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Health Condition and Work Stress as Predictors of Occupational Injury Occurrence among Automobile Mechanics in Benue State, Nigeria

Erena Mary Agajah[1*], Dorothy Ifeyinwa Ugwu[2], Iorvaa Sewuese[1]

[1]Department of Human Kinetics and Health Education, University of Rev. Fr. Moses Orshio Adasu University, Makurdi

[2]Department of Human Kinetics and Health Education, University of Nigeria, Nsukka

*Corresponding author: Erena Mary Agajah E-mail: agajahmary64@gmail.com

Abstract

This study investigated health condition and work stress as predictors of occupational injury occurrence among automobile mechanics in Benue State, Nigeria. Two research questions guided the study, and two null hypotheses were tested at the .05 level of significance. The study adopted a correlational survey research design. The population comprised 328 registered automobile mechanics operating in 121 mechanic workshops in Benue State. A census sampling technique was adopted, and 313 properly completed copies of the questionnaire (a 95.4% response rate) were used for analysis. Data were collected using a valid, structured Predictors of Occupational Injuries Questionnaire (POIQ). Data were analysed using simple linear regression. The findings revealed that health condition had a very weak positive relationship with occupational injury occurrence (β = .055, t = .975, p = .330) and did not significantly predict occupational injury occurrence. Work stress had a low positive relationship with occupational injury occurrence (β = .171, t = 3.065, p = .002) and significantly predicted occupational injury occurrence. The study concluded that while automobile mechanics' health condition was not a significant predictor of occupational injury occurrence, work stress significantly predicted occupational injury occurrence among automobile mechanics in Benue State. Based on the findings, it was recommended that mechanic workshop owners regulate workload – for instance, by capping daily working hours and introducing scheduled rest breaks between repair tasks – to reduce work stress, while occupational safety agencies strengthen stress-management and workplace-safety programmes for automobile mechanics.

Keywords: Occupational injury, Health condition, Work stress, Automobile mechanics, Workplace safety

Introduction

Occupational injuries remain one of the most pressing public health and workplace safety concerns globally. Across various occupations, workers, including automobile mechanics, are exposed to conditions that predispose them to physical harm, illnesses, disabilities, and even death. According to the International Labour Organization (ILO, 2023), approximately 340 million occupational accidents and 160 million work-related illnesses occur annually worldwide. The National Safety Council (NSC, 2021) similarly reported that a worker in the United States is injured on the job every seven seconds. These injuries often result in severe physical, psychological, and economic consequences for workers, their families, employers, and society, and highlight the widespread burden of occupational injuries and the need for continuous efforts toward workplace safety.

The burden of occupational injuries is more pronounced in developing countries where occupational health and safety systems are weak, and informal work settings dominate many sectors of the economy. In Sub-Saharan Africa, occupational injuries have been reported at alarming rates due to inadequate safety regulations, poor enforcement of workplace standards, and limited access to protective equipment. Lund and Marriott (2011) reported that Sub-Saharan Africa records some of the highest rates of occupational injuries globally, while Alamneh et al. (2020) reported a pooled prevalence of 44.66 per cent of occupational injuries across African countries. This suggests that workplace injuries continue to pose a serious challenge to workforce productivity and wellbeing in the region.

Among high-risk occupations, automobile mechanics are particularly vulnerable due to the nature of their work. Automobile repair activities involve frequent handling of heavy mechanical parts, prolonged standing, repetitive bending and kneeling, lifting of engines and vehicle components, and exposure to dangerous substances such as engine oils, lubricants, fuels, battery acids, and chemical fumes. Automobile mechanics also work with sharp tools, electrical systems, and heated engine parts, all of which increase the possibility of cuts, burns, electrocution, fractures, and musculoskeletal injuries. These conditions expose automobile mechanics to both immediate and long-term health and safety risks.

In Nigeria, the situation among automobile mechanics is concerning. Recent studies have shown that automobile mechanics are frequently exposed to occupational hazards and injuries, while adherence to occupational safety practices and the use of personal protective equipment remain generally poor, thereby increasing their risk of work-related injuries and illnesses (Ozomata et al., 2021; Ozomata, 2024). Similarly, Olarewaju et al. (2021) reported that 78.5 per cent of automobile mechanics in Nigeria suffered different forms of workplace injuries. These findings indicate that occupational injuries among automobile mechanics are prevalent and remain a major occupational health concern.

Occupational injury refers to any physical harm or damage sustained by workers in the course of performing work-related activities. It includes minor injuries such as cuts and bruises, as well as severe conditions such as fractures, burns, dislocations, amputations, and long-term musculoskeletal disorders. Occupational injuries may result from unsafe work environments, poor safety practices, exposure to harmful chemicals, and repetitive strain (Ozomata, 2024). Beyond the physical effects, occupational injuries can lead to reduced productivity, absenteeism, loss of income, disability, and psychological trauma. They also impose substantial economic costs on organizations and national economies: the ILO (2023) estimates that occupational injuries and diseases account for about 4 per cent of global gross domestic product (GDP) annually, reflecting their considerable economic burden worldwide. Hence, the need to investigate probable predictors of this variable.

Several factors have been associated with occupational injury occurrence among workers, particularly automobile mechanics, of which health condition and work stress are prominent. Health condition refers to the overall physical, mental, and emotional state of an individual in relation to work performance. An automobile mechanic in poor health may experience fatigue, weakness, reduced concentration, and slower reaction time, all of which may increase the likelihood of accidents and injuries. In automobile repair, where physical strength, alertness, and coordination are essential, poor health conditions may compromise the ability of mechanics to carry out tasks safely

and efficiently. Research has shown that workers with poor health conditions are often more vulnerable to occupational hazards and injuries.

Work stress is an important occupational factor that may influence injury occurrence. Work stress refers to the physical and emotional strain experienced when job demands exceed a worker's capacity or ability to cope. Automobile mechanics often work under stressful conditions characterized by high workload, pressure to meet deadlines, prolonged working hours, financial pressure, and difficult customer demands. These stressors may impair concentration, reduce attention to safety procedures, and increase the likelihood of mistakes, thereby predisposing mechanics to occupational injuries. Previous studies have shown that work stress contributes significantly to workplace accidents, reduced efficiency, and poor health outcomes among workers.

In Benue State specifically, many automobile workshops operate with inadequate safety facilities, poor work organization, limited occupational health support, and insufficient modern tools, exposing mechanics to significant occupational hazards. Despite these challenges, there is limited empirical evidence on the predictive roles of health condition and work stress in occupational injury occurrence among automobile mechanics in the state. Most existing studies have focused on the prevalence of occupational injuries and workplace hazards, with little attention to the extent to which health condition and work stress predict injury occurrence. This gap in knowledge necessitated the present study.

Empirical evidence has consistently demonstrated the widespread occurrence of occupational injuries across different occupational settings. For example, Asiedu et al. (2024), Alamneh et al. (2020), and Debela et al. (2021) reported a high prevalence of occupational injuries among industrial workers and identified unsafe work environments, inadequate training, poor supervision, long working hours, and poor use of personal protective equipment as major contributing factors. Among automobile mechanics, Oche et al. (2020) and Johnson and Bassey (2016) documented frequent injuries such as cuts, burns, bruises, headaches, dizziness, and low back pain resulting from unsafe work practices and hazardous workplace conditions. Furthermore, Adejumo et al. (2023) revealed that exposure to occupational hazards adversely affects the health condition of automobile mechanics, while Debela et al. (2022) established that poor health conditions significantly increase the likelihood and costs of occupational injuries. Similarly, Akunne et al. (2021), Adeniran and Alabi (2022), and Mulugeta et al. (2023) identified work stress as an important occupational factor associated with adverse health and safety outcomes.

Despite the growing body of literature on occupational injuries, workplace hazards, safety practices, and general occupational health outcomes, limited empirical attention has been given to the predictive roles of automobile mechanics' health condition and work stress in occupational injury occurrence in Benue State. This gap limits the availability of evidence needed to develop interventions that address these specific risk factors. Consequently, this study investigated health condition and work stress as predictors of occupational injury occurrence among automobile mechanics in Benue State, Nigeria. Specifically, the study assessed the predictive power of health condition and work stress on occupational injury occurrence. The findings of the study would provide empirical evidence for the development of targeted workplace safety interventions, inform occupational health policies, and ultimately enhance the health, safety, and well-being of automobile mechanics in Benue State and similar settings.

Methods

Study design and setting

This study adopted a correlational survey research design to investigate health condition and work stress as predictors of occupational injury occurrence among automobile mechanics in Benue State, Nigeria. Benue State was purposively chosen as the study setting because it has a large concentration of automobile mechanic workshops operating predominantly in the informal sector, where physically demanding tasks, inadequate occupational safety measures, and limited occupational health support expose mechanics to considerable risk of occupational injury.

Study population

The population comprised 328 registered automobile mechanics operating in 121 mechanic workshops in Benue State, as documented in the 2024 membership register of the Nigeria Automobile Technician Association (NATA), Benue State Chapter. Mechanics were eligible for inclusion if they were registered members of NATA, were actively engaged in automobile repair work in a workshop within Benue State at the time of data collection, and consented to participate. Mechanics who were not registered members of NATA (including apprentices without independent registration), and those who could not be reached at their workshops after repeated visits, were excluded from the study.

Sample size and sampling technique

A census sampling technique was adopted because the entire population of registered automobile mechanics (328) was considered a manageable size for complete enumeration; no sample size formula was therefore applied, and all 328 registered mechanics were targeted for data collection. Questionnaires were administered to all available and consenting mechanics across the 121 registered workshops. Of the 328 questionnaires administered, 313 were correctly completed and returned, giving a response rate of 95.4 per cent. The remaining 15 questionnaires were excluded from analysis owing to incomplete responses or non-return, and these 313 valid responses constituted the sample used for analysis.

Data collection instrument

Data were collected using a structured Predictors of Occupational Injuries Questionnaire (POIQ), which measured occupational injury occurrence, health condition, and work stress. The occupational injury occurrence items were adapted from Reason's (1990) model of accident causation. The health condition items were adapted from the RAND 36-Item Short Form Health Survey (SF-36) developed by Ware and Sherbourne (1992), which assesses physical functioning, role limitations, energy/fatigue, emotional well-being, social functioning, pain, and general health. The work stress items were adapted from the Workplace Stress Scale developed by the Marlin Company and the American Institute of Stress (1978), an eight-item scale that measures the frequency of common workplace stressors (for example, unreasonable workload and deadlines, and job pressures interfering with personal life) on a five-point response format ranging from “Never” to “Very Often.”

The instrument was face- and content-validated by five experts from the University of Nigeria, Nsukka. The panel comprised three lecturers from the Department of Human Kinetics and Health

Education, one lecturer from the Department of Mechanical Engineering, and one lecturer from the Department of Psychology; the final version of the instrument incorporated their corrections and suggestions. Reliability of the instrument was established through a pilot study involving 20 automobile mechanics in Nasarawa State (a state not part of the main study), using Cronbach's alpha to assess internal consistency. The reliability coefficients obtained were .92 for the health condition sub-scale and .91 for the work stress sub-scale, indicating high internal consistency.

Data collection procedure

Ethical approval for the study was obtained from the Research Ethics Committee of the Faculty of Education, University of Nigeria, Nsukka prior to data collection. An introductory letter obtained from the Head of the Department was presented to the leadership of the National Automobile Technicians Association (NATA), Benue State Chapter, to obtain institutional permission for the study. Assisted by five trained research assistants, the researcher administered the questionnaires directly to respondents at their respective workshops using the direct delivery and retrieval method, to ensure a high response rate. Before administration, the purpose of the study was explained to each respondent, and written informed consent was obtained; respondents were assured of voluntary participation, confidentiality, and anonymity, and were informed of their right to withdraw at any point without penalty. Completed questionnaires were retrieved immediately after completion to minimize non-response and loss of instruments.

Data analysis

Data were analysed using IBM SPSS Statistics version 21. Simple linear regression was used to separately test the predictive power of health condition and work stress on occupational injury occurrence, in line with the research questions and hypotheses, at the .05 level of significance. For each model, the coefficient of determination (R^2) indicated the proportion of variance in occupational injury occurrence explained by the predictor, while the standardized beta coefficient (β), t-value, and p-value indicated the direction, strength, and statistical significance of the predictive relationship. Because each model contained a single predictor, β is numerically equivalent to the zero-order correlation between the predictor and occupational injury occurrence, and the overall model F-ratio is mathematically equivalent to the square of the predictor's t-value; β, t, and p are therefore reported as the primary indices of significance for these simple (bivariate) regression models, rather than the multi-predictor F-test used in multiple regression. R^2 values were interpreted using Cohen's (1988) benchmark, where R^2 values of approximately .02, .13, and .26 represent small, medium, and large effects, respectively.

Results

Table 1**: Simple Linear Regression Showing the Predictive Relationship between Health Condition and Occupational Injury Occurrence among Automobile Mechanics in Benue State (n = 313**

Model summary

	R	R^2	Adj. R^2	F (df)	p
Model	.055	.003	.000	.951 (1, 311)	.330

Coefficients

	B / β	T	p	95% CI [LB, UB]
(Constant)	–	10.253	.000	[.400, .590]
Health condition	.055	.975	.330	[–.059, .175]

Dependent variable: Occupational injury occurrence. Predictor: Health condition.

Note. B/β = unstandardized coefficient for the constant and standardized coefficient (β) for the predictor; t = t-test value; p = significance value; LB/UB = lower/upper bound of the 95% confidence interval. Because each model contains a single predictor, F = t² for the predictor and is reported here as a model-level statistic only; significance of the predictor itself is determined from its β, t and p values.

Table 1 shows that there was a very weak positive relationship between health condition and occupational injury occurrence among automobile mechanics in Benue State (R = .055). The coefficient of determination (R^2 = .003) indicates that health condition explained only 0.3% of the variation in occupational injury occurrence a negligible contribution by Cohen's (1988) benchmark. Health condition did not significantly predict occupational injury occurrence (β = .055, t = .975, p = .330). Since the p-value (.330) is greater than the .05 level of significance, the null hypothesis was not rejected. This implies that health condition was not a significant predictor of occupational injury occurrence among automobile mechanics in Benue State.

Table 2**: Simple Linear Regression Showing the Predictive Relationship between Work Stress and Occupational Injury Occurrence among Automobile Mechanics in Benue State (n = 313)**

Model summary

	R	R^2	Adj. R^2	F (df)	P
Model	.171	.029	.026	9.394 (1, 311)	.002

Coefficients

	B / β	T	p	95% CI [LB, UB]
(Constant)	–	35.496	.000	[2.351, 2.627]
Work stress	.171	3.065	.002	[.095, .435]

Dependent variable: Occupational injury occurrence. Predictor: Work stress.

Note. B/β = unstandardized coefficient for the constant and standardized coefficient (β) for the predictor; t = t-test value; p = significance value; LB/UB = lower/upper bound of the 95% confidence interval. Because each model contains a single predictor, F = t² for the predictor and is reported here as a model-level statistic only; significance of the predictor itself is determined from its β, t and p values.

Table 2 shows that there was a low positive relationship between work stress and occupational injury occurrence among automobile mechanics in Benue State (R = .171). The coefficient of determination (R^2 = .029) indicates that work stress explained 2.9% of the variation in occupational injury occurrence – a small effect by Cohen's (1988) benchmark. The positive beta coefficient (β = .171) indicates that an increase in work stress was associated with an increase in occupational injury occurrence. Work stress significantly predicted occupational injury occurrence (β = .171, t = 3.065, p = .002). Since the p-value (.002) is less than the .05 level of significance, the null hypothesis was rejected. This implies that work stress was a significant predictor of occupational injury occurrence among automobile mechanics in Benue State.

Discussion

The findings of the study revealed that health condition did not significantly predict occupational injury occurrence among automobile mechanics in Benue State. Although a weak positive predictive relationship was observed, the contribution of health condition to occupational injury occurrence was negligible. This implies that variations in health condition did not meaningfully influence injury occurrence among the automobile mechanics studied. The finding contrasts with previous studies that established health condition as a significant predictor of workplace injuries. For instance, Adejumo et al. (2023) found that automobile mechanics exposed to heavy metals experienced cardiovascular and kidney-related health complications, which increased vulnerability to occupational risks. Similarly, Debela et al. (2022) reported that co-morbid health conditions and sleep disorders significantly predicted occupational injury costs among industrial workers. The disparity in findings may be attributed to differences in occupational settings, exposure levels, and safety practices. It is possible that among automobile mechanics in Benue State, environmental and behavioural factors play a stronger role in injury occurrence than personal health status.

The findings also revealed that work stress significantly predicted occupational injury occurrence among automobile mechanics in Benue State, although the predictive contribution was modest. This indicates that higher levels of work stress increase the likelihood of occupational injuries. Specifically, the finding suggests that work-related pressures such as excessive workload, unreasonable deadlines, and emotional strain may impair concentration, increase fatigue, and reduce safety compliance, thereby predisposing workers to injury. This finding agrees with previous studies: Bai et al. (2023) found that work-related stress significantly increased injury risk among farm and ranch operators, while Mulugeta et al. (2023) reported high levels of workplace stress among vehicle repair workers. Similarly, Parimita et al. (2024) found that stress, fatigue, and sleep deprivation significantly contributed to occupational injuries among industrial workers. However, the modest predictive power observed in this study suggests that other workplace and behavioural factors may also influence injury occurrence among automobile mechanics. Overall, while automobile mechanics' health condition did not significantly predict occupational injury occurrence, work stress played a significant, though modest, role in predicting injury occurrence among automobile mechanics in Benue State. This implies that interventions aimed at reducing workplace stress may be more effective in minimizing occupational injuries than focusing solely on workers' health conditions.

Conclusion

The findings showed that health condition was not a significant predictor of occupational injury occurrence among automobile mechanics in Benue State, indicating that personal health status had minimal influence on injury occurrence. However, work stress emerged as a significant, though modest, predictor of occupational injury occurrence, suggesting that increased workplace stress contributes to a higher likelihood of sustaining injuries. Therefore, occupational injury occurrence among automobile mechanics in this study appears to be influenced more by work stress than by health condition.

Recommendations

1. Workshop owners should regulate workload to reduce work stress among automobile mechanics – for example, by capping daily working hours, introducing scheduled rest breaks between repair tasks, and rotating physically and mentally demanding assignments among workers.

2. Occupational health and safety agencies should organize stress-management and safety-awareness programmes for automobile mechanics to help reduce workplace injuries.

3. The Nigeria Automobile Technician Association (NATA) should strengthen and enforce workplace safety measures aimed at reducing stress-related risks and improving working conditions.

4. Researchers should investigate other possible predictors of occupational injury occurrence, such as unsafe work practices, environmental hazards, and safety compliance, to broaden understanding of injury risks among automobile mechanics.

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