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INTERACTION OF PSYCHOSOCIAL WORK FACTORS, ERGONOMIC RISK AND CUMULATIVE TRAUMA DISORDER OF CONSTRUCTION WORKERS IN CONSTRUCTION INDUSTRIES

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ABSTRACT

The study focused on the role of stress which is accumulating in the cause of performing work that are stressful and dwelled on psychosocial work factor affecting construction workers in diverse form ranging from low productivity, absenteeism. It pointed out different types of Ergonomic Risk Factors (E R F) that are verse in many sectors which remain unknown to construction workers. It generates two research purposes, two research questions and two hypotheses. It shows how the results of this study will be useful to construction industry workers in providing those with useful knowledge and skills in will also be useful to Medical Research Centers in Nigeria. It laid down the methodology including the research design up to the presentation of the results in tabular form and the interpretations of the results, and the findings revealed that ergonomic risk factors had high effects and high factors on its development. Conclusion was made with these recommendations: Managers of Construction industry should organize seminars and workshops on ergonomic to construction industry workers to expose them on the effects of ergonomic risk that includes fracture, fatal death, fractures in body parts, damage of properties and materials or loss of jobs. Extra training should be organized by construction industry managers to construction workers on the factors that lead to the development of ergonomic risk among workers on construction industry.

INTRODUCTION

In construction industries, much attention is focused on the role of stress which is accumulating and aggravating in the cause of performing work that are stressful leading to the generation of what is termed as cumulative trauma disorders Armstrong, T. J., Buckle, P., Fine, L. J., Hagberg, M., Jonsson, B., Kilbom, Å., ... & Silverstein, B. A. (1993). Psychosocial work factor is an aspect of the work environment that can affect an individual's psychological and social wellbeing, imparting their mental wellbeing and overall job satisfaction.

These factors encompasses an interaction between the individual and their social environment, including how they perceive their work, relationships with colleagues and organizational culture, (Rugulis, 2019). Psychosocial work is one of the factors that affect workers in construction industries thereby causing malfunction of the workers and its consequences usually affect productivity of the construction industry Leung, M. Y., Chan, Y. S., & Yu, J. (2009). This problem kept on increasing and thereby attracting the attention of researchers to look into its possible causes in order to reduce its effects on construction workers, in line with this, some researchers like Nobuki, Jianfei, yeoungjoo, Yesushi, Shiegeo, Shuichi and Kota (2020), perceive construction industry as a work environment that poses many dangers to workers, with many hidden factors that affect work awareness. Therefore, if the management of construction industries will not incorporate some form of developmental growth for construction industry workers through motivation and other social support, then the malfunction of construction industry workers will keep on increasing at an alarming rate and will continue to cause setback of the construction industry that may finally lead to collapse of the industry due to its condition of non-productivity Leung, M. Y., Chan, Y. S., & Yu, J. (2012).

These Psychosocial factors at work affecting construction workers is in diverse form ranging from low productivity, absenteeism and claims of damages. So, the inability of these problems to be attended will lead to development of cumulative trauma disorder on workers in construction industry Leung, M. Y., Chan, Y. S., & Yuen, K. W. (2010). Another aspect of problem which is unknown to construction workers in construction industry is Ergonomic risk, it usually occurs when the work environment is not ergonomically free and stable to suit the workers, there are different types of Ergonomic Risk Factors (E R F) that are verse in many sectors which remain unknown to construction workers, examples are awkward postures and repetitive actions. (La jolla, 2025) Ergonomic aspect in construction site should be considered paramount since there are series of activities and work components at different stages right from site clearance, trench excavation, reinforcement and concreting work up to structural formation and partitioning that are of multiple operations and hazardous, these activities cannot be performed safely if the workers lack adequate ergonomic knowledge, therefore, construction workers are expected to be well equipped with adequate knowledge of ergonomic so that when they become acquainted some ergonomic risk can simply be identified and will be avoided for the benefit of their health and this can be achieved through designing work system such that it can suite the capacity of the construction workers.

Various terms were used to describe Cumulative trauma disorders (CTD), (Zaheen 2017), defined CTD as a range of musculoskeletal and nerve injuries caused by repetitive motions, forceful exertions, awkward postures and other factors that place excessive stress in the body over time. The development of cumulative trauma disorder over time with symptoms worsening with continued exposure to the causative factor of CTD on construction industry

workers. There is an increasing recognition that Cumulative trauma disorders (CTD) in the workplace are somehow involved in the etiology of musculoskeletal disorder most especially in the context of repetitive action in construction industry which arise due to some factors like monotonous work, perceived workload, time pressure and low control, (Jaffar, Abdul Tharim, Mohd-Kamar, Lop & Jaffar, 2019). Cumulative trauma disorders (CTD) is said to manifest through a range of symptoms primarily involving pain, swelling and mobility in the affected area and worsen gradually with repetitive use or activities, but improve with rest, John (2023). This research recognizes that there is an absence and satisfactory research which explain an interaction between psychosocial work factors, ergonomic risk and cumulative trauma disorder on construction worker's stress and therefore it was on this basis that this research work was conducted.

Purpose of the Study:

The main purpose of this research work was to examine interaction of psychosocial work factors, ergonomic risk and cumulative trauma disorder of construction workers in construction industries in Yobe state, specifically, the study will seek to:

1. Determine the effects of ergonomic risk factors on construction industry workers in the study area.
2. Determine the factors that lead to the development of ergonomic risk among workers in construction industry in the study area.

Research Questions:

2. What are the effects of ergonomic risk factors on construction industry workers in the study area?
3. What are the factors that lead to the development of ergonomic risk among workers in construction industry in the study area?

Research Hypotheses:

1. There is no significant difference in the mean response of carpenters, iron binders, brick/block layers and concreters on the effects of ergonomic risk factors on construction industry workers in the study area.
2. There is no significant difference in the mean response of carpenters, iron binders, brick/block layers and concreters on the factors that lead to the development of ergonomic risk among workers in construction industry in the study area.

Significance of the Study:

The result of this research work will be useful to the following: The results of this study will be useful to construction industry workers in providing them with useful knowledge and skills in getting rid of trauma effects that is accumulating as a result of repetitive actions. The result will also be useful to Medical Research Centers in Nigeria by providing current information on the method of identifying the possible causes of cumulative trauma disorders on workers in construction industry. The result will also be useful to ministry of labor and statistics that covers all data related to cumulative trauma disorder and other diseases related with trauma like vibration and noise induced hearing loss or pressure. Other beneficiaries will include wood cutters in wood industry who are

always in a state of risk of psychosocial or trauma effects. Tiles and carpet layers will also find this result very useful being that it will provide them with an ergonomic safety measures against knee injury, plants and equipment operators.

RESEARCH METHODOLOGY

The research design used for this study was a Cross-Sectional Survey Research Design employing occupational and environmental observations. A Cross-Sectional Research Design was defined as the type of Research Design where the researcher collects data at one point in time on current attitudes, beliefs, opinions or practices, (Simkus, 2023). This research design was considered suitable for this study because it measures the prevalence of diseases and describes the characteristics of population. It also examines a group of participants and depicts what already exist in the population without manipulating any variable or interfering with the environment.

This study was carried out in Yobe state which is located in North-East geo-political region of Nigeria, the region consist of six (6) states namely: Adamawa; Bauchi; Borno; Gombe; Taraba and Yobe state respectively which the study area is. The region lied between latitudes 6 degree 26" and 7 degree 12" east, and longitude 17 degree 22" and 20 degree 32" north on the globe and it covers a land mass of an area 104,639 square km. (www.researchgate.net).

RESULTS AND DISCUSSIONS

Research question one

What are the effects of ergonomic risk factors on construction industry workers?

Table 1 revealed the result of respondents on the effects of ergonomic risk factors on construction industry workers in the study area with ten items ranging from item 23 to 32 having a mean range of 1.97 to 4.13 as lower and upper value with grand mean 3.57. Respondents agreed with the statement that fatal death, bending, claim of damages, awkward postures, damages of materials and properties, competition with other workers among others have high effects of ergonomic risk factors on construction industries workers in the study area. But item 27 and 28 which opined that awkward posture and damage of properties in construction industries has very less effect on ergonomic risk factors on construction industry workers with a mean rating of 1.97 and 1.98 that are below 3.00 as minimum mean rating and a standard deviation range of 0.73 to 1.18 which had a grand mean 0.89

Table 1: Mean Rating on the Effects of Ergonomic Risk Factors on Construction Industry Workers

S/N	Item	Carpenters		Bricklayers		Iron Binders		Plumbers		Grand		Remark
		$\bar{X}_C$	SD_C	$\bar{X}_B$	SD_B	$\bar{X}_I$	SD_I	$\bar{X}_P$	SD_P	$\bar{X}_G$	SD_G	
23.	Fatal death was identified as one of the effect of ergonomic risk that causes on construction industry workers.	4.11	0.88	4.09	0.78	4.10	0.63	4.28	1.02	4.12	0.83	Effect

24.	Bending for long time is another effect of ergonomic risk that causes on construction industry workers.	4.07	0.94	3.96	0.91	4.02	0.72	4.41	0.95	4.07	0.90	Effect
25.	Other effect of ergonomic risk on construction workers is fracture on body parts which affect construction industry at:	4.06	0.96	4.29	0.65	3.95	0.74	4.16	1.19	4.13	0.88	Effect
26.	Claim of damages by workers is another effect of ergonomic risk that is rated as on construction industry workers.	4.13	0.82	3.94	0.82	4.05	0.63	4.56	0.80	4.11	0.81	Effect
27.	Awkward posture at construction industry causes delay of work during construction and therefore lead to:	1.89	0.89	1.97	1.11	1.83	0.83	2.31	1.06	1.97	0.99	Effect
28.	Damage of properties and materials is another effects of ergonomic risk which is rated on construction industry workers.	1.93	1.17	1.99	1.11	1.93	1.10	2.19	1.47	1.98	1.18	Effect
29.	Poor quality products is another effects of ergonomic risk that yield on construction industry workers	3.99	0.96	4.01	0.82	3.85	0.82	4.34	1.00	4.02	0.91	Effect
30.	Unplanned maintenance development at construction industry usually arise due to poor ergonomic and the	3.92	0.87	4.01	0.79	3.68	0.52	4.38	0.978	3.97	0.83	Effect

	effects is on construction industry											
31.	Another effect of ergonomic risk is discouragement of competition with other construction industries, and it lead to:	3.73	0.92	3.77	0.89	3.63	0.54	3.69	0.82	3.72	0.84	Effect
32.	Other ergonomic risk effect on construction workers is loss of jobs by the construction workers.	3.68	0.81	3.51	0.70	3.63	0.54	3.38	0.75 1	3.57	0.73	Effect
	Average	**3.55**	**0.92**	**3.55**	**0.86**	**3.47**	**0.71**	**3.77**	**1.00**	**3.57**	**0.89**	**Effect**

Source: Field Survey 2025

Research question two

What are the factors that lead to the development of ergonomic risk among workers in construction industry in the study area?

Table 2 showed the mean rating and standard deviations of Carpenters, Bricklayers/Concreters, Iron Binders and Plumbers on the factors that lead to the development of ergonomic risk among workers in construction industry in the study area. The result of the study revealed the mean range of 1.91 to 3.95 with grand mean of 3.59. All the respondents opined that factors like the ability of repetitive motion during work at construction site, high force and deviation from neutral body alignment, inadequate work rest-cycle highly developed ergonomic risk among workers in construction industry except item 44 which had a mean rating of 1.91 and it opined that unaccustomed work is a factor that lead to the development of ergonomic risk in construction industry. The standard deviation of lower range 0.64 to higher range of 2.67 with a grand of 0.91 was obtained.

Table 2: Mean Rating on the Factors that Lead to the Development of Ergonomic Risk among Workers in Construction Industry

S/N	Item	Carpenters		Bricklayers		Iron Binders		Plumbers		Grand		Remark
		$\bar{X}_C$	SD_C	$\bar{X}_B$	SD_B	$\bar{X}_I$	SD_I	$\bar{X}_P$	SD_P	$\bar{X}_G$	SD_G	
33.	The ability of repetitive motion during work at construction site affect workers and that lead to the development of ergonomic risk on construction industry workers	3.69	0.74	3.58	0.73	3.80	0.56	3.78	0.87	3.69	0.73	
4.	High forces and deviations from neutral body alignments during work is also identified as factor that lead to the development of ergonomic risk on construction industry workers	3.85	0.70	4.08	0.70	3.78	0.57	4.00	0.80	3.93	0.70	
35.	The amount of input that workers perceive in doing their work contribute greatly as and lead to the development of ergonomic risk on construction industry workers	3.64	0.67	3.64	0.54	3.80	0.46	3.56	0.98	3.66	0.65	
36.	Inadequate work-rest cycle appears to be the factor that lead to the development of ergonomic risk, and it appears as:	3.69	0.81	3.64	0.93	3.66	0.58	4.00	0.98	3.71	0.85	
37.	High-perceived workplaces stress is ranked as factor that lead to the development of	3.49	0.61	3.71	0.67	3.41	0.50	3.63	0.75	3.57	0.64	

	ergonomic risk on construction industry workers										
38.	Low-perceived social support is ranked as factor that lead to the development of ergonomic risk on construction industry workers	3.39	0.68	4.08	4.54	3.34	0.58	3.56	0.84	3.63	2.67
39.	Low perceived job control lead to the development of ergonomic risk factor	3.62	0.76	3.52	0.64	3.68	0.57	3.78	0.94	3.62	0.72
40.	Lack of task variability is an important factor identified in construction industry that lead to the development of ergonomic risk as:	3.58	0.75	3.65	0.70	3.68	0.61	3.66	0.90	3.63	0.73
41.	Low-perceived workplaces stress constitute a buffer of ergonomic risk factor on construction industry workers at:	3.76	0.79	3.69	0.99	3.66	0.58	3.44	1.19	3.68	0.89
42.	Machine pace work is another factor identified in construction industry that lead to the development of ergonomic risk among construction workers	3.79	0.78	4.03	0.74	3.73	0.55	3.97	0.99	3.88	0.77
	Excessive work duration of construction workers is considered as factor identified in construction industry that lead to the development of ergonomic risk	3.86	0.69	4.08	0.72	3.85	0.48	4.00	0.92	3.95	0.71

44.	Unaccustomed work appears to be as factor that lead to the development of ergonomic risk among construction industry workers	1.94	0.80	1.91	1.17	1.63	0.73	2.16	0.95	1.91	0.95
45.	Inadequate work-rest contribute as great8 as factor that lead to the development of ergonomic risk among construction industry workers	3.62	0.81	3.14	1.10	3.59	0.63	3.69	1.09	3.47	0.95
46.	Payment of work at piece rate in construction industry contribute factor to the development of ergonomic risk among construction industry workers	3.77	0.70	4.05	0.71	3.80	0.51	3.81	0.97	3.88	0.72
	Average	**3.55**	**0.73**	**3.63**	**1.06**	**3.53**	**0.56**	**3.65**	**0.94**	**3.59**	**0.91**

Source: Field Survey 2025

Null hypothesis one

There is no significant difference in the mean response of carpenters, iron binders, brick/block layers and concreters on the effects of ergonomic risk factors on construction industry workers in the study area.

Table 3 presented the result of ANOVA which shows the statistical result of mean difference among the respondents on the effects of ergonomic risk factors on construction industry workers in the study area. It shows the F-calculated value of 1.867 and a p-value of .136. This appears to be greater than 0.05 level of significant (p> .05). The result indicated that the null hypothesis therefore, accepted, that there is no significant difference among the mean responses of Carpenters, Bricklayers/Concreters, Iron binders and Plumbers on the effects of ergonomic risk factors on construction industry workers.

Table 3: ANOVA test of Significant Difference among Respondents on the Effects of Ergonomic Risk Factors on Construction Industry Workers

Source of Variance	**Sum of Square**	**Degree of Freedom *(df)***	**Mean Square *(MS)***	***F***	***P-value***	**Level of Significant**	**Remark**
Between Groups	174.078	3	58.026	1.867	.136	.05	Not Significant

Within Groups	7147.922	230	31.078
Total	7322.000	233	

Source: Field Survey 2025

Null hypothesis two

There is no significant difference in the mean response of carpenters, iron binders, brick/block layers and concreters on the factors that lead to the development of ergonomic risk among workers in construction industry in the study area.

Table 2 showed the result of the ANOVA with regard to the factors that lead to the development of ergonomic risk among workers in construction industry. The result showed that F-calculated value was .650 and p-value .584. This appears to be greater than 0.05 level of significant (p> .05). This implies that the null hypothesis is considered accepted that there is no significant difference in the mean response of carpenters, iron binders, brick/block layers and concreters on the factors that lead to the development of ergonomic risk among workers in construction industry.

Table 4: ANOVA test of Significant Difference among Respondents on the Factors that Lead to the Development of Ergonomic Risk among Workers in Construction Industry in the Study Area

Source of Variance	**Sum of Square**	**Degree of Freedom *(df)***	**Mean Square *(MS)***	***F***	***P-value***	**Level of Significant**	**Remark**
Between Groups	94.652	3	31.551	.650	.584	.05	Not Significant
Within Groups	11167.694	230	48.555				
Total	11262.346	233					

Source: Field Survey 2025

Findings of the Study

1. The result of research question one and its corresponding null hypothesis revealed that ergonomic risk factors had high effect on carpenters, iron binders, brick/block layers and plumbers among construction workers stress in construction industry.
2. The result of research question two and its corresponding null hypothesis revealed that there were high factors that lead to the development of ergonomic risk among carpenters, iron binders, brick/block layers and plumbers among construction workers' stress in construction industry.

Discussion of the Findings

Findings of null hypothesis one revealed that there is high effects of ergonomic risk factors on workers in construction industry with grand mean 3.57 and standard deviation of 0.89, and this has supported the work of (Sukadrin, Deros, Ghani, Ismail, Mokhtar and Mohammed 2024) with regard to the effects of ergonomic risk factors in construction

industry. The result revealed that the most ergonomic risk factors identified were awkward posture in handling job task, force and repetition of specific movement including vibration. The result also revealed that other ERF included uncomfortable static position, contact stress of muscles and tendons and also extreme temperature condition. The study explained the effects of ergonomic risk factors exposure as an early warning of progressively more serious problem which signifies physical sign. This study is considered relevant since it was conducted on the effects of ergonomic risk factors in construction industry which is one of the variable for this current study and both have centered on construction industries in similarity.

Findings of null hypothesis two revealed that the factors that lead to the development of ergonomic risk among workers in construction industries was found to be a high factor based on the fact that it has a has a grand mean of 3.59 and a standard deviation of 0.91. The result agreed with the work of Manuaba (2017), who opined that ergonomics and human factors are often used interchangeably in workplaces. They both described the interaction between the worker and the job demands. Nilson (2016) stressed that workers in construction industry would be kept injury free in as much as traditional and environmental risk factors have been addressed. Other study conducted which pointed out the factors leading to the development of ERF are the underutilization of abilities, work overload, lack of control, role conflict, inequity of pay, lack of job security, problems in relationships at work, shift work and physical danger. (Tan-Fee and Jonathan 2022).

Conclusion

Based on the findings of this study, the data revealed that construction workers experienced some common hazards based on the nature of their work thereby causing cumulative trauma disorder. There is high effects of ergonomic risks due to forceful exertions and stress. Other factors that lead to ergonomic risks was high among construction industries workers

Recommendations

i. Managers of Construction industry should organize seminars and workshops on ergonomic to construction industry workers to expose them on the effects of ergonomic risk that includes fracture, fatal death, fractures in body parts, damage of properties and materials or loss of jobs.
ii. Extra training should be organized by construction industry managers to construction workers on the factors that lead to the development of ergonomic risk among workers on construction industry.

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