

Occupational Stress and Risk Factors in the Oil and Gas Industry in Port-Harcourt

COOKEY-GAM, IDAWARIFA FRANK¹ and DOUGLAS, KINGSLEY²

¹Centre for Occupational Health Safety and Environment University of Port-Harcourt and ²University of Port-Harcourt Teaching Hospital Port-Harcourt.

Abstract

The literature provides much information about occupational stress experienced by workers including those within the Oil & Gas industry. Anecdotal evidence suggests that occupational stress is high among employees of Oil & Gas industry in Nigeria. This study compared occupational stress experienced by Oil & Gas workers and civil servants. It also examined likely risk factors. **Methods/Statistical Analysis:** Self-administered structured questionnaires were distributed among 497 randomly selected personnel of 2 case study companies operating in the Oil and Gas industry within Port Harcourt and its environs, as well as staff of the Rivers State Civil Service Commission (which was the control group). The responses were analysed using standard statistical software. **Findings:** Generally, employees in the Oil and Gas industry experienced more occupational stress than civil servants. The state of psychological health characteristics among Oil & Gas employees differed significantly from that of their counterparts in the civil service. However, the effect of psychosocial characteristics of job-related tasks was the same for Oil & Gas industry workers and civil servants. The risk factors that contributed to occupational stress include psychosocial attributes of tasks and physical environmental conditions, and psychological health of the individual (feelings about self and recent experiences). **Applications/Improvements:** The psychosocial features of jobs should be improved for employees in the Oil & Gas industry and civil service. The aspects of work such as exposure to verbal abuse and physical assault and legal liabilities of the role that could expose workers to psychological and emotional stress should be assessed at least once a year.

KEY WORDS: Occupational stress, Risk Factors, Oil and Gas, Port-Harcourt.

INTRODUCTION: The oil and gas industry workers in Port-Harcourt are faced with a lot of health challenges due to the type of job hazards. A major health challenge in occupational health is stress and stressful working conditions. Most of the oil and gas industry workers pass through different types of stressful conditions which affect their health. According to the current World Health Organization's (WHO) definition, occupational or work related stress "is the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope."

Rajeev Patel et al noted that, Occupational stress is a pattern of physiological, emotional cognitive, and behavioural responses that occur when workers are presented with work demands not matched to their knowledge, skills, or abilities and which challenge their ability to cope. Occupational stress is one of the major health hazards of the modern workplace. It accounts for much of the physical illness, substance abuse, and family problems experienced by millions of blue and white-collar workers. Occupational stress and stressful

working conditions have been linked to low productivity, absenteeism, and increased rates of accidents on and off the job.

According to the Oxford Advanced Learner's Dictionary 6th Edition, stress could among other things, refer to pressure, tension or worries arising from problematic situations in an individual's life. Where the trends of such stress are traceable to a job or work situation, it is known as job stress (Narayanan, 1999). As Narayanan (1999) further observe, job stress could in fact be identified with almost any aspect of a job or work situation such as extremes of heat, noise and light, or too much or too little responsibility etc. According to Irene (2005) job stress "is a pattern of reactions that occurs when workers are presented with work demands that are not matched to their knowledge, skills or abilities, and which challenge their ability to cope".

Stress at work is a relatively new phenomenon of modern lifestyles. The nature of work has gone through drastic changes over the last century and it is still changing at whirlwind speed. They have touched almost all professions, starting from an artist to a surgeon, or a commercial pilot to a sales executive. With change comes stress, inevitably. In most cases, job stress is attributable to negative situations such as a formal reprimand by one's superior for poor performance. Pleasant circumstances could also bring about job stress, such as job promotion and transfer to another location. Job stress has attracted considerable attention in recent times especially within the context of organizational behavior (Kazmi 2008; Shahu and Gole 2008; Nilufar 2009). According to Sarda et al.. Stress is the second largest occupational disease after musculoskeletal disorders. Stress accounts for 90 million lost work days annually in the US alone. \$150 billion is spent annually for psychiatric treatment, lost productivity and disability payments due to occupational stress related illnesses. Studies have shown that women are more likely to be victims of occupational stress than men (Kalkar 171). Occupational stress is studied and treated by many disciplines and these disciplines have tended to define it, study it, and treat it in their separate ways many faces, perhaps due to the interest the topic generates amongst people with ideal varying perspectives. "It is necessary for all the interested parties to recognize that occupational stress is a real risk and one that is deeply rooted in the workplace, industrialists, workers and governments will have to step up preventive measures in this field. Good stress management practices in the workplace are required for tackling this ever increasing problem" (Anna Diamantopoulos European Commissioner for Employment and Social affairs).

(Fm dias www.scielo.br) explains that occupational stress occurs when the individual is unable to meet the demands required by his/her job, which cause distress, discomfort, behavioural changes, sleep disorders and negative feelings. Burnout is defined as a negative response to chronic occupational stress, which is described by the presence of three dimensions: a) emotional exhaustion, characterized by a lack of energy and depletion of resources, leading to feelings ranging from hopelessness, sadness, irritability all the way to physical symptoms such as weakness, headaches, nausea, musculoskeletal and sleep disorders; b) depersonalization, characterized by indifference, disengagement and alienation regarding social groups and work; and c) reduced personal accomplishment at work, characterized by low productivity, making the individual feel unhappy and dissatisfied with his/her professional development. Over the years the oil industry has made a variety of contributions to the Nigerian economy. These include the creation of employment

opportunities, local expenditure on goods and services, contribution to gross domestic product, contribution to government revenue, contribution to foreign exchange reserves, and the supply of energy to industry and commerce <http://www.ogbus.ru/eng/>

Logically, the oil and gas industry is one of the riskiest industries when it comes to health and safety of employees. Interruptions in oil production caused by fires and accidents easily lead to significant economic losses, and potential hazards to humans and the environment Ahlang, 2005 as cited in www.ivythesis.com

For most people, work is a significant and meaningful feature of life with the majority of them spending around 25% of their adult lives working. While work can provide people with structure, purpose, satisfaction, self esteem and spending power, the work place can also be a setting of stress and worry. Problems at work are more strongly associated with health complaints than are any other life stressor-more so than even financial problems or family problems. Many studies suggest that psychologically demanding jobs that allow employees little control over the work process increase the risk of cardiovascular disease. On the basis of research by the National Institute for Occupational Safety and Health and many other organizations, it is widely believed that job stress increases the risk for development of back and upper-extremity musculoskeletal disorders.

There is no single cause of occupational stress. Stress can be triggered by sudden, unexpected pressure; it is often the result of a combination of stressful factors which accumulate over time. Some people can become so used to the symptoms of excessive stress that it goes unnoticed to their detriment. Most occupational stress is related to management of work, relationships at work, organizational setup. The experience of stress is different for every person. Some people are affected more than the others, so what is stressful for one person may not be stressful for another. It can depend on your personality type and on how you have learned to respond to pressure.

The Nigerian industries and organizations needs to re examine their practices. It worthy to note that occupational stress among Nigerian industries could be better addressed if the risk factors and occurrence are properly identified and evaluated.

METHODOLOGY

The study was conducted in Port Harcourt metropolis (4.8156° N, 7.0498° E) of Rivers State, Nigeria which includes the Greater Port Harcourt region covering Port Harcourt, Obio/Akpor, Ikwerre, Etche, Oyigbo, Eleme, Okrika and Ogu/Bolo Local Government Areas of Rivers State (The Tide, 2012). Port Harcourt metropolis (see **Figure 1**) has a population of more than 1,000, 000 based on the 2006 National Population Commission figures (National Bureau of Statistics, 2006).



Source: Google, 2016

Figure 1: Satellite Imagery of Study Area

A sizeable population of Port Harcourt and environs are artisans, civil servants, and employees in various firms offering services in the Oil & Gas industry (Rivers State Ministry of Health, 2010).

Data Collection

The population of the study was composed of personnel of companies operating in the Oil and Gas industry in Port Harcourt and environs, as well as staff of the Rivers State Civil Service Commission.

Sample and Sampling Technique

The sample size was 497; made up of 242 females and 255 males from various departments/units in the respective case study firms (including the control group of workers within the Rivers State Civil Service). The respondents from case study 1 firm comprised of 72 females and 85 males; those from case study 2 firm comprised of 42 females and 124 males; and those from the control group were made up of 128 females and 46 males.

Sampling Technique

The study subjects were selected using random sampling technique. To collect the data, semi-structured questionnaires were prepared. Prior to questionnaire administration, conversations were held with selected respondents to explain the objective of the study. Those respondents who were willing but not able to complete the questionnaire themselves were helped by data collectors. Approval for using the firms for the study and administration of questionnaires was obtained from authorized personnel at each company's health and safety department as well as top management representative.

Inclusion and Exclusion Criteria

The criteria for including participants in the study were: (1) within the legal working age (above 18 years); (2) working in the Oil & Gas sector (and the Rivers State Civil Service); and (3) resident in Port Harcourt and environs. The following groups of people were excluded from taking part in the study: (1) pregnant women were excluded because their physiological signs and symptoms are different from those of the general population. The physically challenged were also excluded from the study.

The Rivers State Civil Service was chosen as control because it is made up of workers from various units/departments employed in different sectors of the economy (for example, health, education, and engineering). The study participants were duly informed of the aim of the study including its objectives, and their consent was obtained prior to administering the study questionnaire. Questionnaire respondents were assured of their anonymity; they were not required to provide their names.

Nature and Sources of Data

Primary and secondary data were used in this study. The primary data were obtained by means of administered questionnaires and interviews with workers of the case study firms and the Rivers State Civil Service. Secondary data were obtained from existing literature on occupational stress among workers. The purpose was to examine research findings on the issue, identify gaps in the literature, and determine appropriate research focus to fill identified gap, and design research methodology to accomplish the task. The consulted literature includes research articles published in journals available in print and on the internet, books, and web searches.

Methods of Data Collection

Self-administered questionnaires were the main tools for primary data collection. Close-ended questions were used as this made the questionnaire easy for respondents to complete; 'yes/no' or 'not sure' questions were used. Open-ended questions were avoided as they are unsuitable for statistical analysis. The format of the questionnaire was in line with the standard for assessing occupational stress (as contained in the NIOSH Generic Job Stress Questionnaire).

The study questionnaire was piloted (between October 2015 and November 2015) prior to field data collection on randomly selected persons from the target population and individuals with experience in questionnaire design. The initial questionnaire was distributed via email and print among 12 persons out of whom 7 completed and provided feedback. The feedback was mainly on how respondents perceived certain questions and this informed their response. There was misunderstanding in differentiating between "fairly often" and "sometimes" as degrees of frequency of experiencing symptoms of stress. The issue was clarified through email, face to face and telephone communication. Once understood, respondents went on to complete the questionnaires. Feedback was also received on questionnaire format, logical arrangement of questions and vagueness. The feedback from this preliminary activity was used to improve the final product that was subsequently administered starting March 2016. The questions in the final version of questionnaire were therefore constructed to be clear and unambiguous as well as unbiased.

The questionnaires were mostly delivered online as attachment in email. Online delivery made it easier to reach more persons. A few survey forms were printed and distributed. A total of 660 questionnaires were distributed with 553 returned. The returned questionnaires were sorted of which 56 were rejected because they were incomplete or responses were unclear. Those who submitted incomplete questionnaires were thanked for their time. They were not requested to complete fresh forms. The administered questionnaire assessed the respondents' job situation, any potential/actual work hazards, the physical work environment, and general health (including feelings about themselves). The questions were grouped in 2 sections:

- Socio-demographic information;
- General job information;
- Jobs situation;
- Work hazards;
- Physical environment;
- Non-work activities;
- Feelings about self;
- General health; and
- Health conditions.

Data Analysis

The data collected by means of the questionnaires were subsequently sorted and entered into Microsoft XLSTAT statistical software for generation of descriptive tables and charts as well as calculation of statistical parameters (for example, correlation, ANOVA, and regression). The responses to questions on stressful conditions were rated in an attempt to quantify (and compare) the information provided by different respondents. The rating scale is shown in **Table 1**.

Table 1: Rating Scale for Parameters

Psychosocial Characteristics				
Rating	Never (0)	Occasionally (1)	Fairly often (1.5)	Very often (2)
Physical Environment				
Rating	TRUE (1)		FALSE (0)	
Non-Work Activities				
Rating	NO (0)		YES (1)	
Psychological Health (Feelings about Self)				
Parameter	Strongly disagree (0)	Disagree (0.5)	Agree (1)	Strongly agree (1.5)
Psychological Health (Recent Experiences)				
Rating	Sometimes (1–2 days) (1)	Rarely (< 1 day) (0.5)	Occasionally (3–4 days) (1.5)	Most times (5–7 days) (2)
Medical Health				
Rating	Never (0)	Occasionally (1)	Fairly often (1.5)	Very often (2)

Health conditions		
	TRUE	FALSE
Rating	(1)	(0)

RESULTS

A total of 660 questionnaires were distributed (220 for each of the 2 case study firms and control group). Four hundred and ninety-seven questionnaires were properly filled and returned with a response rate of 75%. The questionnaire assessed conditions that were likely to lead to occupational stress among respondents such as psychosocial characteristics of the job, physical environmental conditions, and non-work activities that could exacerbate occupational stress, as well as psychological and general medical health of respondents. The findings of the study that pertain to occupational stress and risk factors are discussed in the succeeding sections.

Stressful Conditions

The rates for psychosocial characteristics, psychological health (feelings about self), psychological health (recent experiences), and medical health were subsequently adjusted to be accommodated within a range 0 – 1. The adjusted values were then used as the final scores for the respective parameters. A summary of the values for the evaluated parameters (except medical health and health conditions) is shown in **Table 2**. Further, the Pearson’s (linear) correlation coefficient for associations among the parameters was also determined.

Table 2: Stressful Conditions

Parameter	Case Study 1	Case Study 2	Control
	Mean (SD)	Mean (SD)	Mean (SD)
Psychosocial characteristics	0.38 (0.19)	0.32 (0.13)	0.31 (0.19)
Physical environment	0.26 (0.09)	0.21 (0.09)	0.19 (0.11)
Non-work activities	0.50 (0.16)	0.38 (0.14)	0.49 (0.22)
Psychological health (feelings about self)	0.14 (0.02)	0.13 (0.01)	0.12 (0.03)
Psychological health (recent experiences)	0.10 (0.05)	0.14 (0.02)	0.11 (0.05)

Psychosocial characteristics

The mean value of psychosocial characteristics of respondents’ jobs was highest for Case Study 1 and least for Control Group (**Figure 2**). For all 3 groups, the values of psychosocial characteristics showed positive correlations with each of psychological health (feelings about self), psychological health (recent experiences), medical health, and health conditions.

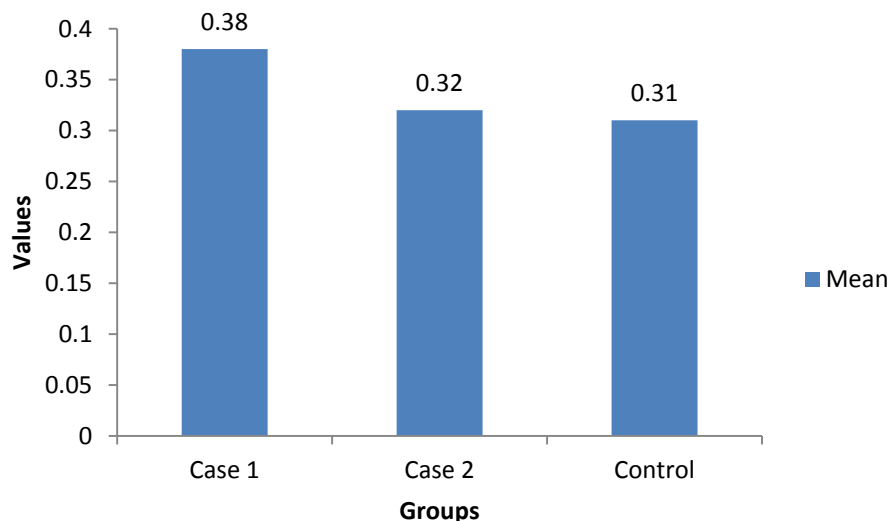


Figure 2: Mean Values of Psychosocial Characteristics

Physical environment

The mean value for physical environmental conditions at respondents' workplace was highest for Case Study 1, and least for the Control Group (**Figure 3**). For all 3 groups, the values of physical environmental conditions showed positive correlations with non-work activities.

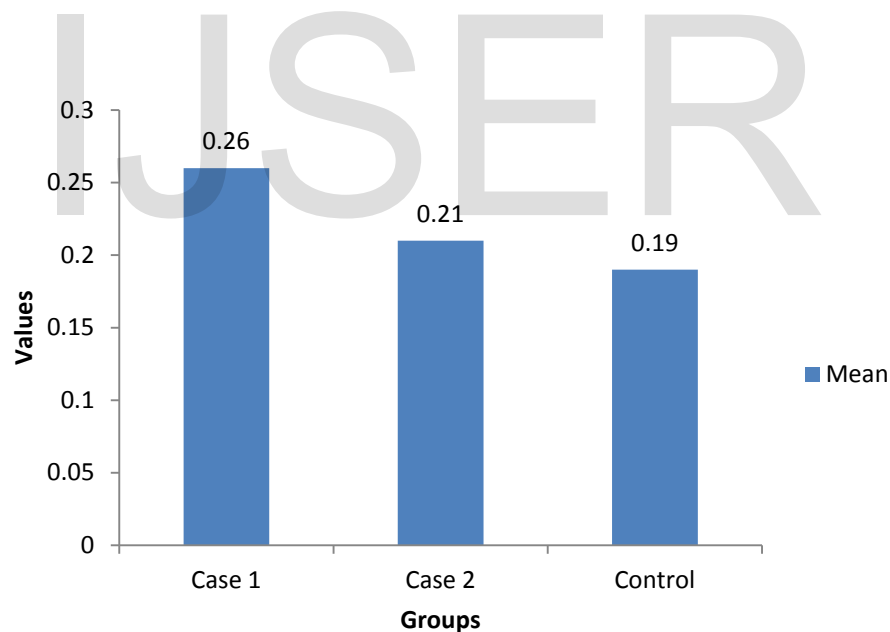


Figure 3: Mean Values of Physical Environmental Conditions

Non-work activities

The mean value for non-work activities that respondents engaged in, was highest for Case Study 1, and least for Case Study 2 (**Figure 4**). For all 3 groups, the values of non-work activities showed positive correlations with physical environmental conditions.

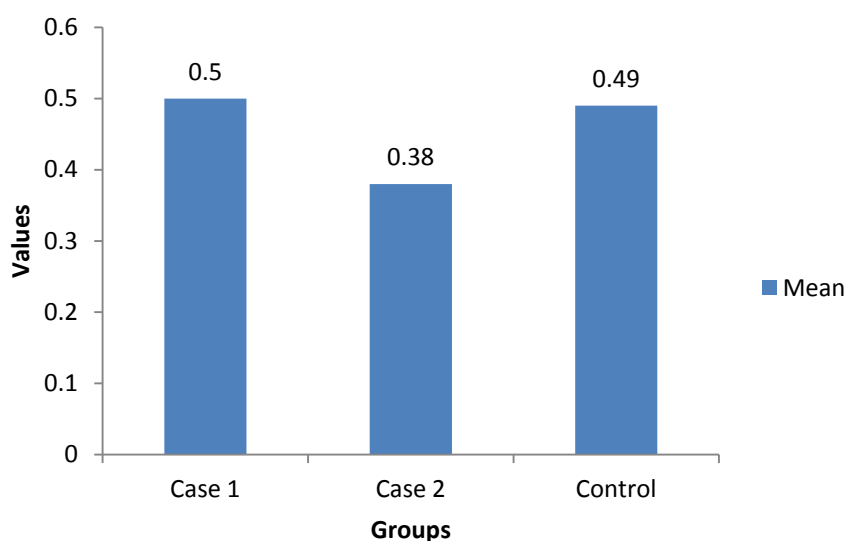


Figure 4: Mean Values of Non-work Activities

Psychological health (feelings about self)

The mean value of psychological health (feelings about self) was highest for Case Study 1, and least for the Control Group (**Figure 5**). For all 3 groups the values of psychological health (feelings about self) showed positive correlations with those of psychosocial characteristics.

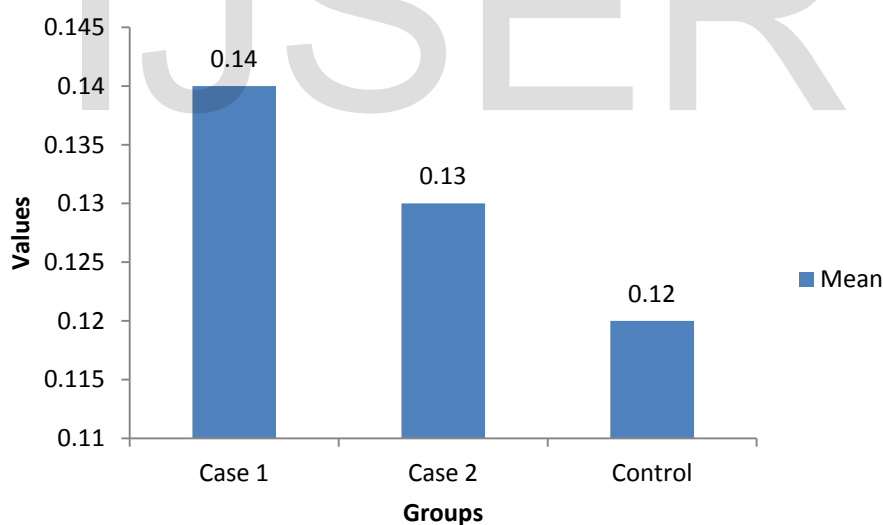


Figure 5: Mean Values of Psychological Health (Feelings about Self)

Psychological health (recent experiences)

The mean value for psychological health (recent experiences) was highest for Case Study 2, and least for the Case Study 1 (**Figure 6**). For all 3 groups the values of psychological health (recent experiences) showed positive correlations with those of psychosocial characteristics.

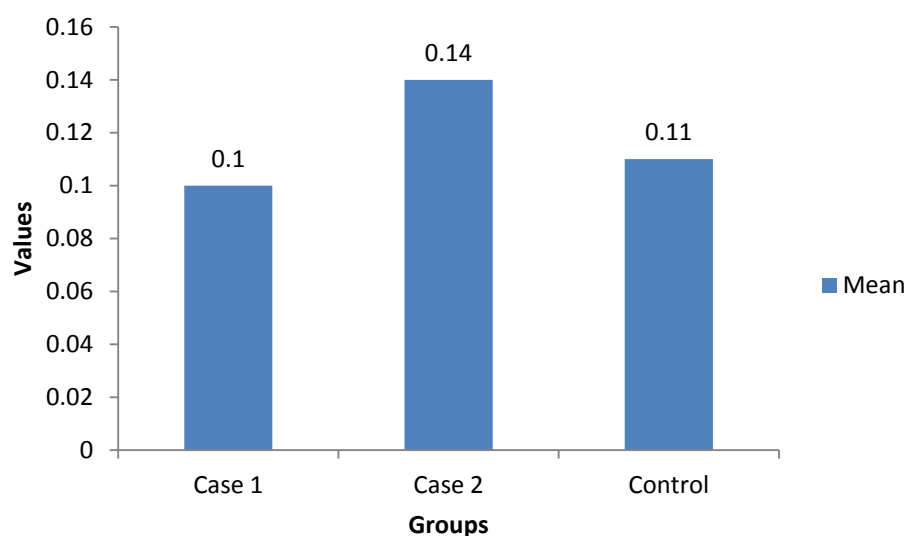


Figure 6: Mean Values of Psychological Health (Recent Experiences)

DISCUSSION

The findings of the study suggest that employees of the case study firms, that is, Oil and Gas industry workers, experienced more stress than those of the control group, that is, civil servants. High levels of occupational stress have been reported among employees of the Oil & Gas industry; with the situation especially worse among offshore workers (Afzainizam and others, 2016; Sutherland and Cooper, 1996). High levels of stress have also been reported for employees of the civil service. Ojwang (2012) reported that more than 24% of employees in the Kenya civil service experienced average to high burnout levels, and as much as 48% experienced high levels of depersonalization. Johnson and others (2005) observed that teachers and social services workers were among employees that experienced worse than average levels of occupational stress. Similar results were obtained by Young and Cooper (1999); Travers and Cooper (1993); and Kahn (1993).

Psychosocial characteristics

The psychosocial characteristics of employees' work environment and physical environmental conditions of their workspace (as gleaned from their responses to the research questionnaire) are likely contributors to the occupational stress they experienced. The employees' level of employment, time in the organisation, previous employment (which could be used to identify inexperienced workers), and contract type (that is, full-time, part-time or variants) are also likely contributors to occupational stress. The information that respondents provided on work shifts and job rotation pattern were limited; and thus their contributions to occupational stress were not further examined. However, Afzainizam and others (2016) reported that job rotation, job enlargement, job enrichment and semi-autonomous job contribute to occupational stress in the Oil & Gas industry. The other issues that the research questionnaire explored were either mostly after-effects of stressful conditions, or demographic information (that were considered) unrelated to stress factors.

The findings of the study indicate that the psychosocial characteristics of employees' jobs (whether in the Oil and Gas industry or civil service) contribute to experience of occupational stress. This suggests that the effect of psychosocial characteristics was the same in the Oil & Gas industry and civil service; none appears to offer better conditions as regards this

aspect of employees' jobs. Johnson and others (2005) reported similar findings for the contribution of psychosocial characteristics of work to affect stress; noting that jobs which involve emotional labour, face to face and voice to voice interaction with customers contribute to occupational stress. The risk of violence and lack of control over work situations have also been noted as contributors to stress (Zapf, 2002; Holman and Fernie, 2000; Zapf and others, 1999).

Physical environment

The findings of the study indicate that the physical environmental conditions of employees' workspace in the Oil & Gas industry did not cause an increase in their occupational stress experience. This however was not the case for the control group organisation where occupational stress (as measured by general medical health) positively related to physical environmental conditions. The results suggest that physical conditions were better for employees of firms in the Oil & Gas industry as compared to those of the civil service; and could thus explain the correlations observed.

Non-work activities

The mean value for non-work activities that respondents engaged in was higher in one of the case study firms of the Oil & Gas industry. The values of non-work activities differed significantly among employees of the Oil & Gas firms and the Civil Service. The values showed positive correlations with physical environmental conditions.

Effects of Occupational Stress on Employees' Performance

The psychosocial characteristics of employees' work environment were compared with their recent experience of psychological stress, in an attempt to assess the effect of occupational stress their performance. The questions on psychosocial characteristics included whether respondents' jobs primarily involved providing direct service to specific groups of people or client populations, exposure to verbal abuse and threat of physical harm from clients, physical assault on the job, and exposure to legal liability from respondent's job. The decision to compare psychosocial characteristics and recent experience of psychological stress is because it was assumed that the experiences (including their frequency) would affect how employees perform on their jobs at the time.

Generally, as the psychosocial characteristics of employees' work environment deteriorated, they indicated experiencing psychological stress; and this likely could have reduced the quality of performance at their jobs. Thus, the effect of psychosocial characteristics on employee performance was the same in the Oil & Gas industry and civil service. Bewell and others (2014) reported significant effect of work-induced stress on organisational effectiveness and employee productivity. They observed that the more the occupational stress experienced by employees, the less their effectiveness and productivity.

Psychological health (feelings about self)

The mean value of psychological health (feelings about self) was higher among employees of the Oil & Gas firms. The values of psychological health (feelings about self) differed significantly among employees of the Oil & Gas firms and the Civil Service. The values showed positive correlations with values of psychosocial characteristics.

Psychological health (recent experiences)

The mean value for psychological health (recent experiences) was higher in one of the case study firms of the Oil & Gas industry. The values of psychological health (recent experiences) differed significantly among employees of the Oil & Gas firms and the Civil Service. The values showed positive correlations with those of psychosocial characteristics.

CONCLUSION AND RECOMMENDATION

Generally, the effect of psychosocial characteristics was the same in the Oil and Gas industry and civil service; none appears to offer better conditions as regards this aspect of employees' jobs. As the psychosocial characteristics of employees' work environment deteriorated, they indicated experiencing psychological stress; and this likely could have reduced the quality of performance at their jobs. The physical environmental conditions of employees' workspace in the Oil & Gas industry did not cause an increase in their occupational stress experience. This however was not the case for employees of the Civil Service.

The psychosocial conditions in the work place should be improved. The aspects of work – for example, exposure to verbal abuse and physical assault, as well as legal liabilities of the role – that can expose workers to psychological and emotional stress should be assessed at least once a year.

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