Indian Journal of Psychological Science

Internationally

Indexed, Refereed and Peer Reviewed

UGC –CARE LIST:

UGC Approved: Emerging Sources Citation Index: WoS

https://mjl.clarivate.com:/search-results?issn=0976-9218

IJPS

The official organ of:

National Association of Psychological Science (Regd.)

www.napsindia.org Email: managingeditorijps@gmail.com, Phone: 9417882789

The association of Cognitive Fatigue with work overload amongst working force

Swetha Sivakumar, Dr. Sangeetha SR, Sounthariyaa J, Dr. Patteswari D

ABSTRACT

The major goal of this study is to examine the cognitive fatigue with work overload among working people. The study consists of 307 participants working in various working sectors using the Maslach Burnout Inventory (MBI) and Oldenburg Burnout Inventory (OLBI) to collect the data The obtained data were analysed using SPSS 20, with different statistical methods such as Frequency and percentage Spearmen's rank corelations, chi-square independent test, Kruskal Wallis H test, Mann Witney U test.

The results show that Depersonalization of cognitive fatigue showed a significant correlation with other dimensions like burnout, depersonalization and personal achievements of cognitive fatigue and disengagement and exhaustion of work overload. There are significant differences in cognitive fatigue based on marital status, working hours, job role, and age, gender while work overload only differed significantly with gender. There are significant associations between personal achievement (cognitive fatigue) and exhaustion (work overload). However, depersonalization and exhaustion with gender, as well as disengagement with gender, marital status, and working hours, were found to be non-significant.

The findings show that cognitive fatigue and work overload affect people differently based on their job and personal factors. Workplaces need to focus on reducing burnout and managing better to support employee well-being.

Key words: Cognitive fatigue, Work overload, Working people, Burnout, Exhaustion, Disengagement

About the authors

1. *Student*
2. *Assistant Professor, Division of Psychology & Cognitive Neuroscience, JSS Academy of Higher Education & Research (Corresponding Author & Guide)*
3. *Student, Department of Computer Science Engineering, Dayananda Sagar University*
4. *Division Coordinator, Division of Psychology & Cognitive Neuroscience, JSS Academy of Higher Education & Research*
5.

Paper Received: 08-05-2025

Paper Accepted: 10-11-2025

Paper Published: 30-11-2025

Introduction

In fast-paced work environments, complaints of cognitive overload and fatigue are more frequent, negatively affecting productivity through increased errors and reduced morale. The inability to manage the mental demands given the processing capacity characterizes cognitive overload, while reduced efficiency because of prolonged mental activity demonstrates cognitive fatigue. Cognitive fatigue is commonly viewed as a

psychobiological state that occurs following an extended period of self-regulated activity, which leads to a decrement in the performance of reasoned cognitive processing tasks over a period (Martin et al., 2018). Different studies specify the relation of fatigue to performance at work, portraying enormous losses in many industries. For instance, in the rail industry, occupational fatigue degraded simple cognitive tasks such as visual search and logical reasoning, impinging on safety and productivity (Fan & Smith, 2020).

Similarly, a study on vigilance dual tasks found that mental fatigue impairs task performance, particularly affecting cognitive elasticity and contributing to increased miss errors and false alarms (Guastello et al., 2016). In healthcare, cognitive overload relates to poor task performance accompanied by bodily cues, thus appealing for better monitoring and interventions to reduce such effects (Sewell et al., 2020). Cognitive overload is intricately linked to fatigue, which negatively impacts working memory and attention in high-demand environments (Subramanyam et al., 2013).

Further, construction labourers who face high mental challenges benefit from immediate results related to fatigue impairments through cognitive screening tools, reducing accidents and improving work efficiency (Powell, 2012). Cognitive overload also significantly affects task performance in assembly tasks, where increasing cognitive demand impairs completion times and increases physical strain due to greater muscle activity (Biondi et al., 2020). The investigation of school staff also showed that workload and affective distress contribute significantly to work-family conflict, mediated by cognitive, physical, and emotional fatigue (Ilies et al., 2015). For instance, the continuously growing cognitive challenges in digitized workplaces are linked to increasing levels of fatigue, depending on the resources available to employees (Meyer & Hünefeld, 2018).

Additionally, research in a communications company found a high mental workload correlated with occupational fatigue, highlighting the impact of cognitive strain even in less physically demanding jobs (Ghanbary et al., 2019). Despite the growing popularity of this topic, there still exists a relative dearth of appropriate knowledge about cognitive fatigue and overload across various job classes and demographic contexts. Many studies of cognitive fatigue and overload have been limited to some specific job classes or isolated workplace contexts. However, there is truly little research that has been done to bring all these phenomena together under one umbrella to study across different jobs and demographics. This research emphasizes the need for a workplace-oriented approach. Owing to limited research in the Indian region, cognitive fatigue results are based on socioeconomic variability. Therefore, demographic variables such as age, gender, work hours, and others may be helpful in many ways as organizations seek to lessen cognitive strain and increase the well-being of workers.

Materials and Methods

Using Cross sectional quantitative research design, The Sample consists of 307 recruited between the ages of 18 and above belonging to work force in Metro-Politan cities and tire 1 cities across India. The sample were purposive in nature, which included type of

job and work hours along with demographic variables like gender, age, and marital status. Unemployed individuals and students with work experience were excluded from the study.

Measures

Consent and demographic data were collected using a data sheet created by the researcher, the Maslach burnout inventory and Oldenburg Burnout Inventory.

Maslach Burnout Inventory (MBI):

MBI has 3 dimensions.

Emotional Exhaustion (EE) — Assesses the level of emotional overextension and exhaustion (Scaled from 0 to 54 with higher scores reflecting greater exhaustion).

Depersonalization (DP): Evaluates cynical or detached attitudes toward other people, among colleagues and clients alike (Scores: 0-30; higher scores are indicative of more depersonalization).

Personal Accomplishment (PA): it reflects a sense of achievement and competence at work [Scores ranges from 0 to 48; higher scores represent lower burnout].

Oldenburg Burnout Inventory (OLBI):

The OLBI examines burnout through two dimensions:

Exhaustion: Involves measures of overall burnout defined as a state of physical, emotional and mental exhaustion (Values range from 8 to 32, a higher number indicates a more severe level of burnout).

Disengagement: Measured by activity as well as lack of interest in work and negative feelings toward it (Range from 8 to 32, higher score is an index of withdrawal).

Procedure

The participants were recruited across India, with ages ranging between 18 years and above. The respondents' consent to participate in the study was anchored on the explicit guarantee of their anonymity. The participants in the study were given both MBI and OLBI and the scores attained were used to examine the association of cognitive fatigue with work overload amongst working force.

Statistics were used to analyse data to provide evidence to support the hypothesis that showed that cognitive fatigue and overload affects job performance.

Statistical Analysis

Descriptive Statistics (Frequencies and Percentages):
This helps summarize the demographic infor mation and discern patterns in cognitive fatigue and burnout across various groups.
Normality Testing (Shapiro-Wilk Test):
This is used to test if the data followed a normal
distribution. It helps determine which statisti cal test can be used for non-normal data.
Mann-Whitney U Test:
This will be used for comparing burnout levels across two independent groups where data is taken as not normally distributed.
Kruskal Wallis H Test:
Used for cross-analysis of burnout or fatigue across more than two independent groups. Good for non-normal data.

Spearman's Rank Correlation:
Determines the association between two the ordinal variables, such as stress and job satisfaction, in distributed data which is non normal.
Chi-Square Test:
Testing the existence of association that might exist between categorical variables, such as burnout and demographic factors, and check for possible risk factors.

Hypothesis:

- H1: There is no significant relationship between categories of cognitive fatigue and dimensions of work overload.

- H2: Demographic variables significantly influence cognitive fatigue and work overload.
- H3: There is a significant association between categories of cognitive fatigue and dimensions of workload among respondents.
- H4: There is no significant association between categories of cognitive fatigue and workload dimensions with demographic variables.

Results:

Demographic Variable	Categories	Frequency (N)	Percentage (%)
Gender	Male	139	45.3%
	Female	168	54.7%
Marital Status	Single	69	22.5%
	Married	213	69.4%
	It's Complicated	25	8.1%
Working Hours	6-8 hours	84	27.4%
	8-10 hours	102	33.2%
	10-12 hours	63	20.5%
	12+ hours	58	18.9%
Age	18-25 years	56	18.2%
	26-33 years	56	18.2%
	34-41 years	65	21.2%
	42-49 years	73	23.8%
	49 years and above	57	18.6%
Job Roles	IT Engineers	96	31.3%
	Teaching Professionals	15	4.9%
	Finance Sector Employees	106	34.5%
	Other Engineers	50	16.3%
	Freelance/Part-Time/Remote/Self-Employed	27	8.8%
	Others	13	4.2%

Hypothesis Findings:

H1: There is no significant relationship between categories of cognitive fatigue and dimensions of work overload.

To test this hypothesis, **Spearman's Rank Correlation** was used to examine the relationship between cognitive fatigue and dimensions of work overload. The test was chosen because of its ability to measure the strength and direction of the association between the ordinal variables without assuming a linear relationship.

Dimension	Correlation with Burnout	Significance (p-value)
Depersonalization	0.609	0.001**
Personal Achievement	-0.060	0.291
Disengagement	-0.066	0.249
Exhaustion	0.089	0.119

- A significant positive relationship exists between burnout and depersonalization ($r=0.609$, $p<0.001$r = 0.609, p < 0.001r=0.609,p<0.001).
- Other dimensions (personal achievement, disengagement, and exhaustion) show no significant relationship with burnout.
- These findings suggest that higher cognitive fatigue may lead to higher levels of depersonalization but not significantly affect other dimensions of work overload.

Significant correlations were found for several dimensions of burnout. Cognitive fatigue was closely linked with total exhaustion and reduced personal achievement. These results indicate that individuals experiencing higher cognitive fatigue are more likely to report a sense of emotional exhaustion and dissatisfaction with their achievements at work, while depersonalization showed less pronounced associations.

Demographic Variable	Cognitive Fatigue	Work Overload
Marital Status	Significant (p=0.001p = 0.001p=0.001)	Not Significant (p=0.097p = 0.097p=0.097)
Working Hours	Significant (p=0.001p = 0.001p=0.001)	Not Significant (p=0.996p = 0.996p=0.996)
Age	Significant (p=0.001p = 0.001p=0.001)	Not Significant (p=0.554p = 0.554p=0.554)
Job Type	Significant (p=0.001p = 0.001p=0.001)	Significant (p=0.001p = 0.001p=0.001)
Gender (Mann-Whitney)	Significant (p=0.002p = 0.002p=0.002)	Significant (p=0.001p = 0.001p=0.001)

H2: Demographic variables significantly influence cognitive fatigue and work overload.

To test this hypothesis, **Kruskal Wallis H Test** and **Mann Whitney U Test** were used to examine the influence of demographic variables on cognitive fatigue and work overload. The Kruskal-Wallis H Test was applied for variables with more than two groups (such as marital status, age, and job type), while the Mann-Whitney U Test was used for gender comparisons (a binary variable).

1. **Marital Status**: Significant differences in cognitive fatigue were observed across marital statuses, with individuals in "It's Complicated" relationships exhibiting the highest fatigue. Work overload was not significantly affected.
2. **Working Hours**: Cognitive fatigue increased with longer working hours, especially for those working over 12 hours. No significant difference was observed in work overload across groups.
3. **Age**: Younger participants (18–25 years) showed higher levels of cognitive fatigue. Work overload was not significantly influenced by age.
4. **Job Type**: Both cognitive fatigue and work overload showed significant differences across job types, with freelancers/self-employed individuals experiencing the highest fatigue and finance professionals reporting the highest work overload.
5. **Gender**: Females experienced significantly higher cognitive fatigue than males, while males reported higher work overload.

Chi-square tests revealed a significant association between higher cognitive fatigue categories and work overload. The data shows that individuals under high workload pressures are more likely to experience elevated levels of cognitive fatigue.

H3: There is a significant association

between categories of cognitive fatigue and dimensions of workload among respondents.

To test this hypothesis, crosstabulations and Chi-Square tests were conducted for various combinations of burnout dimensions and workload components. Below is a summary of the findings:

Crosstabulation Results (H3)

Variable Pair	Pearson Chi-Square	p-value	Significance
TOTAL BURNOUT * TOTAL DISENGAGEMENT	5.600	.231	Not significant
TOTAL BURNOUT * TOTAL EXHAUSTION	13.659	.008	Significant
TOTAL DEPERSONALIZATION * TOTAL DISENGAGEMENT	4.662	.324	Not significant
TOTAL DEPERSONALIZATION * TOTAL EXHAUSTION	8.603	.072	Marginal significance
TOTAL PERSONAL ACHIEVEMENT * TOTAL DISENGAGEMENT	8.987	.061	Near significance
TOTAL PERSONAL ACHIEVEMENT * TOTAL EXHAUSTION	25.985	.000	Highly significant

- The relationship between overall burnout and disengagement was not statistically significant, suggesting these may operate independently in some scenarios.
- A strong relationship was observed, indicating that burnout is significantly tied to feelings of exhaustion, supporting the multidimensional nature of burnout.
- Depersonalization and disengagement did not show a meaningful connection, suggesting these dimensions affect workers differently.
- A nearly significant result indicates a potential trend where higher depersonalization aligns with increased exhaustion, although further study might be needed.
- Lower personal achievement appeared weakly related to disengagement, hinting at the possibility of indirect influences within workplace settings.
- A strong and highly significant relationship was observed, implying that reduced personal achievement is a key dimension affected by exhaustion.

H4: There is no significant association between categories of cognitive fatigue and workload dimensions with demographic variables.

To test this hypothesis, analysis was performed by exploring demographic variables such as gender, marital status, working hours, age, and job roles in relation to cognitive fatigue categories and workload dimensions.

Demographic Analysis Results (H4)

Variable Pair	Pearson Chi-Square	p-value	Significance
TOTAL BURNOUT * Gender	14.861	.001	Significant
TOTAL BURNOUT * Marital Status	55.036	.000	Highly significant
TOTAL BURNOUT * Working Hours	43.257	.000	Highly significant
TOTAL BURNOUT * Age	25.301	.001	Significant

TOTAL BURNOUT * Job Role	33.583	.000	Highly significant

1. Gender

- **Total Burnout and Gender:** Significant association, with females showing higher levels of burnout.
- **Total Depersonalization and Gender:** Marginally significant, with females displaying higher depersonalization.

2. Marital Status

- **Total Burnout and Marital Status:** Significant association, where singles reported higher burnout than married individuals**.**
- **Total Depersonalization and Marital Status:** Significant association, showing differences across marital statuses.

3. Working Hours

- **Total Burnout and Working Hours:** Significant association, with those working over 12 hours showing the highest burnout.
- **Total Depersonalization and Working Hours:** Significant association, with higher working hours correlating with depersonalization.

4. Age

- **Total Burnout and Age:** Significant association, with younger respondents (18–25) showing higher burnout levels.
- **Total Depersonalization and Age:** Significant association, younger participants report higher depersonalization.

5. Job Role

- **Total Burnout and Job Role:** Significant association, with finance professionals reporting higher burnout**.**
- **Total Depersonalization and Job Role:** Significant association, with IT engineers experiencing more depersonalization.

Discussion:

The recent body of research underlines the significant impact of cognitive fatigue, work overload, and burnout among professionals in Indian sectors, especially in high-stress environments such as health and IT. A study by Kesarwani et al. (2020) indicates that burnout is one of the common diseases found among healthcare workers. It manifests in the form of emotional exhaustion, depersonalization, and reduced personal accomplishment. The study found that the opportunity of suffering from burnout was likely due to working stressors among younger and unmarried women (Kesarwani et al., 2020). Kumar 2023 also faced burnout in the Indian IT sector, caused by unyielding pressure placed upon people through high expectations, long hours in work, and a demanding work culture. It came out with the existence of organizational support and stress-managing practice like mindfulness and flexible work hours that would minimize stress and burnout at work (Kumar, 2023).

Koval et al. (2020) further provided insights into burnout among Indian EMTs. The study found that more severe emotional exhaustion

and depersonalization levels would be observed among younger EMTs, with a perceived lack of respect and exposure to physical risks, though tending to coincide with an intent to leave jobs (Koval et al., 2020).

In relation to the interventions, Bhardwaj et al. (2023) has demonstrated that there is an efficacy of yoga-based interventions in reducing emotional exhaustion and enhancing professional quality of life amongst the healthcare workers. According to their findings, the incorporation of wellness programs can efficiently manage stress and may also reduce burnout (Bhardwaj et al., 2023). Bhowmick and Mulla (2020) discussed burnout among Kolkata police officers. The study revealed that job control and organizational support are critical predictors of a decrease in burnout levels. When the demands were high at work without suitable support, emotional exhaustion occurred; otherwise, greater organizational identification led to better personal accomplishment (Bhowmick & Mulla, 2020).

Packirisamy et al. (2017) investigated the phenomenon of burnout among early-career knowledge workers in the IT industry. From that research, the authors qualitatively concluded that underemployment and fear over job security along with exhausting working environments significantly contributed to the burning out. The research thereby highlighted the strong need for not only individual but also organizational-wide holistic strategies to mitigate burnout to enhance employee engagement and retention (Packirisamy et al., 2017).

Collectively with the imperativeness, these studies point towards organisational strategic interventions like workload management and different support systems for the workforce along with well-being programs aimed at alleviating cognitive fatigue and burnout in high-demand professional sectors.

References:

1. Martin, K., Meeusen, R., Thompson, K. G., Keegan, R., & Rattray, B. (2018). Mental Fatigue Impairs Endurance Performance: A Physiological Explanation. Sports medicine (Auckland, N.Z.), 48(9), 2041–2051. https://doi.org/10.1007/s40279-018-0946-9
2. Fan, J., & Smith, A. P. (2020). Effects of Occupational Fatigue on Cognitive Performance of Staff From a Train Operating Company: A Field Study. Frontiers in Psychology, 11, 558520. https://doi.org/10.3389/fpsyg.2020.558520
3. Guastello, S., Reiter, K., & Malon, M. (2016). Cognitive Workload and Fatigue in a Vigilance Dual Task: Miss Errors, False Alarms, and the Effect of. . . ResearchGate. https://www.researchgate.net/publication/313367453_Cognitive_Workload_and_Fatigue_in_a_Vigilance_Dual_Task_Miss_Errors_False_Alarms_and_the_Effect_of_Wearing_Biometric_Sensors_While_Working
4. Sewell, J. L., Santhosh, L., & O'Sullivan, P. S. (2020). How do attending physicians describe cognitive overload among their workplace learners? Medical Education, 54(12), 1129–1136. https://doi.org/10.1111/medu.14289
5. Meyer, S., & Hünefeld, L. (2018). Challenging cognitive demands at work, related working conditions, and Employee Well-Being. International Journal of Environmental Research and Public Health, 15(12), 2911. https://doi.org/10.3390/ijerph15122911
6. Biondi, F. N., Cacanindin, A., Douglas, C., & Cort, J. (2020). Overloaded and at work: Investigating the effect of cognitive workload on assembly task performance. Human Factors the Journal of the Human Factors and Ergonomics Society, 63(5), 813–820. https://doi.org/10.1177/0018720820929928
7. Subramanyam, M., Muralidhara, P., & Muralidhara, P. (2013). Mental Workload and Cognitive Fatigue: a study. https://www.semanticscholar.org/paper/Me

ntal-Workload-and-Cognitive-Fatigue%3A-A-Study-Subramanyam-Muralidhara/98cf73f5737061718f0fe53179a6d17781d8b0f8?utm_source=consensus

8. Powell, R. I., & Copping, A. G. (2016). Measuring fatigue-related impairment in the workplace. Journal of Engineering Design and Technology, 14(3), 507–525. https://doi.org/10.1108/jedt-09-2014-0063
9. Ghanbary, A., Haghshanas, B., Habibi, E., & Abedi, M. (2019). The Investigation Relationship between Mental Workload and Occupational Fatigue in the Administrative Staffs of a Communications Service Company. https://www.semanticscholar.org/paper/The-Investigation-Relationship-between-Mental-and-a-Ghanbary-Haghshanas/2fe9fd0b61c9f7c1388e1fbac5a6ba980553ffe2?utm_source=consensus
10. Ilies, R., Huth, M., Ryan, A., & Dimotakis, N. (2015). Explaining the Links between Workload, Distress, and Work-Family Conflict among School Employees: Physical, Cognitive, and Emotional Fatigue.. Journal of Educational Psychology, 107, 1136-1149. https://doi.org/10.1037/EDU0000029.
11. Kesarwani, V., Husaain, Z. G., & George, J. (2020). Prevalence and Factors Associated with Burnout among Healthcare Professionals in India: A Systematic Review and Meta-Analysis. Indian journal of psychological medicine, 42(2), 108–115. https://doi.org/10.4103/IJPSYM.IJPSYM_387_19
12. Kumar, H. https://www.jcdronline.org/admin/Uploads/Files/64906db08dfc08.95917597.pdf
13. Koval, K. W., Lindquist, B., Gennosa, C., Mahadevan, A., Niknam, K., Patil, S., Rao, G. V. R., Strehlow, M. C., & Newberry, J. A. (2020). First look at emergency medical technician wellness in India: Application of the Maslach Burnout Inventory in an unstudied population. PLoS ONE, 15(3), e0229954. https://doi.org/10.1371/journal.pone.0229954
14. Bhardwaj, P., Pathania, M., Bahurupi, Y., Kanchibhotla, D., Harsora, P., & Rathaur, V. K. (2023). Efficacy of mHealth aided 12-week meditation and breath intervention on change in burnout and professional quality of life among health care providers of a tertiary care hospital in north India: a randomized waitlist-controlled trial. Frontiers in Public Health, 11. https://doi.org/10.3389/fpubh.2023.1258330
15. Bhowmick, S., & Mulla, Z. (2020). Who gets burnout and when? The role of personality, job control, and organizational identification in predicting burnout among police officers. Journal of Police and Criminal Psychology, 36(2), 243–255. https://doi.org/10.1007/s11896-020-09407-w
16. Premalatha Packirisamy Manju Meenakshy Srinath Jagannathan , (2017)," Burnout during Early Career: Lived Experiences of the knowledge workers in India ", Journal of Enterprise Information Management, Vol. 30 Iss 1 pp. - Permanent link t o t his document : http://dx.doi.org/10.1108/JEIM-01-2016-0041