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RESEARCH ARTICLE

PREVALENCE OF MUSCULOSKELETAL DISORDERS IN SONOGRAPHERS

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ABSTRACT

Background: Sonographers while carrying out a scan involve a series of awkward movements such as twisting the body, stretching and a combination of downward pressure, twisting and rotating the wrist of the hand operating the scan **Objective:** The objective of the study was to find out the prevalence of musculoskeletal disorders in sonographers. **Method:** 30 radiologists in the age group of 30-60 years with minimum 3 years of practice were included in the study. Subjects were assessed based on case record form and questionnaire. Pain was assessed using Numeric pain rating scale. **Results:** Out of 30 subjects, 17 had wrist pain, 16 had hand pain, 13 had lumbar pain, 11 had cervical pain, 09 had shoulder pain & 03 had elbow pain. **Conclusion:** In this study, it was found that radiologists had wrist pain, hand pain, lumbar pain, cervical pain, shoulder and elbow pain.

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INTRODUCTION

Sonographers carry out diagnostic tests in the areas of obstetrics, gynaecology, vascular, paediatrics and general investigations of soft tissues. They do this by means of a hand held transducer which is applied to the area needing investigation, linking to a scanning machine, which relays the images collected by the probe. Ultrasound machines also have a keyboard, used to record measurements relating to the images. Ergonomically, a Sonographer would be seated or standing within the reach of the machine's keyboard generally by a couch on which the patient is situated. Most Sonographers tend to hold the probe in their right hand, while manipulating the keyboard with the left, regardless of their handedness. Sometimes, the screen is moved to an angle where by the patient can see the images projected. It is reasonable to assume that Sonographers would be scanning and reporting for the majority of the work time, using similar muscle groups and posture. Sonographers experience particular problems because carrying out a scan involves a series of awkward movements such as twisting the body, stretching (operating keyboard and conducting scan simultaneously) and a combination of downward pressure, twisting and rotating the wrist of the hand operating the scan. The amount of downward pressure varies in relation to the size of the patient – more pressure is required when the patient id bigger.

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The resulting pressure points for Sonographers include the shoulder, wrist and elbow, resulting in strain injuries if not prevented early enough. Previous research and observations about how Sonographers work acknowledges that they have to "maintain various tortuous body positions to achieve the angles with the transducer necessary to access the structures being evaluated, to analyse blood flow and capture the information on videotape (Curry, 2014). There is no opportunity for the Sonographers to relax from these static postures or he or she risks the quality and accuracy of examination.

Similarly, a report by Carmel Murphy confirmed that "the tasks reported to aggravate musculoskeletal symptoms the most were applying sustained pressure on transducer, abduction of shoulder, sustained twisting of the neck and trunk and repetitive twisting of neck and trunk (Russo, 2002). Ultrasound exams require a peculiar type of muscular effort on the part of the sonographer. Tiny muscle tears that are the result of repetitive manipulations of the transducer, without adequate rest between exams, progress to more extensive muscular damage. The muscular damage can lead to career-ending injury.[3] The symptoms include inflammation and swelling, numbness, muscle spasm, burning and/or tingling, and loss of sensation. Some of these symptoms may cause a loss of muscle strength, making it difficult to hold a transducer (Jakes, 2001). Thus the aim of the study was to find out the prevalence of musculoskeletal disorders in sonographers.

METHODS

This study was conducted on radiographers who were posted in ultrasonography.

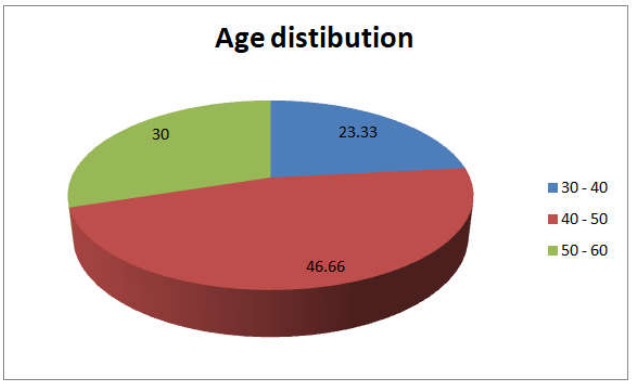
The study was conducted in various diagnostic centres with their prior permission. 30 sonographers in the age group of 30-60 years with minimum 3 years of practice were included in the study. Subjects were explained about the study and written consent was taken. Ethical committee approval was obtained. Subjects were assessed based on case record form and questionnaire. Pain was assessed using Numeric pain rating scale.

RESULTS

It can be seen from table 1 and graph 1that among 30 subjects, the percentage of the sonographers affected in the age group of 30 – 40 years is 23.33%, 40 – 50 years is 46.66% and 50 – 60 years is 30%. Table 2 & graph 2 shows that 20% of sonographers were affected in the 0 – 10 years of practice, 53.33% of sonographers were affected in the 10 – 20 years of practice & 26.67% of sonographers were affected in 20 & above years of practice. Table 3 & graph 3 shows that 30% of subjects took frequent short breaks and 70% of subjects took a single long break.

Table 1: Age distribution in the study

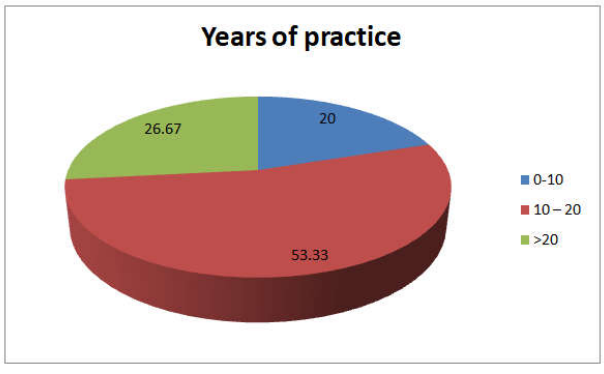
AGE	NO. OF SUBJECTS	PERCENTAGE OF SUBJECTS
30 – 40	07	23.33
40 – 50	14	46.66
50 – 60	09	30.00



Graph 1. Age distribution

Table 2. Years of practice in subjects

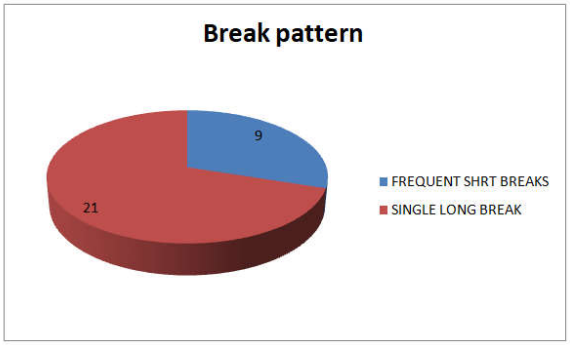
YEARS OF PRACTICE	NO.OF SUBJECTS	PERCENTAGE OF SUBJECTS
0-10	06	20.00
10 – 20	16	53.33
>20	08	26.67



Graph 2. Years of practice in subjects

Table 3. Break pattern in subjects

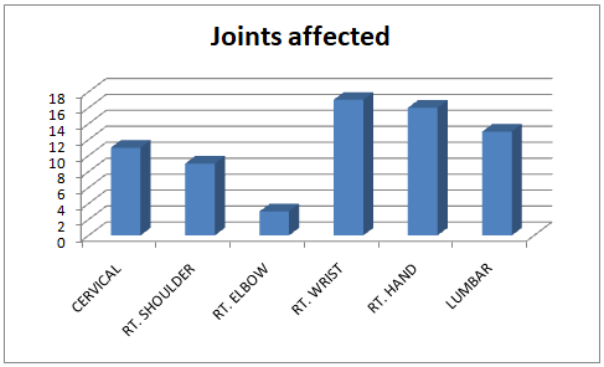
REST PERIODS	FREQUENT SHRT BREAKS	SINGLE LONG BREAK
NO. OF SUBJECTS	09	21
PERCENTAGE	30%	70%



Graph 3. Break pattern in subjects

Table 4. Affected joints in subjects

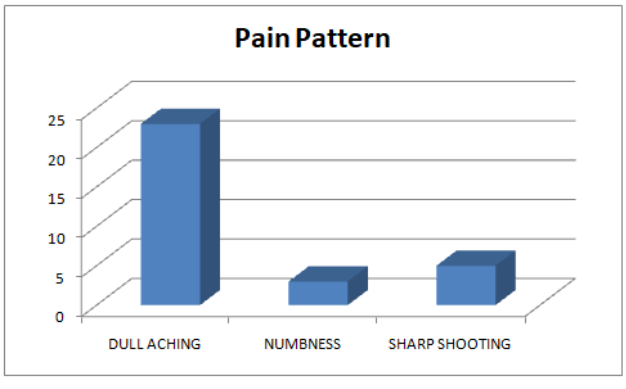
JOINTS AFFECTED	NO.OF SUBJECTS
CERVICAL	11
RT. SHOULDER	09
RT. ELBOW	03
RT. WRIST	17
RT. HAND	16
LUMBAR	13



Graph 4. Affected joints in subjects

Table 5. Pain pattern in subjects

TYPE OF PAIN	DULL ACHING	NUMBNESS	SHARP SHOOTING
NO. OF SUBJECTS	23	03	04



Graph 5. Pain pattern in subjects

Out of 30 subjects, 17 had wrist pain, 16 had hand pain, 13 had lumbar pain, 11 had cervical pain, 09 had shoulder pain & 03 had elbow pain. Also, 23 subjects experienced dull aching pain, 3 subjects experienced numbness and 4 subjects experienced sharp shooting pain.

DISCUSSION

In this study, Radiologists were assessed for prevalence of their musculoskeletal disorders. 17 subjects had wrist pain, which maybe due the continuous wrist flexion posture to be attained during ultrasonography. The distal carpals glides on the relatively fixed proximal bones. Metacarpals are firmly attached to wrist extensor muscles, because of the laxity of ligaments and muscles, they experience wrist pain. 13 subjects had lumbar pain and 11 subjects had cervical pain. This could be explained due to the prolonged forward sitting posture. Forward bending causes increase in the distance of line of gravity from axis of rotation at the head, neck and trunk, thus moment increases. It requires more muscle activity and soft tissue tension to maintain the equilibrium. Awkward working postures and continuous forward bending of neck results in overuse and weakness of neck and back extensors. Along with these, ligamentous and muscular strain with increased discal pressure contribute to cervical and low back pain. 09 subjects had shoulder pain. 03 subjects had elbow pain. Continuous assumption of semi flexed and pronated position of elbow while moving the transducer with any support, causing repetitive microtrauma. Based on this study, the ergonomic advice to be recommended to Radiologists are, Chairs should have cervical and lumbar support and should have a revolving base with adjustable height at the level of patient's bed level. Typically, more a joint deviates from neutral position, greater the risk of injury. Radiologists should their scanning arm as close as possible to the body. Elbow should be be at their side, with thumb facing up and forearm parallel to the floor.

During procedure, it is recommended to stop for mini breaks. Relax muscles by activities like opening and closing fists, rolling shoulders and turning hand from side to side. When viewing ultrasound machine from a seated position, maintain approximately 24"distance from monitor. The normal viewing angle should not be more than 15 degree below the horizon (seated), viewing angles from left to right should be 30 degree. If doing sonography in standing , the bed height should be at the level of Anterior Superior Iliac Crest. Arm should not be suspended while scanning, should have proper arm support. If standing for prolonged time, keep the forward foot over a low stool. While handling the probe, have a relaxed grip. Visual display unit should be at eye level only. Take short frequent breaks instead of a long break.

Conclusion

In this study, it was found that radiologists had wrist pain, hand pain, lumbar pain, cervical pain, shoulder and elbow pain.

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