

## A Need Assessment for Prevention of Work-Related Stress Experienced by Radiographers in Ghana

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### Abstract

**Background:** The various components within the radiography practice pose different injury risks to radiographers in the course of performing diagnostic imaging examinations such as positioning patients in bed or on x-ray tables and lifting of heavy objects. These identified situations have a significant role in the development of RSS in radiographers

**Aim:** This study aimed to establish whether radiographers at the study site experience Repetitive Stress Syndrome (RSS) in order to outline possible techniques to reduce the risk of RSS.

**Method:** This was a descriptive survey and 68 radiographers consented to participate in the study. A structured questionnaire assessing demographic characteristics, radiographers' awareness about distress, work schedule and problems associated with musculoskeletal injury were completed. Data were entered into a database using Statistical Package for Social Science (SPSS) version 17.0 and graphs and tables presented using Microsoft Excel.

**Result:** It was observed from the study that majority of the Radiographers (52%) had practiced between one to five years. Forty eight percent of the respondents had no awareness of any kind of distress. Some of the radiographers (39%) had experienced multiple symptoms of distress in their workplaces.

**Conclusion:** The study identified lack of awareness about several stress syndromes among the radiographer at the study site. The symptoms of distress among the radiographers were mostly pain and weakness. Other practices that influenced the occurrence of stress among the participants were frequent transferring and positioning of patients.

**Keywords:** Radiographers; Syndrome; Awareness; Medical imaging

### Introduction

Diagnostic medical imaging practices have become increasingly difficult to manage due to high rates of continuous distress and Repetitive Stress Syndrome (RSS) among the imaging professionals. The various specialties within the radiography practice pose different injury risks such as low back pain to the practitioners in the course of performing diagnostic imaging examinations or administering radiation therapy [1]. Lamar indicated that radiographers spend many of their working hours pushing equipment or lifting patients from one position to the other, when performing their duties [2]. Radiographers even struggle in the course of carrying out their duties to keep up with their increasing workloads. These vigorous physical demands continuously lead to injuries to the neck, shoulder, wrist and other body parts. Although some research on stress has been done within certain health professions, very little is known about the incidence of occupational stress among radiographers in Ghana [3].

Stress is a disturbing condition which interferes with an individual's physical and mental wellbeing [4]. Clare describes it as an experience where there is a significant lack of balance between the professional's capabilities and the demands made on them [5]. Stress is believed to be caused by physical and emotional stimuli which leads to responses by different systemic organs within the human body in coping with a situation. Stress-related disorders cover a wide range of conditions including psychological disorders such as depression and emotional trauma such as tension or dissatisfaction which may in turn lead to poor work performance, absenteeism or even injury [6].

Distress occurs when a body part functions at a greater level than it could cope at a particular period. The effects may be immediate or long term damage to the practitioner's health status when the stressing occurs repeatedly leading to RSS. RSS, also referred to as repetitive stress injury, repetitive stress disorder or musculoskeletal disorders is

an injury to a part of the body caused by overusing or exerting too much stress on that part of the body [7]. RSS is mainly caused by repeated movement of a particular body part and is often seen in workers whose physical routine are made repeatedly. Failure to check these injuries may lead to deterioration of the radiographer's health and consequently undermine the employee's performance.

Lamar, established that, very high prevalence of musculoskeletal symptoms were likely to interfere with work and leisure activities [2]. Tasks related to patient handling such as positioning and lifting, occasional heavy workload and poor equipment design were identified to be associated with high prevalence of musculoskeletal symptoms such as hand and wrist pains [8]. Researchers also indicated that Sonographers may have increased risk of the dominant shoulder and dominant hand/wrist associated with their tasks as a result of forceful or prolonged grips of probes [9]. Similarly, mammography examinations have also been seen to have greater risks of musculoskeletal symptoms of the shoulder and the lower vertebral column, resulting from radiographers lifting arms above the heads of patients and repetitively twisting their trunks during position of breasts around the equipment [10]. Again, Long et al. indicated that radiographers performing CT examinations were likely to experience RSS as a result of long hours of sitting at the console [11].

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Wright and Witt established that 72% and 77% of males and females respectively experienced back pain among radiographers due to the different techniques or methods used in performing specific tasks [12]. According to them, radiographers working in the general imaging units reported the highest level of back pain. Lamar therefore noted that the different techniques employed could result in the back pain experienced by the radiographers [2]. Similarly, Lois and Kumah also indicated that work-related symptoms could be attributed to increased workload, reduced number of staff, sustained posture or activity and poor equipment design [13]. It has been established that ergonomic stressors such as repetitive motion, awkward posture and duration of work activities may result in the development of musculoskeletal disorders or RSS and radiographers risk injuring themselves in the course of their work, such as in positioning patients in bed or on x-ray tables and lifting of heavy objects.

These identified situations listed have a significant role in the development of RSS in radiographers and they continue to exist among the radiographers in Ghana [2]. The study therefore aimed to establish whether radiographers at the study site experience RSS in order to help find ways to reduce them.

## Methodology

The study was a descriptive survey with a quantitative design. The study which was conducted in one of the Teaching Hospitals in Ghana between the months of April and July, 2014, targeted all qualified Radiographers in the hospital. Participants working in the various imaging facilities were used.

Participants were selected using convenient sampling and those who voluntarily agreed to participate were after signage to the consent form issued with the questionnaires for completion. All participants totaling Sixty Eight were recruited and surveyed to minimize bias and problems associated with generalizing result from small sample. Students were excluded from the study but all interns' radiographers were included in the study.

A 27-item stress scale questionnaire which was a modified version of Cohen et al., was the survey tool used for the study [14]. This consisted of open and closed ended questions and was self-administered. The tool was divided into four sections; Section A, B, C and D. Section A was designed to gather demographic information, section B was intended to collect information about the radiographers' awareness of repetitive stress syndrome. Section C, however, sought to gather data about the radiographer's work schedule while Section D intended to explore the problems associated with musculoskeletal injury.

A pilot study was conducted, using three radiographers, to test reliability and validity of the measuring instrument. The responses from the pilot helped to revise the sequence, wording, clarity and accuracy of translation of the questionnaire. The sample for the pilot study were randomly chosen and not included in the main study to prevent the likelihood influence on the participants in the main study.

Data collected from the respondents were organized, entered into a database and analyzed using Statistical Package for Social Scientists (SPSS) software version 17.0 and Microsoft Excel software version 2007. Descriptive statistics was then used and results presented in both graphical and tabular forms for easy interpretation of findings.

Approval was obtained from the Ethical Review and Protocol Committee of a higher institution. The ethics approval was supported by written permission for the study to be conducted at the study site with the ethical standard of confidentiality being upheld. All participants

gave informed consent prior to the commencement of the study and each data collection activity. The study did not involve any risk or harm as it sought to seek information from participants of their work related stress.

## Results

The study received a 100% response rate with the majority (81%) being males and 19% females. Most of the respondents (45%) were between the ages of 20-29 years and the least were 50+. Fifty-eight percent of the respondents formed majority workforce. Majority (52%) of the respondents had been working for 1-5 years and the least forming less than 2%. In all, 61% of the respondents worked 5-7 hours daily, 29% worked 8-10 hours daily, while 6% spent over eleven hours at work.

Majority (71%) of the respondents had been working in their current unit up to 5 months, while 3% had been working for over 6 years in the same Unit. According to 39% of the participants, they were very much aware of Stress though 48% indicated otherwise. Moving a further step about how they had information about stress, 38% of the respondents did not respond to it. However it was noted that 25% of the respondents had knowledge about Stress from the internet, while 38% did not answer the question.

In all, 38% of the radiographers reported the causes of Stress as repeated motion, bad posture, and working under strenuous environment though the majority of the respondents (48%) had no idea about the causes of Stress. The activities mostly engaged in by radiographers were transferring and repositioning patients who offer little or no assistance. It was noted that 32% and 28% of the radiographers attended daily to 20-30 patients and 30+ patients respectively.

Table 3 indicates that 20% of the radiographers experienced discomfort at their lower back, 16% experienced wrist discomfort, while 15% experienced shoulder and neck discomfort.

Seventy-one percent of the respondents believed the design of their equipment was not efficient for work. Only 26% of the respondents shared in the fact that health and safety organization were in place at their unit (Figure 3). The most predominant discomfort experienced by the majority (63%) of the respondents was pain and weakness. In all, 37% of the radiographers experienced discomfort at their lower back, 29% experienced wrist discomfort, while 28% experienced shoulder and neck discomfort. Fifty-two percent of the respondents reported that pushing, pulling and lifting of equipment and patients were responsible for the discomfort they experienced (Table 1). Eighty four percent of the respondents had not experienced bodily traumatic injury due to repetition of work activity. Thirty-nine percent of the radiographers become tired while 23% become less active as a result of the discomfort (Table 2). In all, 39% of the participants recommended provision of modern equipment where as 26% recommended expansion of rest room shield (Table 3).

DISCOMFORT	RESPONDENTS	PERCENT %
Pain	7	10
Pain and weakness	38	63
Pain, numbness, tingling, and weakness	3	3
Pain, numbness, and weakness	5	7
Pain, visible swelling and weakness	3	3
Pain, tangling, visible swelling, and weakness	5	7
Pain and numbness	3	3
Pain, numbness, tingling, and visible swelling	3	3

Table 1: Type of discomfort experienced in the course of work.

ACTIVITY	RESPONDENTS	PERCENT %
Pushing, pulling and lifting	32	52
Sitting and lifting	2	
Pulling and pushing	2	3
Standing	2	3
Lifting, positioning and pulling	12	19
Lifting	4	6
Data entering	2	3
All the above	4	6
<b>Total</b>	<b>60</b>	<b>100</b>

Table 2: Type of activities responsible for discomfort experienced by respondents.

SITE	RESPONDENTS	PERCENT %
Neck	18	26
Shoulder	19	28
Hand	14	21
Wrist	20	29
Elbow	4	6
Lower back	25	37
Ankle	10	15
Knee	12	18
None of listed	2	3

Table 3: Anatomical site discomfort is experienced during work.

## Discussion

Healthcare practitioners, including radiographers, are vulnerable to various hazards identified to be detrimental to their health. As healthcare providers, it is essential for the practitioners to maintain good health so as to deliver quality health services. The study was done to assess the causes and effects of stress in work related environment among diagnostic radiographers in Ghana. Stress has been identified as one of the pervasive and potent occupational hazards in the healthcare settings. The gender was biased towards the males and this was because males dominate in Ghana among the Radiography Profession unlike the other parts of the world with the ratio of 7:2 and this cuts across most of the health professions in Ghana.

### Working experience

In order to reduce Stress and avoid RSS at the work environment as much as possible, changes or rotation is important especially to reduce work related injuries as revealed in the study [1]. A total of 90% of the respondents had worked in the other units of the department such as CT scan and MRI units and continue to rotate as and when time is due. There was however 3% of the respondents who had worked in a particular unit for over 6 years and were predisposed to stress as they remained in the same unit, performing the same task repeatedly for a long time. The reason is that in Ghana, there is what we call one man station with only one radiographer manning the unit and they are not moved to any place unlike the teaching hospital where we have variety of the equipment's. It was also observed that majority of the respondents handled over 20-30 % of patients daily of the total number patients (Figure 1). This demonstrated that there was an inconsistency in the expectation of an ideal situation, thereby resulting in excessive workload on the practitioner leading the radiographer to an RSS [15].

### Awareness of stress and working conditions

The findings showed that 48% of the respondents were not aware of any stress though 13% did not provide any answer regarding awareness of stress in the work environment. This may be as a result

of the respondents' lack of information on the subject area or perhaps these radiographers might have possibly had undergone any in-service training on Stress related issues to enhance their understanding of the topic. This situation of unawareness may lead to an increase in the prevalence of high symptoms of RSS [16].

Allowing continuous work till the end of the working hours without any relaxation period or break time, as established in Figure 1 may be due to heavy workload at the various units though this situation may continuously place the radiographers under some level of stress resulting in the development of RSS by the practitioners [8,9].

The study also highlighted that some of the equipment designs do not enable efficient work done (Figure 2). Thus, some equipment in the various units was not specifically designed to enhance the type of cases being carried out in a particular unit, thereby making the practice strenuous and stressful. Again, some of the equipment were obsolete and therefore required a lot of energy in operating them, thus making the practice so cumbersome. These experiences by the practitioners may expose them to the risks of developing continuous stress leading to RSS.

### Sources of stress at work place

From the results, more than half of the radiographers reported experiencing stress at the work place leading to as many as 65% of the respondents experiencing pains and weaknesses in their various body parts during the course of their work (Table 1). Unsatisfactory working conditions such as poor equipment design and frequent equipment breakdown, causes forceful manual exertions as the radiographers require the use of extra effort in moving some of the equipment's a cited by Lamar, were some of the major contributors of RSS [2].

From Table 2 some aspects of the nature of the work of radiographers particularly, frequent manual pushing and pulling of equipment, transferring and repositioning of patients including the wearing of lead

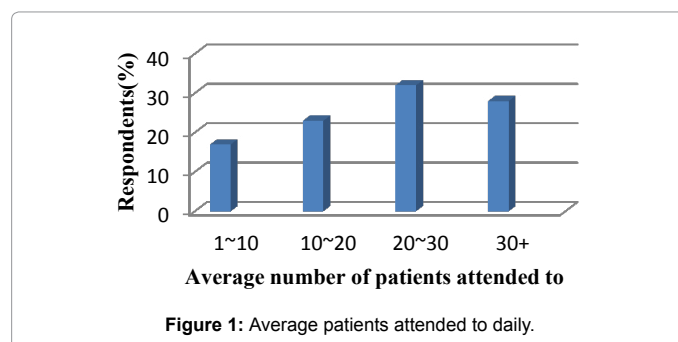


Figure 1: Average patients attended to daily.

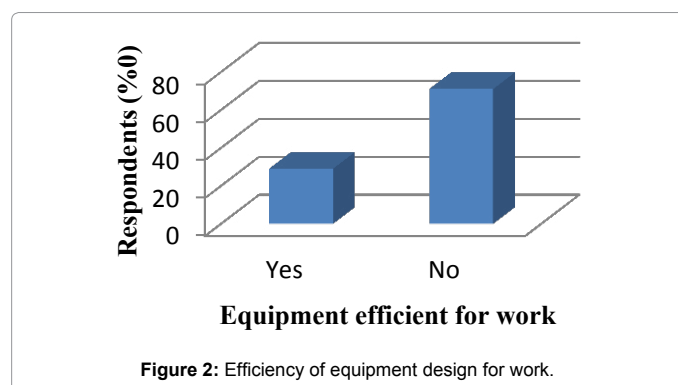


Figure 2: Efficiency of equipment design for work.

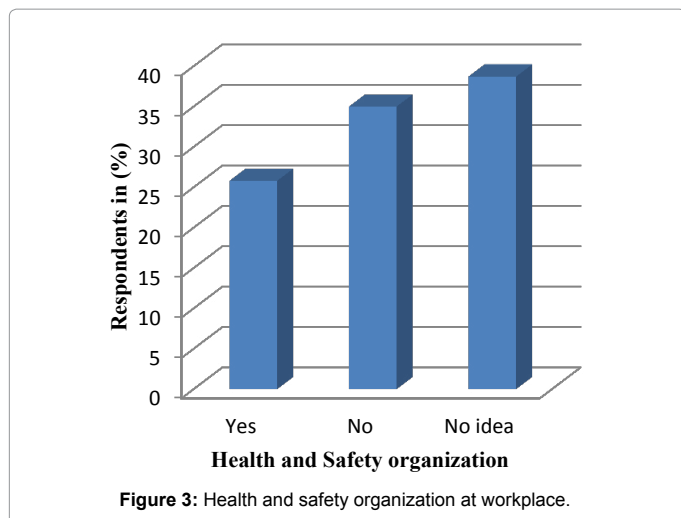


Figure 3: Health and safety organization at workplace.

RECOMMENDATIONS	RESPONDENTS	PERCENT %
Provision of state-of-the-art equipment	27	39
More staffs to help	4	3
Expansion of rest room and shield area	17	26
Maintenance and repair of equipment	9	13
Provision of sink, air conditioners and fitting light	9	13
<b>Total</b>	<b>68</b>	<b>100</b>

Table 4: Recommendations by respondents for improvement at the workplace.

aprons, created discomfort and stressful experiences for radiographers. This was expected as previous research and Lamar, indicated that, tasks related to patient handling such as, lifting and positioning, increases the risks of having Stress at the work environment [2]. The study also showed that the radiographers experienced some discomfort at the low back, wrist, neck, shoulders, hand and knees.

Moreover, the discomfort experienced by the respondents had various effects on them according to the findings which included tiredness, inactiveness and absenteeism which affected their normal work activities and productivity.

Several working conditions such as poor working environment, which are detrimental to the radiographers' well-being, should not be overlooked by the stakeholders of the radiography profession. While some of the practitioners complained of non-availability of state-of-the-art equipment and break-time, others also had concern for the expansion of rest rooms. Some also recommended for the repair and maintenance of equipment and training of more staffs to help (Table 3) (Table 4).

### Availability of health and safety organization

There was conflicting knowledge of the existence of health and safety organization at the workplace. The study identified that while 26% of the radiographers felt it existed, 32% had contrary view and with 39% having no idea about health and safety organization. This indication was very worrying at the study site looking at the number of patients being attended to daily and the fact that this was necessary for the welfare of their staff on post at every point in time.

### Conclusion

The symptoms of Stress among the participants were mostly pain and weakness. The workstation practices that influenced the

occurrence of Stress which could lead to RSS among the participants were frequent manual pushing and pulling of equipment, patient handling, bad postures used in performing tasks, wearing of lead aprons as well as repeated forceful manual exertions, required by some of the equipment due to their obsolete state. The effects of work related Stress on the participants were tiredness, inactiveness and absenteeism. All of which interferes with normal work activities and hence productivity.

### Recommendations

Based on the findings of the study, the following recommendations were made;

- Workshops or in-service training about Stress should be organized to increase radiographers' awareness.
- Periodic rotation of radiographers should be encouraged to vary their work activities.
- Health and safety organization should be made available or be made known at the department to assess employee's health, safety and welfare.

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