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Original Article

Association between occupational stress and mental health in an automobile manufacturing factory in Iran

Karimi L[1], Sharifian SA[2], Aminian O[3], Rasooli SR[4], Zia G[5], Eftekhari S[6]

[1,3] Center for Research on Occupational Diseases (CROD), Tehran University of Medical Sciences (TUMS), Tehran, Iran
[2,6] Occupational Medicine Department, , Medical Faculty, Tehran University of Medical Sciences (TUMS), Tehran, Iran
[4,5] Occupational Health and Safety (OH & S) Department, SAIPA Group, Tehran, Iran

ABSTRACT

Introduction: To improve productivity and enhance employees' physical and mental well-being, it is essential to identify and mitigate work-specific stressors due to their direct impact on efficiency. This study aimed to assess the relationship between occupational stress and the symptoms of anxiety, depression, and stress among the employees of an automobile manufacturing factory in Iran.

Methods: A cross-sectional study was conducted from January to December 2021 in an automobile manufacturing factory located in Tehran, Iran. The study utilized simple random sampling to select a population of 4,565 participants. Data were collected using the OSIPOW Occupational Stress Inventory and the Depression Anxiety and Stress Scale 21 (DASS-21) questionnaires. The analysis was conducted using SPSS version 16, applying both descriptive and inferential statistical methods.

Results: All participants experienced some level of job stress, with 65.5% in the low-stress group and 34.5% in the high-stress group. White-collar workers had higher job stress than blue-collar workers. The prevalence of depression, anxiety, and stress symptoms was 22.6%, 24%, and 29.3%, respectively. The participants with high job stress reported higher symptoms of depression, anxiety, and stress [OR=2.35, CI 95% (1.88-2.92)], [OR=1.41, CI 95% (1.12-1.83)], [OR=1.38, CI 95% (1.19-1.76)]. Linear regression analysis identified that being a white-collar worker, having more work experience, exposure to workplace noise and stressors, and exhibiting symptoms of depression are factors that may contribute to occupational stress.

Conclusion: This study highlights the detrimental effects of psychosocial hazards in the work environment on workers' mental health, evidenced by increased symptoms of depression, anxiety, and stress. It underscores the need to manage occupational stress to preserve both the general and mental health of employees.

Keywords: Anxiety, Depression, Mental health, Occupational stress

Corresponding author:
Sahar Eftekhari,
Assistant Professor, Occupational Medicine Department,
Medical Faculty,
Tehran University of Medical Science (TUMS), Tehran, Iran
E-mail: shareftekhari32@gmail.com
Tel.: +982166405588
ORCID ID: https://orcid.org/0000-0002-2706-7999

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Introduction

Stress caused by job-related factors, terms such as 'occupational stress', 'work stress', 'job stress' and 'work-related stress' are often used interchangeably. The definition of occupational stress that is most commonly accepted by scholars and researchers comes from the United States National Institute for Occupational Safety and Health (NIOSH, 1999). NIOSH defines occupational stress as 'the harmful physical and emotional responses that occur when the demands of the job do not align with the worker's abilities, resources, and needs'.[1]

With the advent of industrialization worldwide, the phenomenon of stress has become particularly

significant and increasingly impacts workers' health.[2] Occupational stress is recognized as a significant psychological risk factor in the workplace and holds particular importance.[3] Mental health is a state in which individuals are aware of their own abilities, can cope with everyday life and work-related stresses, perform effective activities, and engage in group work within society.[4] Mental health is a condition where individuals recognize their own capabilities, manage daily and job-related stresses, carry out productive activities, and participate effectively in community group activities.[5] Conversely, it can be a primary cause of heightened workplace accidents, increased absenteeism, job dissatisfaction, and a decrease or lack of interest in work.[6-8] The impacts and manifestations of occupational stress can lead to the deterioration of interpersonal relationships.[9] Career opportunities and accomplishments can be forfeited, and the quality of life can suffer as a result.[10] The harm inflicted on individuals' quality of life, coupled with the substantial economic costs involved, underscores that occupational stress is a complex issue with significant socio-economic dimensions that demand considerable attention.[11,12] Thus, focusing on productivity and enhancing both the physical and mental well-being of employees within work environments, and recognizing the direct impact of stress on employee efficiency, it is crucial to identify and mitigate stressors specific to each field of work. The objective of this study is to assess the correlation between occupational stress and symptoms of anxiety, depression and stress among employees at an automobile manufacturing factory in Iran.

Methods

This cross-sectional analytical study was conducted from January to December 2021 at an automobile manufacturing factory in Tehran, Iran, renowned for its large employee population. The study used a simple random sampling method. The primary objective was to assess the overall level of occupational stress within the automobile manufacturing company and explore the association between occupational stress and mental health. As the study progressed, we identified additional research opportunities, including a comparison of occupational stress levels between blue-collar and white-collar workers. Since the required statistical power varies for each hypothesis, these comparisons demand a larger sample size. To ensure adequate power for these new analyses, we conducted a pilot study with 70 participants (35 blue-collar and 35 white-collar workers). The pilot study yielded the following results:

- Blue-collar workers: Mean occupational stress level = 162.04 ± 32.31
- White-collar workers: Mean occupational stress level = 164.67 ± 32.29

Using these results, we applied the following sample size formula to estimate the number of participants needed for each group:

Sample Size Formula: $N = (Z_{\alpha/2} + Z_{\beta})^2 \times 2 \times \sigma^2 / (\mu_1 - \mu_2)^2$

Where:

N is required sample size per group (blue-collar and white-collar workers).

$Z_{\alpha/2}$ is the Z-score corresponding to the significance level α (for α=0.05, $Z_{\alpha/2}$ =1.96)

Z_{β} is the Z-score corresponding to the desired power (for 80% power, Z_{β} = 0.84)

μ_1 and μ_2 are the means of the two groups (blue-collar and white-collar workers), from the pilot study: $\mu_1 - \mu_2 = 164.67 - 162.04 = 2.63$

σ^2 is the pooled variance (combined variance of both groups).

Using this formula, the required sample size per group (N) was calculated to be 2,293 participants. Therefore, the total required sample size for the study is: 2,293×2=4,586 participants

To account for a 20% attrition rate, the total required population was adjusted to 5,503 participants. A total of 6,000 questionnaires were distributed, and we received 4,850 completed responses. After applying the study's exclusion criteria, 4,565 participants remained in the study.

This study obtained ethics approval from the ethics committee of the Tehran University of Medical Sciences.

Participants were given the freedom to choose whether to participate, and their responses were

treated confidentially with no requirement to disclose personal information. Prior to participation, all individuals provided informed consent after a comprehensive explanation of the study's objectives.

OSIPOW and DASS-21(Depression Anxiety and Stress Scale 21) questionnaires were completed by the employees of the automobile manufacturing factory. OSIPOW occupational stress questionnaire was prepared and used for the first time in 1987 by OSIPOW et al. to assess individual stress from six dimensions: role overload, role insufficiency, role ambiguity, role boundary, responsibility, and physical environment. This questionnaire contains 60 questions, and each of the 6 mentioned dimensions is evaluated by ten statements, respectively. The scoring of OSIPOW occupational stress questionnaire is based on a 5-point Likert scale as follows: 5 options for each statement, point 1 for never, 2 for sometimes, 3 for often, 4 for usually, and 5 for most of the time. The range of scores of this questionnaire fluctuates from 60 to 300, and the higher scores of the subject in this questionnaire indicate his high level of stress. Furthermore, the amount of overall stress is divided into four categories as follows: low stress, 60 to 119 points, low to moderate stress 120 to 179, moderate to severe stress 180 to 239 and severe stress 240 to 300. During Sharifian et al.'s research, the content validity of this questionnaire was reported to be very favorable, and its reliability was calculated at a satisfactory level by the retest method, and its Cronbach's alpha coefficient was calculated and reported as 0.89.[13-17]

The DASS-21 questionnaire, developed by Lovibond and Lovibond in 1995,[18] is a self-report measure designed to assess negative emotional states, specifically depression, anxiety, and stress. Each of the seven questions in the DASS-21 subscales is scored on a four-point Likert-type scale: 0 (did not apply to me at all), 1 (applied to me to some degree or some of the time), 2 (applied to me to a considerable degree or a good part of the time), and 3 (applied to me very much or most of the time). The depression scale evaluates dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest or involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experiences of anxious affect. The stress scale measures difficulty relaxing, nervous arousal, irritability, and a tendency to be easily upset or agitated, reflecting levels of chronic non-specific arousal. Scores from relevant items are summed up to obtain subscale scores for depression, anxiety, and stress. Since the DASS-21 is a shortened version of the original DASS (42 items), the final score for each subscale is multiplied by 2 to maintain consistency with the full scale. The Persian version of the DASS-21 has been validated and its reliability was confirmed in a study conducted by Habibi et al.[19]

Table 1. General guidelines for the DASS severity ratings:

Severity Ratings	Z Score	Percentile	DASS-Depression	DASS-Anxiety	DASS-Stress
Normal	<0.5	0–78	0-9	0-7	0-14
Mild	0.5–1.0	78–87	10-13	8-9	15-18
Moderate	1.0–2.0	87–95	14-20	10-14	19-25
Severe	2.0–3.0	95–98	21-27	15-19	26-33
Extremely severe	>3.0	98–100	28+	20+	34+

After data collection, the information was entered into SPSS version 22 software for analysis. Descriptive statistics, tables, and graphs were utilized to summarize the data. Analytical analysis included the Chi-square test and Fisher's exact test for qualitative variables as necessary. To assess the

relationship between occupational stress and symptoms of Depression, Anxiety, and Stress, logistic regression analysis was performed. This analysis adjusted for potential confounders such as age, sex, work experience, education level, regular exercise, job type (blue/white collar), shift work, smoking habits, and marital status. A significant level of $p < 0.05$ was used, and odds ratios (ORs) with 95% confidence intervals were reported for each comparison. Furthermore, linear regression analysis was employed to identify factors contributing to occupational stress. These analytical methods allowed for a comprehensive examination of the data to understand the associations between occupational stress and mental health symptoms, while also identifying predictors of occupational stress within the study population.

Results

In the current study, 4,565 employees of an automobile manufacturing factory were examined, of which 4,474 (98.1%) were male. Among the participants, 18.6% were smokers, 40.1% engaged in shift work, 61% experienced workplace noise exposure, and 3% regularly exercised during their leisure time. Based on a self-report study, 94.9% of people reported stressors in their jobs. The average age of the participants was 42.59 ± 4.45 years, and the average duration of employment in this company was 16.83 ± 4.5 years. The average OSIPOW occupational stress scores were 162.83 ± 32.61; Considering the cut points [low stress 60 to 119 points, low to moderate stress 120 to 179, moderate to severe stress 180 to 239 and severe stress 240 to 300], all of participants had some degree of job stress;11.9 percent mild stress,53.6 percent mild to moderate, 34 percent moderate to severe and 0.5 percent severe stress. To identify any possible relation between occupational stress and baseline and occupational factors, participants were divided into two groups according to their scores; high stress (180 to 300) and low stress (60 to 179). This study showed that white-collar workers experienced higher job stress at the workplace than blue-collar workers ($P<0.01$) and occupational stress increased significantly by increasing work experience and working years of the workers ($P= 0.01$). Besides, participants who stated that they were exposed to noise at work had high job stress ($P<0.01$). (Table 2)

Table 2. Baseline and Occupational characteristics in total study participants (N= 4565) and in the two groups of employees with High/ Low occupational stress:

Variables	Total Study Population (N= 4565)	High Stress Employees (N=1574, 34.5%)	Low Stress Employees (N=2991,65.5%)	pvalue
Job type				
Blue collar N (%)	2702 (61.9)	843 (31.2)	1859 (68.8)	
White collar N (%)	1664 (38.1)	681 (40.9)	983 (59.1)	< 0.001
Gender				
Male N (%)	4477 (98.1)	1533 (34.2)	2944 (65.8)	0.12
Age: Mean ± SD	42.59 ± 4.45	42.74± 4.46	42.51± 4.45	0.10
Educational level				
Diploma and lower diploma N (%)	1828 (40.1)	597 (32.7)	1231 (67.3)	
Associate degree N (%)	802 (17.5)	280 (34.9)	522 (65.1)	
Bachelor degree and higher N (%)	1933 (42.4)	695 (36)	1238 (64)	0.10

Shift work **Shift workers N (%)**	1831 (40.1)	659 (36)	1172 (64)	0.08
Smoking status **Smokers N (%)**	850 (18.6)	264 (31.1)	586 (68.9)	0.23
Noise **Having Noise exposure N (%)**	2784 (61)	855 (30.7)	1929 (69.3)	< 0.001
Exercise **Doing regular exercise N (%)**	135 (3)	41 (30.4)	94 (69.6)	0.31
Stressors **Having stressors at workplace N (%)**	4331 (94.9)	1497 (34.6)	2834 (65.4)	0.60
Work experience (years of employment): Mean ± SD	16.83± 4.55	17.15 ± 4.56	16.66 ± 4.54	0.001
Number of children: Mean ± SD	1.54± 0.83	1.52 ± 0.81	1.55 ± 0.84	0.22
Marital status **Married N (%)**	4257 (93.3)	2832 (36.5)	1425 (63.5)	0.34

As mentioned earlier, OSIPOW job stress questionnaire has six domains. The role of these domains in creating occupational stress was evaluated in the whole study population and compared between the white and blue-collar workers. Physical environment was identified in this research as the primary contributor to occupational stress in both groups and throughout the whole study population. Fascinatingly, in comparison to blue-collar employees, white-collar workers showed statistically significant higher ratings across all occupational stress factors (Table 3).

Table 3. Total occupational stress levels and values of different components (based on OSIPOW) in study population and comparing between Blue/ White collar employees:

OSIPOW	Study population (N=4565) Mean, SD	Blue collar (N=2702) Mean, SD	White collar (N= 1664) Mean, SD	pvalue
Occupational Stress	162.83 ± 32.61	161.41 ± 32.33	166.10 ± 32.65	< 0.001
Role Overload	26.91 ± 7.81	26.46 ± 8.03	27.68 ± 7.50	< 0.001
Role Insufficiency	28.99 ± 8.18	28.75 ± 8.37	29.08 ± 7.8O	0.002
Role Ambiguity	22.70 ± 7.71	22.40 ± 7.90	23.01 ± 7.34	< 0.001
Role Boundary	26.69 ± 5.78	26.35 ± 6.92	27.36 ± 5.46	< 0.001
Responsibility	27.45 ± 7.22	27.00 ± 7.48	28.18 ± 6.86	< 0.001
Physical Environment	30.08 ± 10.69	29.85 ± 9.49	30.78 ± 12.26	< 0.001

To better evaluate the effect of occupational stress on the mental health of the workers, we dichotomized the workers, based on DASS-21 scales, into 2 categories: Normal people or people with symptoms of Depression, Anxiety, and Stress. Univariate analysis showed that workers with

high job stress reported more symptoms of depression, anxiety, and stress (OR=2.31, 1.44, and 1.45, respectively), and these differences were statistically significant (P<0.001) (Table 4).

Table 4. Comparing DASS-21 components in two groups of employees with High/ Low occupational stress (according to OSIPOW scores) in univariate analysis

DASS Components	High Stress Employees (N= 1574, 34.5%)	Low Stress Employees (N= 2991, 65.5%)	Odds Ratio pvalue (Univariate analysis)
Depression			
Normal N (%)	1088 (69.1%)	2447 (81.8%)	2.31
Symptoms of Depression N (%)	486 (30.9%)	544 (18.2%)	< 0.001
Anxiety			
Normal N (%)	1125 (71.5)	2343 (78.3)	1.44
Symptoms of Anxiety N (%)	449 (28.5)	648 (21.7)	< 0.001
Stress			
Normal N (%)	1031 (65.5%)	2196 (73.4%)	1.45
Symptoms of Stress S N (%)	543 (34.5%)	795 (26.6%)	< 0.001

Logistic regression analysis verified the same findings After adjusting for age, sex, work experience, education level, doing regular exercise, task (blue/white collar), shift work, smoking, and marital status: [OR=2.35, CI 95% (1.88-2.92)], [OR=1.41, CI 95% (1.12-1.83)], [OR=1.38, CI 95% (1.19-1.76)], respectively (Table 5).

Table 5. Multiple logistic regression modeling used to assess DASS-21 components in two groups of employees with High/ Low occupational stress adjusted for Age, Sex, Education Level, doing regular Exercise, Task (Blue/White collar), Shift work, Smoking and Marital status.

DASS Components	Beta	P value	Odds Ratio	95%CI for OR
Depression	1.23	< 0.001	2.35	1.88-2.92
Anxiety	0.86	< 0.001	1.41	1.12-1.83
Stress	0.83	< 0.001	1.38	1.19-1.76

Linear regression analysis was applied to predict the factors that might be involved in creating occupational stress. The relationship between the blue and white collars, work experience (years of employment), exposure to noise and stressors at work and having symptoms of depression with occupational stress were statistically significant (P = 0.001 and < 0.001). (Table 6)

Table 6. linear Regression to analysis the predictive factors of occupational Stress

Variables	B	P value
AGE	0.18	0.16
Gender	1.65	0.64
Educational Status	0.08	0.87
Children Number	0.59	0.33
Smoking Status	2.04	0.09
Regular Exercise	5.03	0.07
Blue/ White collar	3.90	0.001
Work experience (years of employment)	0.53	< 0.001
Shiftwork	1.54	0.11
Stressors at workplace	5.54	0.01
Noise at workplace	4.55	< 0.001
Depression Symptoms	1.02	< 0.001
Anxiety Symptoms	0.08	0.55
Stress Symptoms	0.11	0.30

Discussion

To advance effective interventions, this study explored the relationship between occupational stress and mental health issues, specifically symptoms of depression, anxiety, and stress, among employees in an automobile manufacturing facility. Occupational stress represents a significant occupational health concern across various industries, including the automotive sector, where workers often experience elevated levels of stress. Research indicates that automotive assembly line workers, in particular, face considerable challenges associated with occupational stress.[20] Workers commonly encounter a range of health risks in their workplaces, from longstanding physical and chemical hazards to emerging psychosocial strains linked to modern work structures and intense market competitiveness.[21] Occupational stress appears to be a pervasive issue, evident across various occupations. Studies across different sectors, including managers, educators, and industries like healthcare and services, consistently indicate increasing levels of stress.[22] Various studies have revealed that approximately 30% of the workforce in developed countries experience stress, with higher prevalence rates observed in developing countries.[23,24] The findings of this study indicated that all participants experienced some level of job stress, with 65.5% classified into the low stress group and 34.5% into the high stress group. The average OSIPOW occupational stress score was 162.83 ± 32.61. The domains with the highest scores were the physical environment, role insufficiency, and responsibility. The physical environment, as identified by participants, represents a significant source of workplace stressors. This includes exposure to high levels of noise, moisture, dust, extreme temperatures, frequent equipment malfunctions, exposure to hazardous substances, and unpleasant odors. Research has shown that such conditions, characterized by repetition and a lack of humanization, can detrimentally impact physical health. [13]

In terms of role insufficiency, individuals scoring high on this dimension may experience a mismatch between their learned skills and the job

demands they face. Regarding responsibility, high scorers may express significant accountability for the activities and performance of their subordinates. In the current study, it was found that white-collar workers reported higher levels of occupational stress. This is consistent with another study conducted among Malaysian Railway Workers, which also found that white-collar workers experienced significantly greater perceived stress than blue-collar workers. [25] This finding may be attributed to the fact that operational personnel often have more opportunities for career development, a greater variety of tasks, more autonomy, and more opportunities to apply their expertise and learn new skills compared to office workers. Interestingly, blue-collar workers reported relatively better perceived health. This observation might be explained by the tendency to recruit healthier individuals into physically demanding roles, while potentially allocating less healthy personnel to office positions. These findings appear to align with the conclusions of the study conducted on employees of a regional electricity distribution company in Iran. The Iranian study found that blue-collar workers scored higher on the "possibilities for development" scale, contributing to a higher perceived level of health among operational workers. This mirrors the relatively better-perceived health reported by blue-collar workers in the current study. [26]

This study revealed a significant relationship between the mean occupational stress and work experience, indicating that as the number of working years increased, so did the level of occupational stress. This finding contrasts with the conclusions drawn by Sharma et al. [27] and Sahraian et al.,[28] whose studies did not report a similar association between work experience and occupational stress, but Yoosefan Miandoab etal[29] similarly found a significant statistical relationship between the mean of occupational stress and work experience. The present study supports this by suggesting that the cumulative effects of occupational stress over years of work contribute to higher stress levels. Specifically, individuals with longer job experience, as indicated by the role insufficiency dimension, may feel underutilized in their current roles, despite possessing skills, knowledge, and experience. This can lead to a desire for career advancement and the need to apply their talents more effectively, potentially leading to feelings of boredom and underperformance. According to occupational stress theorists, older senior executives may face stressors such as increased responsibility without further advancement prospects, heightened isolation, a narrowing of interests, and the realization of impending retirement. These factors contribute to increased occupational stress among senior employees. [30] Given these points, the justification for higher job stress among individuals with longer work experience is apparent, reflecting the complex interplay between career development, role fulfillment, and psychological well-being in the workplace.

In this study, linear regression analysis revealed that workplace noise, the presence of stressors, longer work experience, and holding a white-collar position were significant predictors of occupational stress. These findings align with scientific literature and previous explanations, indicating that factors such as environmental stressors, cumulative work experience, and job type can contribute significantly to occupational stress levels.[26,31,32]

In the present study, we observed that 22.6% of the participants experienced symptoms of depression, 24% reported symptoms of anxiety, and 29.3% experienced symptoms of stress. In contrast, a study conducted among 227 automobile industry workers in Chennai, India, found higher prevalence rates: 38.8% for depression, 43.6% for anxiety, and 26.9% for stress.[33] This disparity suggests that while the rates of depression and anxiety in this study were lower compared to those in Chennai, the prevalence of stress was relatively similar. These differences could be attributed to variations in occupational conditions, cultural factors, or support systems between the two regions. Additionally, participants with higher levels of job stress reported higher levels of depression, anxiety, and stress symptoms. These

findings underscore the detrimental impact of psychosocial hazards in the workplace on the mental health of workers, as assessed through measures of depression, anxiety, and stress symptoms. Furthermore, the linear regression analysis identified symptoms of depression as a predictor of occupational stress. This suggests a potential bidirectional relationship where higher levels of occupational stress may contribute to increased symptoms of depression, and vice versa. As this study was cross-sectional and questionnaire-based, future research should aim to conduct more objective and longitudinal cohort studies to better elucidate the possible causal relationships between occupational stress and mental health outcomes. A growing body of literature has increasingly focused on understanding the associations between occupational health factors and mental health outcomes, highlighting the need for further investigation in this area.

The study conducted in 2016 highlighted a direct correlation between mental health, job stress, and burnout. [34] Specifically, it demonstrated that increasing levels of job stress and burnout were associated with unfavorable mental health states. This underscores the significant impact that workplace stress and burnout can have on mental well-being, emphasizing the need for effective strategies to mitigate these factors in occupational settings. The findings from another study indicated a notable and inverse relationship between psychological health and occupational stress among midwives. A significant proportion of midwives employed in hospital settings were reported to experience psychological disorders. This suggests that occupational stress likely plays a role in exacerbating or contributing to the decline in their psychological well-being. These results highlight the unique occupational challenges faced by midwives, particularly in high-pressure hospital environments, and underscore the importance of addressing occupational stress to support the mental health and well-being of healthcare professionals.[35] In a study conducted by Norito et al. [36] in 1999, occupational stress was identified as the primary contributor to mental disorders, with a particular emphasis on depression. This research underscored the significant impact that workplace stressors can have on mental health, highlighting the need for effective interventions and support mechanisms to mitigate occupational stress and its adverse effects on psychological well-being. In a cross-sectional study involving Malaysian car manufacturing workers, it was found that psychological job demands, job insecurity, and exposure to risky conditions are directly associated with higher levels of depression, anxiety, and stress,[20] which is in consistent with findings of present study. The study by Maharaj et al. [37] in 2019 examined the prevalence and risk factors of depression, anxiety, and stress among Australian nurses using the DASS-21 questionnaire. They reported higher prevalence rates of 32.4% for depression, and 41.2% each for anxiety and stress, compared to this study participants. This difference could be attributed to the distinct job demands and stressors inherent in nursing compared to the specific context of car manufacturing workers in the study. One notable finding from Maharaj et al.'s study was that job dissatisfaction significantly predicted a higher risk of depression and stress symptoms among nurses. This aligns with our understanding that workplace factors, such as job satisfaction, play a crucial role in mental health outcomes. Addressing job dissatisfaction and implementing strategies to improve job satisfaction could potentially mitigate the risk of depression, anxiety, and stress among employees in various occupational settings.[37] The research conducted by Pham et al. investigated occupational stress, risky activities, and workplace accidents within the car sector. Their findings revealed a significant correlation between work stress and engagement in risky behaviors, which subsequently contributed to higher rates of workplace accidents.[38] These results underscore the importance of addressing mental health issues among employees in the car industry to mitigate occupational stress and enhance overall workplace safety and well-being. Implementing measures to support mental health can potentially

reduce the incidence of risky behaviors and accidents, thereby promoting a healthier and safer work environment.

According to the International Labour Organization (ILO), the costs associated with occupational stress in developed countries are estimated to range from 1% to 3.5% of Gross Domestic Product (GDP).[23] This underscores the substantial economic impact of occupational stress on economies, highlighting the importance of addressing workplace stressors to improve productivity, reduce healthcare costs, and enhance overall well-being in the workforce.[24] In a study conducted in Germany by Rabe et al., it was found that works council members experienced higher levels of job strain compared to office workers and the general population on various psychosocial scales. This suggests that individuals serving in works councils face heightened job demands and stressors, possibly due to their roles in representing and advocating for workers' rights and interests within organizational contexts. These findings underscore the unique challenges and stressors faced by works council members, highlighting the need for supportive measures to mitigate job strain and promote their well-being.[39] These differences were also observed in the present survey, where varying job tasks or working conditions significantly influenced the relationship between occupational stress and the psychological health of employees. Another investigation focusing on healthcare workers demonstrated a similar association, highlighting that occupational stressors contribute to elevated levels of depression, anxiety, and stress among employees in this sector.[40]

Based on these findings, there is a clear imperative for interventions aimed at enhancing mental health dimensions among employees to foster better occupational outcomes. A randomized controlled study focusing on stress management training among healthcare workers highlighted significant improvements across various dimensions of occupational stress, such as role duality, role incompetence, and role scope. The study demonstrated that stress management training effectively reduces occupational stress levels among nurses, underscoring the potential benefits of such interventions in improving workplace well-being and performance.[41] In the context of automobile manufacturing factories, we propose several interventions to address occupational stress and improve mental health outcomes among employees. First, reducing psychological job demands, alleviating job insecurity, and minimizing hazardous working conditions are essential steps. These changes aim to mitigate sources of stress that contribute to self-perceived sadness, anxiety, stress, and overall occupational stress levels. Additionally, fostering strong support networks among coworkers and supervisors can provide emotional and practical assistance, which is crucial for enhancing psychological well-being in the workplace. At the individual level, the findings of the study underscore the effectiveness of job stress management training. Such programs can equip employees with coping strategies and resilience skills to better manage and reduce self-perceived symptoms of depression, anxiety, and stress. By implementing these interventions, automobile manufacturing factories can create a healthier and more supportive work environment conducive to both employee well-being and organizational success.

Limitations

Limitations of this study benefited from a substantial number of participants, which enhances the statistical power and reliability of the findings within the context of automobile manufacturing. The cross-sectional nature of the study restricts our ability to establish causal relationships between occupational stress and mental health outcomes. Longitudinal studies would be needed to explore the directionality and temporal aspects of these relationships. Due to the uneven distribution of participants across certain levels of mental health states and occupational stress categories based on DASS-21 and OSIPOW cut-offs, we were compelled to merge groups. This may limit the comparability of our study results with existing literature and affect the precision of our findings. The specific characteristics of our

study population, focusing on automotive workers, may limit the generalizability of the findings to other industries or settings. Addressing these limitations in future research could provide deeper insights into the complex interactions between occupational stress, mental health, and effective workplace interventions.

Conclusions

The study findings showed that all of the participants had some degree of job stress, 65.5% were in low- stress group and 34.5% in high-stress group. Occupational stress in white-collar workers was more than blue-collar workers. Employees with more work experience have higher job stress suggesting that cumulative exposure to work-related stressors over time contributes to increased stress levels. The presence of stressors at work is effective in creating occupational stress.

Participants with high occupational stress were more likely to experience symptoms of anxiety, depression, and stress compared to those with low occupational stress levels. This relationship persisted across various demographic and occupational groups. Moreover, adjusting for demographic variables (age, sex, education), work-related factors (work experience, exercise, job type), and lifestyle factors (shift work, smoking, marital status) confirmed that higher occupational stress levels were associated with increased risks of mental health symptoms.

Linear regression analysis was applied to predict the factors involved in creating occupational stress. In this analysis, the relationship between the blue and white collars, work experience (years of employment), exposure to noise and stressors at work, and having symptoms of depression with occupational stress were statistically significant.

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