MUSCULO-SKELETAL SYMPTOMS AND ITS SEVERITY AMONG RADIOGRAPHERS AND SONOGRAPHERS IN SOUTHERN NIGERIA

Abstract

Background: A lot of activities have been found to contribute to musculoskeletal symptoms (MSS) among different professionals such as lifting of heavy objects, prolonged sitting or standing, long schedule of duties equipment manipulation and others. The aims of this study were to assess the prevalence and severity as well as risk factors of musculoskeletal symptoms among practicing radiographers and sonographers in south-eastern part of Nigeria.

Method: This study involved distribution of questionnaire to radiographers within south-eastern part of Nigeria. A total of 48 radiographers and 45 sonographers were involved in this study. Information collected from the participants include categories of work performed, schedule/ duration of duty, types of equipment used, work organizational factors, prevalence and severity of musculoskeletal symptoms to mention a few.

Results: Out of the 48 Radiographers and 45 sonographers that participated in the study, 76.3% complained of at least one episode of symptom. Low back pain was the most frequent complaint (52.6%), followed by neck pain, shoulder pain and hand/wrist pain. Reports showed that some of the respondents were prevented from performing their duties as a result of the symptoms experienced. The major risk factors were prolonged standing/sitting during prolonged duration of duty, lifting of patients and heavy equipment, overstretching of the neck following heavy work schedules.

Conclusion: There is a high prevalence of musculoskeletal symptoms among radiographers and sonographers in Southern Nigeria. Work schedule/duration of duty and lifting of heavy loads are important factors to be controlled in order to reduce the prevalence and severity of musculoskeletal symptoms among radiographers and sonographers in Southern Nigeria.

Key words: muscles, pain, symptoms, waste, neck , sonographers, radiographer

Introduction

Musculoskeletal symptoms (MSS) also called repetitive motion disorders, are injuries of the muscles, tendons, ligaments, joints, cartilages, nerves and spinal disks [1]. They are degenerative diseases and inflammatory conditions that cause pain and impair normal activities [2]. They can affect many different parts of the body including upper and lower back, neck, shoulders and extremities [3]. Common symptoms of musculoskeletal pain are localized or wide spread pain that can be worsened with movement, stiffness of the entire body, fatigue sleep disturbance, twitching muscle, the sensation of burning in your muscle [4, 5].

Low back pain is the most common type of musculoskeletal pain and is caused by overuse, poor posture or prolong immobilization, and wrong movements used during long working hours [1, 4]. Some researchers [6] investigated the prevalence of back pain among radiographers and the various work exposures in form of method utilized to perform specific

tasks. The results obtained showed that individual strategy is a source of variability for the work performed which influences the presence of back pain and other forms of disorder.

A lot of activities have been found to contribute to MSS among different health care professionals. These include highly repetitive movements, poor posture, forceful hand application, hand-arm vibration, direct mechanical pressure on body tissues, cold work environments, work organization, and workers' perception of work organization [7-12]. In addition, psychosocial factors such as work demands, job control, job content, and social support have been implicated for increased report of work-related musculoskeletal disorders (WRMDs)[13]. Faulty ergonomics workstation has been noted to increase the prevalence of musculoskeletal disorders [14]. Keyserling (2000)[15] stated that weight of objects lifted, horizontal reaching distance, awkward posture and frequency of exertions play a significant role in the development of low back pain. Other studies have shown that ergonomic stressors such as repetitive motion, intense force, awkward posture, and duration of work activity may be related to the development of upper extremity discomfort, and musculoskeletal disorder such as tendinitis, and carpel tunnel syndrome [16-19]. It is thought that through the various tasks required of some health professionals such as Radiographers and sonographers, they may be exposed to the factors mentioned above, and therefore at risk of developing work-related musculoskeletal disorders (MSDs) [20] .

MSDs are an increasing healthcare issue globally, being the second leading cause of disability [5] . For example in the US, there were more than 16 million strains and sprain treated in 2004, and the total cost for treating MSDs is estimated to be more than $125 billion per year [21]. In 2006, approximately 14.3% of the Canadian population was living with a disability, with nearly half due to MSDs [22].

Radiographers and sonographers are trained healthcare professionals responsible for performing diagnostic and therapeutic imaging procedures and providing essential service in clinical healthcare system. These tasks are achieved by manual handling of patients, equipments and materials at different postures and work schedules and as a result, they are prone to occupational musculoskeletal symptoms and disorders because of the heavy patients, equipment and materials handled[23,24].

Although a great variety of tasks are performed by radiographers and sonographers in clinical settings, but hitherto very few works have been carried out to assess the prevalence of musculoskeletal symptoms among radiographers and sonographer in southern part of Nigeria. The aims of this study were to assess the prevalence and severity as well as risk factors of musculoskeletal symptoms among practicing radiographers in southern part of Nigeria.

Method

This is a non-experimental descriptive study that involves collecting information from practicing radiographers and sonographers in different hospitals located within different states in the southern part of Nigeria. These hospitals include; Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi, New Hope Diagnostic Centre Onitsha, both in Anambra State, National Orthopaedic Hospital, Enugu, University of Nigeria Teaching Hospital (UNTH)

Ituku-Ozala, Enugu State University of Science and Technology Teaching Hospital, Parklane, Enugu State, Federal Teaching Hospital Abakali, Ebonyi State, Assurance Medical Diagnostic Centre, Calabar, Cross River State and many other hospitals and diagnostic centres within the region of study. Ethical approval for the study was obtained from Human Research and Ethics Committee of Assurance Medical Diagnostic Center, Calabar.

Data for this study was collected using questionnaires. Questionnaires were previously given to experienced experts in the field of study to validate question wordings, question contents, response alternatives and other forms of validations to the questionnaire. Questionnaires were issued to 53 radiographers and 50 sonographers practicing in the above named hospitals. Out of these numbers, 48 and 45 questionnaires were retuned and accepted from radiographers and sonographers respectively. The questionnaires contained questions that provide demographic data and work characteristics, work description, postures maintained for prolonged periods, frequency of equipment use and areas of the body where the subjects (radiographer and sonographers) experienced pain/symptom and other necessary information. The information on pain experienced was restricted to four major areas of the body. This includes the neck, shoulders, low back and hand/wrist.

Respondents were asked to state the possible cause of the symptom(s) experienced. Exposures to the risk factors of MSSs were measured by the time spent per work day moving patients, standing, sitting or using computers and the postures taken to perform the normal daily task.

Data was analyzed using statistical package for social sciences (SPSS V. 16.0). Descriptive statistics was used to obtain the mean standard deviation and frequency of the variables studied while T-test and chi square were used to assess the significance of the demographic factors and work characteristics on the development of musculoskeletal symptoms. Correlation equations was used to examine the relationships between potential risk factors and MSSs. Statistical level of significance was $P \leq 0.05$.

Results

Out of the 48 radiographers and 45 sonographers that participated in the study, 76.3% complained of at least one episode of symptom. Low back pain was the most frequent complaint (52.6%) among the radiographers, while neck/ shoulder pains was the most frequent complaint among the sonographers (40.4%) followed by hand/wrist pains. Results showed that 66.8% of the respondents were prevented from performing their duty as a result of the symptoms experienced. The major risk factors were prolonged standing during prolonged duration of duty, lifting of patients and heavy equipment, overstretching of the neck/ shoulder following heavy work schedules and cold work environment. Some demographic and anthropometric variables such as gender, age and body mass index had significant association with occurrence of symptoms.

Table 1: Correlation (r, p) between job content/activity and occurrence of symptoms.

Activity	Low back Pain	Shoulder Pain	Neck pain	Hand/wrist Pain
Excessive standing/walking while on duty.	0.83 0.00	0.14 0.07	0.02 0.23	0.03 0.12
Lifting of heavy load/patients	0.88 0.00	0.25 0.04	0.01 0.32	0.53 0.03
Excessive stretching of the neck	0.01 0.32	0.17 0.06	0.81 0.00	0.07 0.26
Prolonged stretching of the shoulder	0.03 0.14	0.85 0.00	0.03 0.14	0.26 0.04
Excessive griping of object with the hand	0.01 0.32	0.34 0.04	0.02 0.23	0.74 0.01

Table 2: Severity of symptoms

Severity	Low back Pain	Shoulder pain	Neck pain	Hand/wrist Pain
Hospitalized due to symptoms	0%	0%	0%	0%
Changed duty temporally due to symptoms	9.0%	5.2%	17.4%	12.1%
Excused duty due to symptoms	60.7%	80.1%	70.7%	7.3%
Managed to work with	30.3%	14.7%	3.5%	80.6%

symptoms

Discussion

Excessive forces can trigger different pathophysiological processes depending on the tissues affected. It is the magnitude, duration and frequency of loading as well as the time for recovery which determine the physiological effect. Different symptoms in different body sites will depend on how far the physiological processes have advanced.

More than seventy six percent (76.3%) of the respondents complained of at least one episode of symptoms of musculoskeletal pains which occurred as a result of performance of their professional task. Low back (waist) pain was the most frequent complaint (52.6%); followed by neck/shoulder pains and hand/wrist pains. To date, low back pain remains the most prevalent and most common work related injury among health workers [25]. Other studies have reported low back pain as most common musculoskeletal pain among radiographers and other health workers [26 - 29].

The origin of most musculoskeletal disorders (MSDs) lies in a mismatch between the external load and the capacity of the human body to resist biomechanical and physiological strain [30]. The waist, being the center or fulcrum of the body is surrounded and suspended by muscles and ligaments which receive most of the impacts of these mechanical forces. The muscles produce the forces needed for different activities at work. The mechanical output of the human body is best in the neutral posture of the joints. The local forces acting on the tissues increase at the extreme postures and extreme limits of the joint movements. The capacity depends on individual factors such as body build and size, gender, age, and general health, and it weakens with age due to MSDs. In addition to the foregoing, gravity acts continuously on parts of the body and muscle force is needed to maintain certain body postures. Studies have shown that Mechanical forces are the most important factors placing stress onto the musculoskeletal system [30].

Several different physiological responses can account for the muscle pain related to muscular work [31]. By nature, muscle contraction means increased pressures within the muscles resulting in obstruction of blood flow in the vessels. Lack of blood flow (ischemia) is a potential cause of pain due to static contractions. With high muscular exertions, internal rupture of muscle cells is possible. In addition, the accumulation of Ca++ ions can cause cell damage [32].

Our results also show that some demographic and anthropometric variables such as gender, age and body mass index had significant association with occurrence of symptoms ($p < 0.05$). Females were twice more likely to suffer from MSS than their male counterpart irrespective of

age. This could be explained by the fact that the mean maximal muscle strength of women is about 2/3 of that of men, independent of body size [33, 34]. It therefore means that males have a higher capacity of the body to resist biomechanical and physiological strain than their female counterpart. The results show that 68.2% of the MSS occurred in people of 40 years and above. Age was therefore a factor for the occurrence of MSS. Studies have shown that muscle strength grows during adolescence but starts a gradual decrease before the age of 30 years. First this decrease is small but the decline increases with years and is about 8–16% per decade after approximately 50 years of age[33,34]

Factors which predisposed the respondents to the risks of MSSs from the study (as suggested by the respondents) include lifting of patients and equipments, prolonged standing/walking during prolong duty schedule, wrong postures and excessive work load. This finding is in consonant with that of Kumar et al., (2003)[35] who conducted a research on the biomechanical loads placed on x-ray technologists during a selected number of tasks such as pushing a mobile unit, lifting a patient from wheel chair to mention a few. Their studies concluded that the occurrence of musculoskeletal symptoms increases linearly with the tasks of x-ray technologists. On the other hand, Vahdati et al 2014[36], in their study, stated that No significant relationship was found between incidence of lower back pain and lifting of heavy loads. The environment and task encountered by individual radiographer/sonographer vary depending on the clinical specialty. Tasks in some clinical specialties may be associated with increased risk of developing a certain musculoskeletal symptoms than others. Sonographers, in our studies, had increased risk of developing neck and shoulder pain than low back pain while radiographers had increased risk of developing low back pain than neck pain. This is so because for the sonographers, most of the mechanical forces are exerted on the neck and shoulder as the muscles of these region are always stretched during the scanning process. The radiographers usually take some uncomfortable postures and repetitive movements like bending to lift the patient from wheel chair and positioning of the patients on the x-ray couch during radiographic examinations and therefore more prone to risk of low back pain. Bongers et al., (1993)[37] found out that there is an association between monotonous work, high workload, time pressure, poor work content, stress symptoms at work and the development of neck and shoulder pain.

Conclusion

Low back pain, neck/shoulder pains were the most common musculoskeletal symptoms experienced by radiographers and sonographers in Southern Nigeria. Although none of the respondent who experienced the symptoms was hospitalized, most of them were prevented from performing their normal duties due to the symptom(s) experienced. Adjusting working schedules (shifts), and modification of equipment design can reduce work-stress and consequently musculoskeletal symptoms.

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