0.54       | 0.326-0.893    | 0.022S            |
| No                                     | 77               | 48          | 21.43 |            |                |                   |

Upon multivariate analysis, perceived problems related to shift duties by workers were studied as the significant risk predictors for the Common psychiatric Disorders (CPD) and the Wald criteria also demonstrated that perceived shift problems made a significant contribution to prediction of psychiatric morbidity among Railway's employees.(Table 4)

**Table 4**  
**Work Related Predictors for Common Psychiatric Disorders (CPD): Multivariate Analysis\***

| Predictors                            | Exp (B) | 95% C.I. for EXP (B) |       | Significance<br>P value LS |
|---------------------------------------|---------|----------------------|-------|----------------------------|
|                                       |         | Lower                | Upper |                            |
| Safety Category                       | 0.869   | 0.548                | 1.380 | 0.552 NS                   |
| Shift Workers                         | 1.500   | 0.836                | 2.692 | 0.174 NS                   |
| Perceived Shift Problems              | 0.090   | 0.041                | 0.197 | 0.000 S                    |
| Type of Job (executive/non-executive) | 0.727   | 0.359                | 1.473 | 0.377 NS                   |
| Perceived Support at Work             | 0.000   | 0.000                | 0.000 | 0.999 NS                   |
| Satisfaction with Current Job         | 1.122   | 0.612                | 2.059 | 0.709 NS                   |
| Perceived Stress at Work Place        | 0.000   | 0.000                | 0.000 | 0.999 NS                   |

\* Binary Logistic Regression

#### IV. DISCUSSION

The index study was designed to elicit basic epidemiological profile, especially occupational attributes of common psychiatric disorders in the occupational health scenario of Railway's set up.

This study found psychiatric disorders in 54% among Railway's employees who reported to medical OPD. Well comparable prevalence i.e. 51.7% was reported by Dutta S. et al (2007)<sup>12</sup> in their study among industrial population.

In this study, psychiatric disorders were significantly ( $p=0.000S$ ) more observed among employees who perceived stress at work place as compared to those who did not. This fact was supported by literature where psychiatric symptoms were known to be the result of increased stress levels at work,<sup>17</sup> dysfunctional interpersonal relationships, increased job pressure, greater responsibility without authority, feeling of insecurity,<sup>7</sup> career problems and pressure for production.

Higher proportion of psychiatric morbidity among employees of safety category is reasonable, because there is a high stress involved in furnishing their scheduled duties in comparison to workers of other non-safety categories. This high stress among employees of safety category, is also supported by the results of Kumar et al (2011)<sup>18</sup> from a cross sectional analytical study that mean of occupational stress index of railway engine pilots was significantly ( $t = 9.466, P < 0.01$ ) higher to that of office clerks, and other similar observations were also made in earlier studies like the jobs of railway drivers fall under 'high-strain' category as they have to perform long hours of duty with rigid procedures and little options for taking breaks (Karasek & Theorel, 1990,<sup>19</sup> Kumar et al., 2011).<sup>18</sup>

High proportion of psychiatric morbidity among shift workers may be understandable on the ground of nature of their jobs, where they face many adversities i.e. about half (52.02%) of shift workers were came across with problems related to their shift duties and more than 3/4<sup>th</sup> (78.38%) of employees, who had furnishing shift duties were encountered with stress at their work places as compared to other non-shift workers (52.56%). Similar observations were also made by Kiran Kumar P.K. et al (2001)<sup>20</sup> that 49.2% of the workers reported shift related problems; while, Dutta S. et al (2007)<sup>12</sup> concluded that shift duties were significantly associated ( $P = 0.000$ ) with more psychiatric morbidity.

Total duration of job (Work experience >20 years) was also observed as a risk factor for occurrence and distribution of psychiatric morbidity among Railway's employees, which may be explained by the additive influences of the above noticed occupational attributes with time factor in the present study sample.

It must be emphasized that in the sample studied, the multivariate analysis revealed that perceived problems related to shift duties by workers was an independent determinant of Common psychiatric Disorders among study individuals. Perceived problems related to shift duties i.e. stress of working in odd hours, sleep disturbances and irregularity in exercise or eating habits are associated with various physiological, physical and psychosocial adverse consequences like disruption in the circadian rhythm, isolation/cut off from friends and families and changes in life style etc.

In the index study, those who had job satisfaction and perceived support at work place, were found to be at lower risk for psychiatric disorders. A job satisfaction and perceived support at work place may itself be the form of protective factors and may also stem from various favorable bio-psycho-social and occupational factors like life style, physical fitness, coping skills, self efficacy, duty hours, family dynamics and interpersonal relationships in the workplace etc.

## V. CONCLUSIONS

Common Psychiatric Disorders especially depression, anxiety and somatoform disorders were found in medical outpatients. Employees working in rotatory shifts, perceived problems related to shift duties and stress in the working environment, work experience more than 20 years and non-executive type job as the occupational risk factors of common psychiatric disorders in current study sample. So it can be concluded that there is scope for psychiatric intervention for the management of perceived stress at work place, problems related to shift duties and other occupational challenges. This may have both therapeutic and preventive values.

## CONFLICT

None declared till date.

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