

THE SOCIETY OF
RADIOGRAPHERS



THE CAUSES OF

**MUSCULOSKELETAL
INJURY AMONGST
SONOGRAPHERS**

IN THE UK

Society of Radiographers, June 2002



THE CAUSES OF MUSCULOSKELETAL INJURY AMONGST SONOGRAPHERS

IN THE UK

Eleanor Ransom, Society of Radiographers, June 2002

TABLE OF CONTENTS

BACKGROUND.....	03
WHAT IS MUSCULOSKELETAL INJURY?	04
PREVIOUS RESEARCH	05
METHOD	06
FINDINGS AND DISCUSSION	06
Age range.....	06
Employment History	07
Working patterns	07
The Injuries	08
Diagnosis by medical practitioners	11
Occupational Health.....	12
Sick leave.....	12
Support from employer	13
Support from trade union.....	14
Risk Assessments and Health and Safety Law.....	14
Health and Safety information	18
Rest breaks.....	19
Factors contributing to injury.....	21
CONCLUSIONS	23
Lack of Health and Safety organization	23
Lack of control over the pace of work.....	24
Unsuitable equipment	24
RECOMMENDATIONS	24
Risk Assessments	24
More breaks, less pressure	24
Job design	25
REFERENCES.....	26
ANNEX A - SONOGRAPHERS AND UPPER LIMB DISORDERS questionnaire	27
ANNEX B - Risk Filter.....	31



BACKGROUND

SONOGRAPHY AS A FULL-TIME JOB in the UK is relatively young. In the USA it was recognized as a separate profession in 1974, but in the UK, the state-registered profession is radiography, of which sonography is a specialism. Sonography has been used as a diagnostic tool in clinical practice for about 40 years, but it is only from about 15-20 years ago that radiographers in the UK have practiced sonography as a full-time occupation.

A radiographer who has first obtained a degree after three or four years of full-time study would be employed as an entry grade radiographer. However, opportunities arise to specialize and, in the case of sonography, this is by way of further study towards an ultrasound qualification. It is theoretically possible for a radiographer to study for a post-graduate ultrasound qualification without first practicing as a radiographer, but this is not usually the case.

The ultrasound qualification, the Diploma in Medical Ultrasound, which was a professional qualification from the College of Radiographers, was phased out in 1996, when a government initiative moved all healthcare-related education to higher education institutions and radiography became a degree-entry profession. The DMU was replaced by a Postgraduate Certificate, Diploma or Masters in Ultrasound, which takes between one year and eighteen months to complete. The advent of these new qualifications in 1993 gradually replaced the obsolete DMU qualification.

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, linked 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 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 whether they are right- or left-handed. Sometimes, the screen is moved to an angle whereby the patient can see the images projected.

The number of actual scans performed per day is usually governed by a list of patients, plus ward and emergency additions. Most sonographers also report on their findings, typically either on a computer or by hand. The duration of the scans depend on the type of scan being carried out and the complexity of the information gathered from the images. It is reasonable to assume that full-time sonographers would be scanning and reporting for the majority of their working time, using similar muscle groups and posture.

Sonography has been used as a diagnostic tool in clinical practice for about 40 years, but it is only from about 15-20 years ago that radiographers in the UK have practiced sonography as a full-time occupation.



WHAT IS MUSCULOSKELETAL INJURY?

The term musculoskeletal injury covers a range of conditions affecting the tendons and muscles in the hand, wrist, arm, neck and back, which can be caused by repetitive or awkward movements to the fingers, hand or arms.

In the USA, the National Institute for Occupational Safety and Health (NIOSH) acknowledged that “overexertion injuries, such as low back pain, tendonitis, and carpal tunnel syndrome, are often associated with job tasks that include: (1) repetitive, stereotyped movement about the joints; (2) forceful manual exertions; (3) lifting; (4) awkward and/or static work postures; (5) direct pressure on nerves and soft tissues; (6) work in cold environments; or (7) whole-body or segmental vibration. The risk of injury appears to increase as the intensity and duration of exposures to these factors increase and recovery time is reduced.”

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 is bigger. The resulting pressure points for an sonographer include the shoulder, elbow and wrist, 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 assess the structures being evaluated, to analyse blood flow, and capture this information on videotape. There is no opportunity for the sonographer to relax from these static postures or he or she risks the quality and accuracy of the examination. For example, most examinations require the sonographer to lean across the patient’s body without shoulder or elbow support to view organs on the patient’s left side”. (Baker, 2001)

Similarly, a report by Carmel Murphy (Murphy, 2000) confirmed that “the tasks reported to aggravate musculoskeletal symptoms the most were applying sustained pressure on the transducer; abduction of the shoulder; sustained twisting of the neck and trunk; and repetitive twisting of the neck and trunk”.

An NHS Ergonomist, Mary Leete, from Addenbrookes Hospital, suggested that she had observed sonographers working and noted problems with the wrist position from gripping the transducer as well as ergonomic issues with prolonged abduction of the scanning arm and little or no back support.

There are two broad types of musculoskeletal injury, localized or diffuse. A localized injury is confined to one particular part of the body, such as the wrist, and the site of injury is usually apparent, for example a tendon. The sufferer will experience symptoms usually in that area only. Examples of localized conditions include inflammation of a specific tendon (tendonitis) or at a tendon insertion (e.g. lateral epicondylitis or tennis elbow), nerve entrapment syndromes (e.g. carpal tunnel syndrome) and inflammation of a specific tendon sheath (tenosynovitis).

Diffuse conditions are much less well understood and are characterized by muscle discomfort, pain, burning and/or tingling. Although identifiable areas of tenderness are usually present in the muscles, it may not be apparent exactly where the injury has occurred due to the diffuse nature of the symptoms. Diffuse injuries are more common than localized ones, and, whereas localized conditions can be treated using methods such as steroid injections, ultrasound, acupuncture or a carpal tunnel release operation, diffuse conditions may need a variety of methods, including looking at the work process, social environment, ergonomic considerations and relaxation techniques. The two categories of injury often overlap and diffuse conditions can often mimic localized ones, for example, diffuse muscle discomfort in the shoulder area may present itself as discomfort in the arms due to the way nerves and muscles in the shoulder, neck and upper arms are organized. (TUC 1994)

It is important to realize that symptoms do not necessarily follow a specific pattern or take the same length of time to become severe. The development of musculoskeletal injury usually involves a variety of factors, rather than just one. This leads to some confusion when trying to diagnose an individual’s condition in the early stages, as there are several symptoms and factors common to musculoskeletal injury and to muscle fatigue, as both:

- are related to work intensity and duration
- increase with the intensity and duration of work
- result in pain and impair work performance
- are often unreported
- involve mechanical and physiological processes and possibly stress at work
- may be caused by several factors.

However, there are also significant differences between musculoskeletal injury and muscle fatigue, which enable the conditions to be correctly diagnosed. Musculoskeletal injury takes much longer to recover from, while



muscle fatigue should cease within minutes of stopping the activity that has caused it or, in extreme cases, after a night's rest. When symptoms continue through to the next day, it may be a sign that the condition is not merely muscle fatigue, but something more serious.

The following describes the symptoms of musculoskeletal injury.

STAGE 1 (MILD): The first symptoms are a dull pain or a tingling sensation in the affected area, which gets better when rested. At this stage, the condition is reversible and is known as threatened over-use injury.

STAGE 2 (MODERATE): If the condition is left unchecked at the mild stage, recurrent pain, aching and tiredness will occur earlier in the working day and will persist at night, possibly disturbing sleep. There may be a visible swelling. The condition may be reversible at this stage, but only by complete rest from the task that has brought on the injury in the first place.

STAGE 3 (SEVERE): The pain, along with weakness and fatigue, can be felt even when resting completely. Sleep can be disturbed and it may not be possible to carry out even the most mundane tasks at home or work. This stage may result in permanent disability.

When NIOSH in the USA performed an ergonomic evaluation of sonographers at St Peter's University Hospital, New Jersey, they saw that the design and lack of adjustability of work station and equipment components led to awkward postures of the shoulder and wrist, long reaches, sustained static forces and pinch grips. (Habes and Baron, 1999)

The Society of Radiographers has been aware anecdotally of the musculoskeletal discomfort associated with working as a sonographer for some time and has represented individuals in the past. However, it has been difficult to prove the connection between the activity and injury in many cases, due to the fact that upper-limb injuries are often diffuse and can also occur as a result of other activities or age degeneration.

In order to try to show a connection it was decided to conduct two studies – one, by Janice Miles, into the prevalence of musculoskeletal injury among sonographers in the UK; and this study of sonographers suffering from such injury. It is believed that the evidence from these studies will both help sonography departments to prevent further injury in the future and also assist in claims for damages cases.

PREVIOUS RESEARCH

There has been little previous research carried out in the UK regarding musculoskeletal injury amongst sonographers, but the following is a summary of research findings to date.

In 1997, the Society of Radiographers carried out a limited study into the prevalence of musculoskeletal injury among radiographers, which indicated that up to 71 per cent of all radiographers experienced symptoms of pain and discomfort they believed were associated with their work. A more scientific and larger study into musculoskeletal injury among radiographers was carried out in 2000, which showed that 70 per cent of all radiographers and 79 per cent of sonographers suffered. There was a higher prevalence of wrist and shoulder pain among sonographers than among radiographers in total (Arrowsmith, 2000). The study concluded that the reasons for injury were the intensive workload, poor equipment design and lack of training and awareness, amongst both staff and employers.

A later UK study of 300 sonographers concluded that the prevalence of overall musculoskeletal problems in British sonographers is high (89 per cent), with 84 per cent complaining of symptoms in the neck and upper limb. Main risk factors appeared to be related to the poor work postures and sustained muscle exertions involved during an ultrasound examination, exacerbated by poor equipment design and job organization factors. (Feather, 2001)

A study of sonographers in the West Midlands (Grant and Cattell, 2002) showed that 93.3 per cent of respondents had experienced symptoms and concluded that there was an overwhelming need for changes to equipment and working practices. This research also indicated a problem with the space available to sonographers for reporting purposes, with 61.2 per cent identifying that there was inappropriate space to enable them to report in comfort.

In a combined survey of sonographers in Canada and the USA and an assessment of ultrasound tasks conducted by the Healthcare Benefit Trust in Canada, the results clearly indicated the high prevalence of musculoskeletal symptoms among sonographers, with a higher level of discomfort experienced in the shoulder, neck, low back, wrist and hand/fingers. The clinical study indicated that several ergonomic risk factors



contributed to the discomfort experienced, encompassing engineering controls (equipment and workstation design and layout), administrative controls (work organization and practices) and individual controls (risk identification and control, training and education). (Murphy and Russo, 2000)

A further Canadian study (CSDMS 1999) found that 87 per cent of respondents had pain and discomfort at some time during their career for an average period of four years and that the majority of symptoms involved the shoulder, neck, wrist and upper back. Australian research (Gregory 1998) concluded that musculoskeletal injuries affect about 80 per cent of sonographers, representing a serious health hazard. In Italy, a study also found an 80 per cent prevalence rate of injuries. (Magnavita 1999)

Baker (2000) concluded that eight out of ten sonographers were scanning in pain and one out of five sustained a career-ending injury, caused by combinations of rapid repetitive movement, overuse, excessive force, poor posture, improper positioning, compounded by stress.

In a review of Baker's research, Chapman-Jones (2001) concluded that managers should "undertake a serious review of working practices to avoid a flood of occupational induced musculoskeletal disorder compensatory claims".

METHOD

Interviews were conducted with 55 sonographers throughout the UK, 53 (96.4 per cent) of them female, who were suffering from musculoskeletal injuries they believed were caused through work. Questions were asked regarding employment history, employment as sonographers, patterns of work, location and type of pain, medical diagnosis and remedy, attitude of the employer towards the injury and towards health and safety at work, risk assessments and rest breaks. A copy of the questionnaire is attached at Annex A.

Most interviews were carried out either at the sonographer's place of work or at their home, although some were held in locations other than those for reasons of either convenience or confidentiality. The interviews took from 30 minutes to one hour and detailed notes were taken. In some cases, several members of the same department were interviewed, if they identified themselves as sufferers.

FINDINGS AND DISCUSSION

AGE RANGE

The sonographers were asked to give their date of birth and it was found that their ages ranged from 25 to over 60 years old. It is theoretically possible, in cases where students have gone to study for a post-graduate qualification in ultrasound without first practicing as a radiographer, for a qualified sonographer to be as young as 22, but in the experience of the Society, it is usual for a newly-qualified radiographer to practice first before proceeding to an ultrasound qualification.

Table 1: Sonographers and WRULDs - age range of sufferers

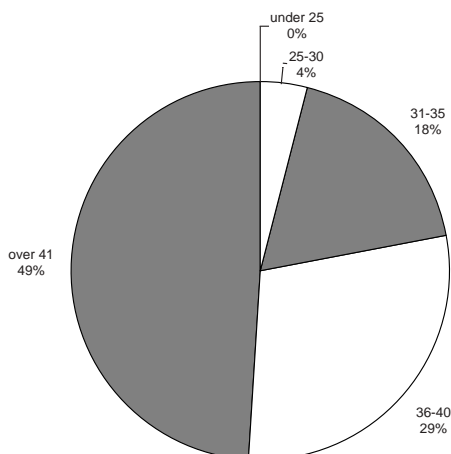


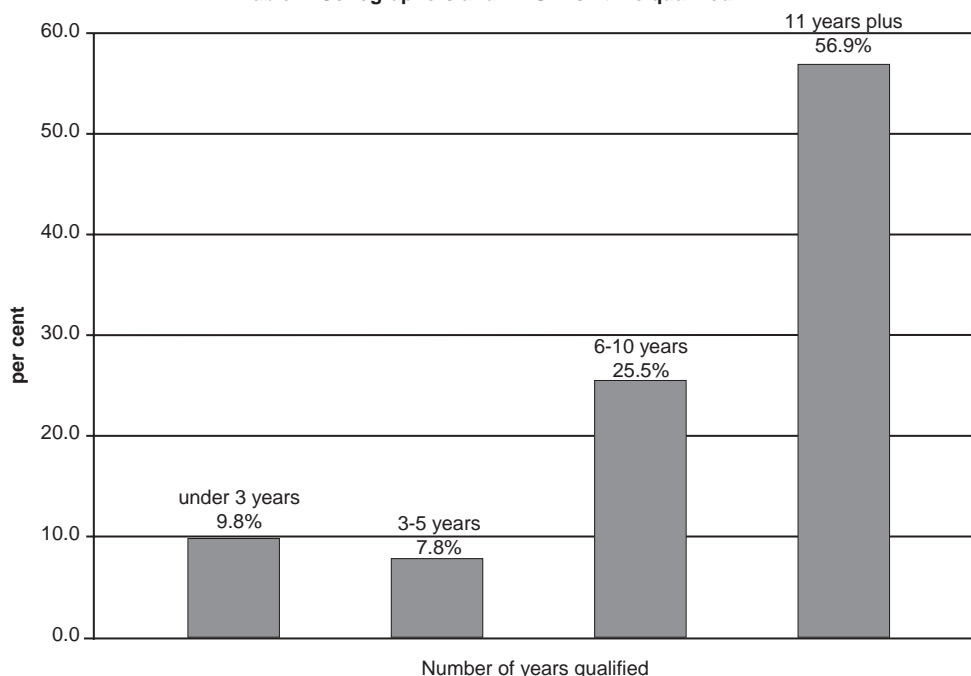
Table 1 shows the age range of those interviewed. It can be seen that the majority are aged 40 or under (51 per cent), making it unlikely that all the injuries in the sample could be explained away by natural degeneration. One of the best known musculoskeletal injuries is Carpal Tunnel Syndrome, a painful and disabling disorder characterized by inflammation and swelling in the tendons that run through the narrow carpal tunnel in the wrist. It is recognized that if Carpal Tunnel Syndrome were to develop naturally, it would do so in the fifties and sixties.



EMPLOYMENT HISTORY

All of the interviewees had previously qualified and worked as a radiographer prior to undertaking an ultrasound qualification. The amount of time they had worked as sonographers since qualification in that field varied from under 3 years to over 11 years (Table 2). However, a significant minority (17.6 per cent) of the respondents had been practicing as a qualified sonographer for five years or less and had already experienced problems with injury.

Table 2: Sonographers and WRULDs - time qualified



WORKING PATTERNS

Most of the sample (87 per cent) worked as full-time sonographers (Table 3), suggesting that there may be a correlation between length of time spent scanning and the amount of suffering. This is further borne out by Table 4, in which it can be seen that 84 per cent spent over six hours per day scanning patients.

Table 3: Sonographers and WRULDs - part-time and full-time

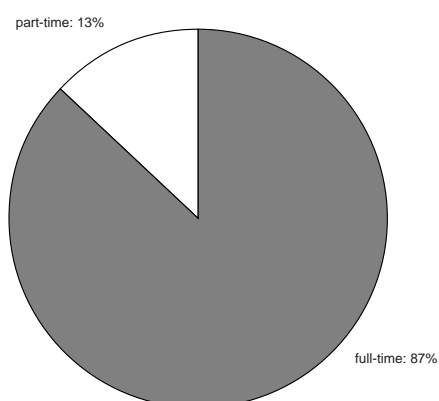
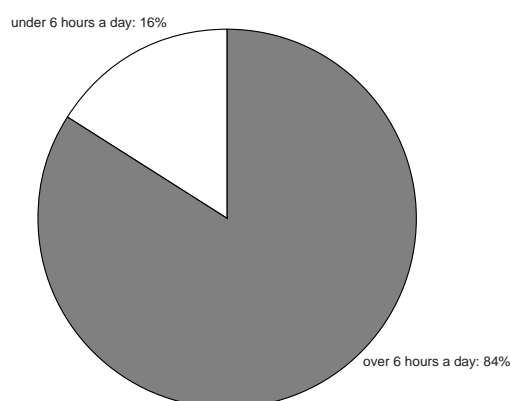


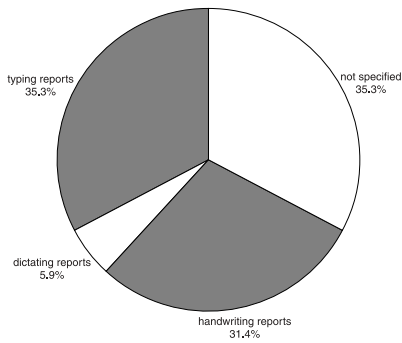
Table 4: Sonographers and WRULDs - time scanning



As referred to earlier in this report, as well as a list of patients, sonographers are often slotting in emergency and ward patients. Most respondents' working patterns followed a similar pattern: bring the patient into the scanning room; perform the scan (varying in length from 5 minutes to as much as 60 minutes in a complex procedure); showing patient out of the room; handwriting or typing the report; referring the patient on to a doctor or nurse or making a decision; showing next patient in, etc. Table 5 shows that 35.3 per cent of respondents typed reports on a computer and 31.4 per cent wrote reports by hand, using similar muscle groups to those utilized in scanning.



Table 5: Sonographers and WRULDs - Method of producing reports



In obstetrics, it is quite normal to perform in the region of 20 scans per day, beginning at around 9 am, breaking for lunch, and then continuing until 4.30 or 5 pm. In addition, sonographers are exposed to stressful situations, such as giving bad news to patients in the event of problems shown by the scan.

One respondent likened the working pattern to a “conveyor belt” and another said it was “like a cattle market”. A further respondent working in paediatrics said “By June 1999, hip numbers had crested to 35 plus per day as the norm. After scanning 38 patients in the Wednesday hip clinic, I attended for work the next day but was unable to perform due to pain.”

THE INJURIES

Table 6: Sonographers and WRULDs - sites of pain

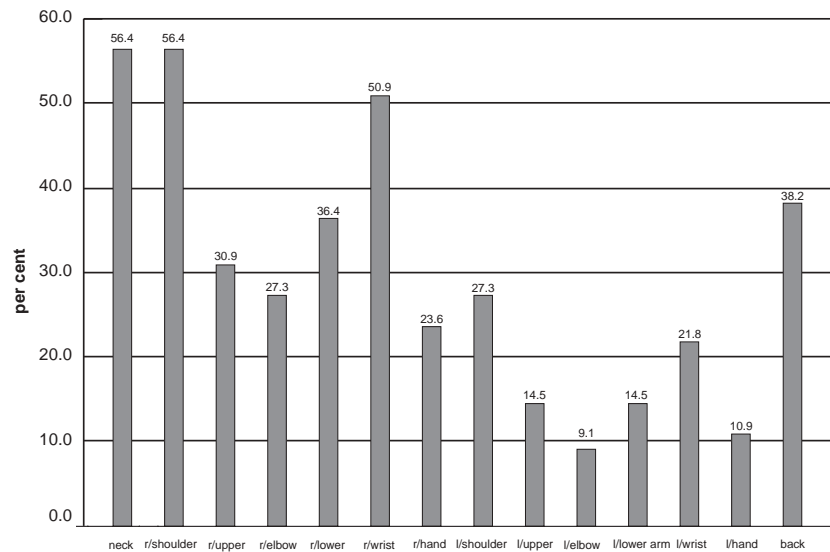
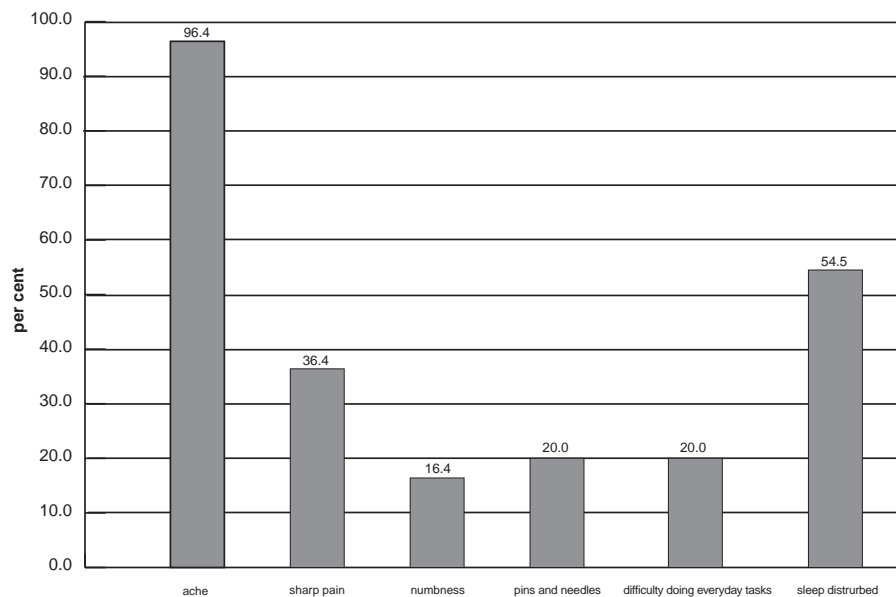


Table 6 shows where the interviewees experienced pain. It can be seen that in the majority of cases, the pain appears to manifest itself in the actual scanning arm – usually the neck, right shoulder, right arm and wrist (49 respondents or 89 per cent). However, a significant minority (15 or 27.3 per cent) experienced pain on the left

Table 7: Sonographers and WRULDs - type of pain





side, either in addition to the right arm or instead of, suggesting that there are also problems with the ergonomics of keying in information at the same time as scanning.

Almost all of the sample (96.4 per cent) had experienced aching (Table 7), over one third (36.4 per cent) had experienced sharp pain, 16.4 per cent had had numbness and one in five experienced difficulty in carrying out everyday tasks. Over half (54.5 per cent) of respondents found that their sleep was disturbed by the pain.

Of those who reported pain with the right side, one respondent said that her sleep had been regularly disturbed since 1983 – “I wake with one arm numb, turn over and awake 20 minutes later with the other arm numb”. Some reported that the muscles were overdeveloped in the right arm or weakened with overuse. Pins and needles appeared to precede sensations of complete numbness.

A respondent who had problems with gripping the transducer said that because she had to keep scanning in the same place with no movement for some time, her fingers started locking. Another said that scanning the apex of the heart, which involved pressure and small movements, resulted in her wrist locking.

For one respondent, the pain had become so severe that she had had to give up swimming and had difficulty in sleeping for at least 4-6 months. Another described it as being “like a toothache”.

Of the minority of respondents who had reported pain in the left arm, one had started with severe pain in the right wrist, but now suffers with pain in the left shoulder joint. Another could not do simple everyday things sometimes because of the pain in the left wrist. Yet another experienced sudden pain in the left shoulder joint during an anomaly scan, which got so intense, she could not continue. A small number of those experiencing pain in the left side did so because they scanned left-handed, but this is not true in all cases, as some specified that it was their non-scanning arm which was causing problems.

There appears to be little doubt that scanning exacerbated the painful condition – one respondent stated that the pain had almost completely ceased since stopping scanning and another said “my arm improved gradually over time once I stopped the hip clinic, and I feel it had regained normality although it did not feel as strong as previously”.

It is well documented that the pain caused by this type of injury tends to creep up on a victim to such an extent that it is often difficult to realize there is a potential injury until a more serious stage is reached.

A typical reaction was that the pain had “started as hardly anything – noticed it when doing everyday tasks, for example, lifting and opening doors. Eventually I started to notice the pain when scanning.”

One respondent said that the pain “begins as heaviness in the shoulders, developing into cramp type pain in the neck and right shoulder. By mid afternoon I have an annoying upper limb tremor after heavy sessions during weight loaded upper limb abduction”. Another said, although neck and shoulder pain had begun in 1983, this increased with limitation of neck movement and by 1998 she was in constant pain from elbow to hand even when not at work. More recently, her right hand often became numb whilst scanning and she had to stop for a few seconds. Yet another said it started with a dull ache in the muscles around the scapula and shoulder joint, but it got “so bad that it hurt to lift my arm and affected my driving.”

This respondent describes the pain thus – “I was really suffering at work, even on full dose Ibuprofen. I had a CVA patient on a trolley, and whilst trying to scan his liver intercostally, I began to cry because my right wrist was so tired/painful that I could not hold the probe properly. I told the patient I had hayfever and finished the scan using my left hand.”

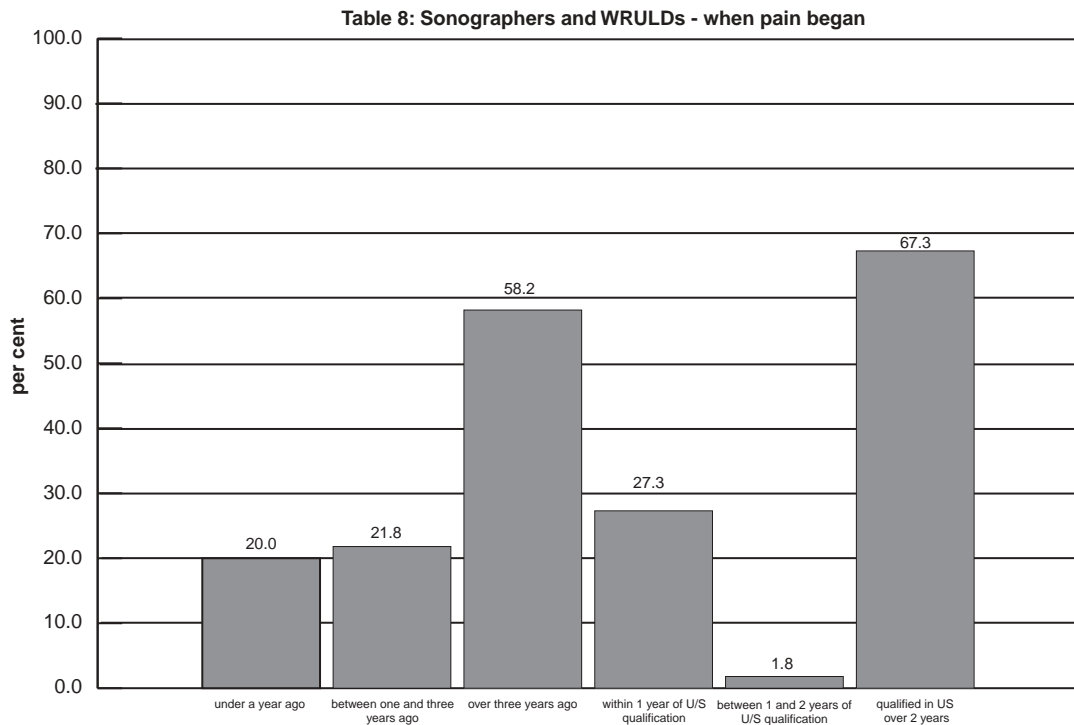
In some cases, the condition had become so severe that medical retirement was the only option. One such respondent said that even after being medically retired for two years after one year’s sick leave “I don’t lead a normal life. I can’t do as much housework and 15 minutes of gardening causes dreadful problems. Shopping has to be the one bit of activity in a day and I can’t sit for periods of time – I haven’t been to the cinema or theatre for years and I can’t even sit and read a book.”

Occasionally the onset of the initial pain had been experienced suddenly – one respondent said “I woke up in the middle of the night with pain in my right shoulder, which had spread to my neck within a year”.



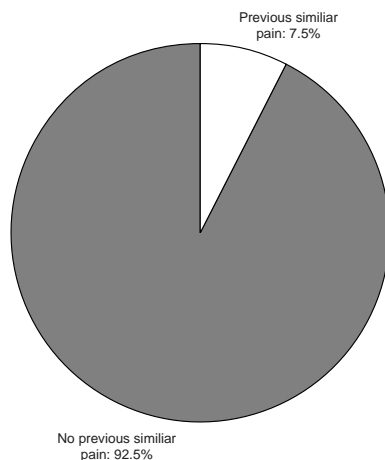
Other respondents had failed to notice that something was wrong until they found themselves unable to do something – one said she noticed she could not play badminton, and after a period of being very short-staffed and doing extra work, she could not even pick up a cup of tea.

In the case of the sonographers interviewed, the period of time that had lapsed between first noticing something was wrong to realising they were injured varied from under one year to over three years. Table 8 also shows that over one quarter (27.3 per cent) of respondents said their pain had begun within one year of qualifying as a sonographer.



It is significant for the purposes of this research that only four of the interviewees (7.5 per cent) had experienced any similar pain previously to becoming a sonographer (see Table 9). In all but one case where there was a history of tennis elbow, the previous injury had been unrelated and caused by whiplash experienced in accidents.

Table 9: Sonographers and WRULDs - previous pain



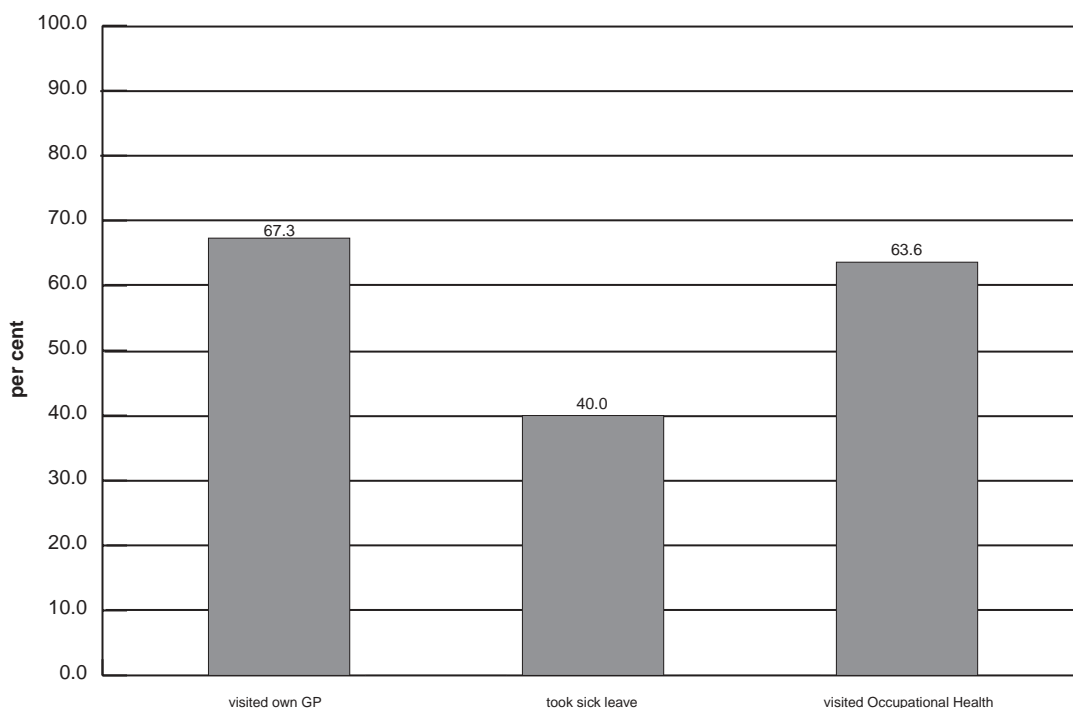
As many as 52 (94.5 per cent) respondents knew of other sufferers in their department, ranging from a quarter of their colleagues to everyone in the department.



DIAGNOSIS BY MEDICAL PRACTITIONERS

Table 10 indicates that the majority of sufferers interviewed had taken their injury seriously enough to visit their own GP (67.3 per cent) and/or their employer's Occupational Health Service (63.6 per cent). Over one third (40 per cent) had had to resort to taking sick leave, owing to their incapacity to work normally.

Table 10: Sonographers and WRULDs - seriousness of injury



It is evident from the survey results that there were problems with diagnosis by GPs. Many GPs did not initially diagnose work-related problems or even a form of strain injury. Out of 37 respondents who had visited their GP, in 16 cases (43.2 per cent) their GPs had diagnosed a form of strain injury, such as tendonitis, carpal tunnel syndrome or tennis elbow; and in 10 cases (27 per cent) they had opined that the injury was due to the nature of work

One respondent reported that her GP had referred her to a rheumatologist, who thought she had osteoporosis and sent her for a bone density scan. However, when this turned out to be normal, the rheumatologist implied she was imagining things. This echoes the explanation of “hysteria” offered in Australia some years ago where the number of women reporting symptoms of repetitive strain injury due to working on electronic keyboards had increased. Another GP thought a respondent’s condition was spondylosis, but the x-ray showed this not to be the case. A further respondent’s GP sent her for an x-ray for arthritis, but once again the x-ray showed nothing abnormal. Many GPs did not give a specific diagnosis, but advised rest and sometimes painkillers.

However, there were some good examples of GPs getting it right, as illustrated by the figures quoted above. In one case, the respondent said her GP had said she had a “nasty case of tennis and golfers elbow, which was clearly work-related.” She added to me that she did not play either tennis or golf!

Of those who did not visit their GP, there were a variety of reasons, ranging from “quicker to self refer to Occupational Health” to “I’m scared I will be signed off sick and there are not enough staff”. One respondent stated “I felt very stressed because no-one likes to admit they can’t do something, and there is still a stigma attached – especially if your colleagues aren’t suffering (yet). I was just admitting to myself that I needed to go off sick when one of my colleagues, whose neck was obviously really bad, beat me to it. Only too aware of the pressure I would leave those left working under if I went off too, I continued to work, in tears, for the rest of the day.”



OCCUPATIONAL HEALTH

With regard to visiting occupational health, there was also a wide range of experience. Occupational health staff often were reported as being perplexed and ignorant of the condition. In some cases, they merely told the sonographer to go to their GP. One respondent said that occupational health “didn’t do much; just concerned in getting me back to work and not interested in the injury”. Another respondent said that the occupational health department had told them that the injury came with the job, but they could come back in two months if it was still bothering them. A further Occupational Health Department told one sufferer that they did not associate themselves with injuries or strains like this.

However, in a small number of cases (6), Occupational Health had been very supportive and had made positive recommendations as to how work practices could be modified to help the situation. For example, one respondent said her occupational health department had made a positive effort to talk to staff regarding posture and to look at the way in which staff scanned. In another example, the occupational health department had been very supportive and had talked about possible redeployment with protected salary.

Some respondents had been referred, either by their GP or Occupational Health, for physiotherapy and in most cases this had helped, especially when this could be done on a regular basis.

SICK LEAVE

Of those who took sick leave (22 or 40 per cent), this ranged from a few weeks through to medical retirement because of disability. Almost without exception, respondents felt uncomfortable about taking sick leave because of staffing problems within the department. In the case of one respondent, who had to take medical retirement in her thirties, the stress of the job, subsequently being off sick and ultimately of being medically retired, led to her being prescribed anti-depressants. Although she was lucky enough to get a place at university to study something different, she is classified as a disabled student and feels this may hamper her chances of employment in the future.

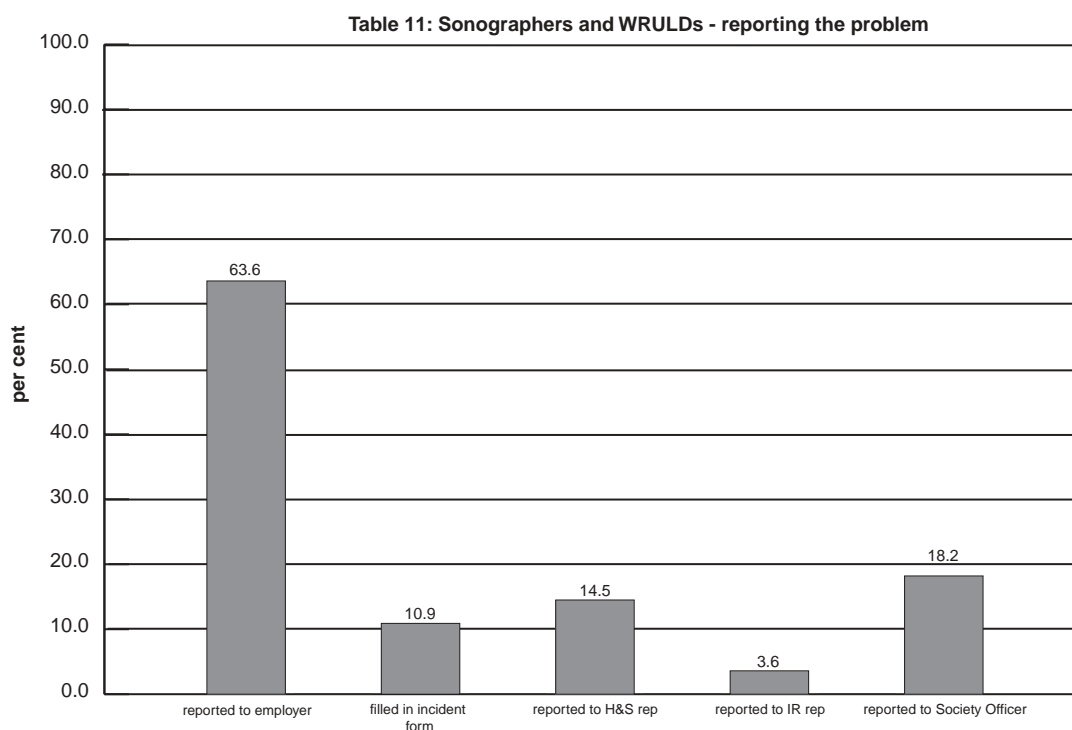
Many respondents reported a lack of sympathy from the employer when they returned from sick leave. One respondent said “What I find most objectionable is that although Occupational Health and Radiology managers agreed (in fact, stipulated) that I must re-integrate gradually up to full-time, I was expected to use annual leave for the time I was not at work”.

In the case of one respondent who was medically retired, she said “I had to contact the employer to discuss the situation – I felt like a discarded machine.”



SUPPORT FROM EMPLOYER

Although Table 11 shows that 63.6 per cent of respondents had reported the problem to their employer, again there were a variety of responses, ranging from “my employer admitted the condition was work-related and was very supportive. There was no pressure to return to work until I was better”; through “no reaction”; to “lack of understanding of RSI led her to be less than helpful on a couple of occasions”. One respondent said “have complained to my Ultrasound department superintendent for at least 6 months about the increasing difficulty and pain with TV scanning. No action taken or reduction in workload. Only took action by seeing Radiologist for me to have a scan, when finally I was in tears from pain.”



Of those who had not notified the employer, it is reasonable to assume that the employer would expect work to carry on as normal, even though this would be to the detriment of the sufferer. The consequences of not reporting injury to the employer are enormous, as the injury would then be allowed to worsen. In some responses, the sonographers said the employer had known there was a problem, but had adopted a “head in sand” attitude.

Some respondents had not reported the injury to the employer because of the pressure of work and in the knowledge that nothing would get done. Others were afraid their job would be at risk if they complained, causing respondents to suffer in silence rather than to admit their injury. A respondent commented “I feel some of this is my own fault as I should have made complaints about my pain and too heavy a workload. We all seem to be too conscientious and worry about patients waiting for too long at the expense of taking breaks.” A different respondent referred to the pressure of work as “emotional blackmail”.

One respondent in her mid thirties commented “Complained to x-ray superintendent several months ago on separate occasions about pain and problems with TV scanning. Did not take anything I said seriously, made jokes about getting old. Would not do any risk assessment. When I told him I had to take time off after seeing Surgeon he commented that it was a good way of getting Christmas and New Year off work!”

In a different trust, a respondent said “It took a long time for the department to take my injury seriously. It was only when it seemed there might be some legal action taken that they started to take the problem seriously.”

An effective way of ensuring the issue is formally brought to the employer’s attention is by the sufferer filling in an incident form. However, this had happened in only 6 cases (10.9 per cent), due mainly to lack of knowledge that such forms could be used for reporting an injury such as this. Of those who had filled in a form, one respondent said they did so “every time the clinic was overbooked”.



SUPPORT FROM TRADE UNION

Only a small percentage of interviewees had sought help from the Society of Radiographers, with 14.5 per cent reporting to their local Health and Safety Rep, 3.6 per cent to their local IR Rep and 18.2 per cent reporting to a Society Official. These low figures should be of some concern to the trade union, although there had been some publicity in the Society's magazine in the past, pointing out to members the importance of health and safety in the workplace and advising them to seek help from the union if necessary.

Communication with the Society appeared to cause some difficulty – one respondent said “it's impossible to contact anyone at the Society!” In some cases, respondents had said they had not felt the Society had been very supportive, even when they had sought help.

However, there were also good comments from some who had sought help, where the Society had looked into industrial and personal injuries claims and had helped to negotiate better working arrangements.

RISK ASSESSMENTS AND HEALTH AND SAFETY LAW

Risk assessment is the process of identifying what hazards exist in a workplace and how likely it is that these hazards will cause harm to employees and others, in order to determine what prevention or control measures are needed.

The Management of Health and Safety at Work Regulations 1999 set out the employer's main risk assessment duties as follows:

- Make a suitable and sufficient assessment of risks to the health and safety of employees and others who may be affected
- Identify any preventive and protective measures needed
- Introduce the preventive and protective measures needed to improve health and safety in the workplace
- Review assessment regularly or if there is reason to believe that they are no longer valid – for example, if the process has changed or the workplace has been refurbished
- Keep a written record, where there are five or more employees, of the findings of the assessment and any groups of employees who are particularly at risk
- Have arrangements for effective planning, organization, control, monitoring and review of preventive and protective measures
- Provide any health surveillance identified in the risk assessment
- Appoint competent people to assist the employer
- Establish procedures to be followed in the event of serious and imminent danger
- Provide health and safety information, instruction and training for all employees
- Consult with health and safety reps



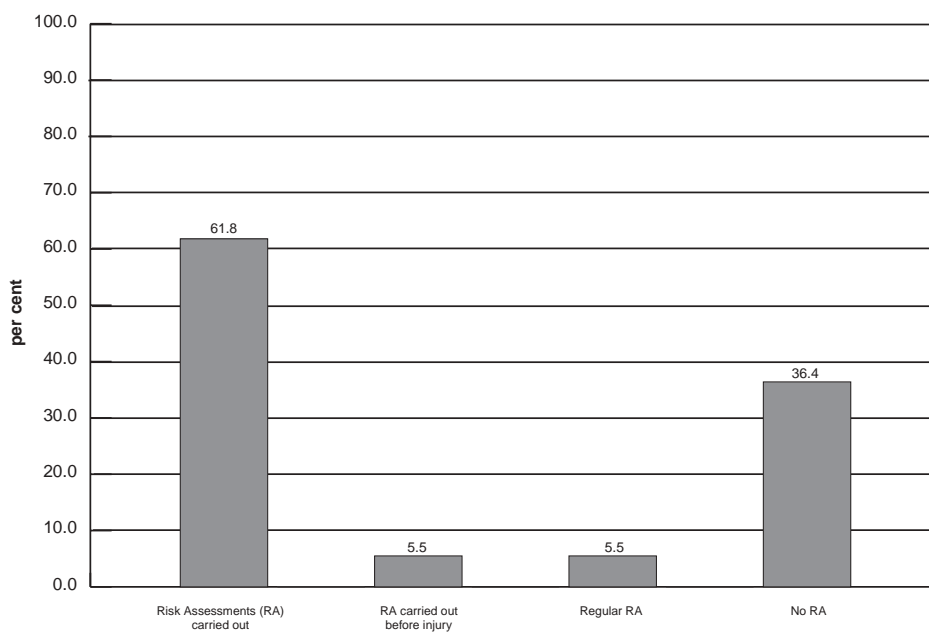
Table 12 shows that in 61.8 per cent of cases, risk assessments had been carried out. However, only 5.5 per cent of them had these been carried out prior to injury presenting itself. There were examples of only partial assessments being done – one respondent said that an assessment had been made in respect of pregnant workers, but not for others. Another said that an assessment had been carried out only in the x-ray department, but that the maternity department, which was felt to be worse ergonomically, had not been assessed.

One respondent said that their employer had been asked to carry out a risk assessment, but had said that there was no-one suitably qualified in ergonomics to do it. Yet another said assessments were only carried out if someone raised problems.

The majority of risk assessments had not been carried out until a problem had been raised, and comments were typically that they had not happened until the sonographer had gone off sick or that the employer was “thinking about it now”. In the case of one respondent, a risk assessment had only been carried out two months following her return to work after extended sick leave.

Regular risk assessments had only been carried out in 5.5 per cent of the interviewees’ workplaces. No assessment at all had been carried out in 36.4 per cent of workplaces, despite the fact that these are required by law.

Table 12: Sonographers and WRULDs - risk assessments

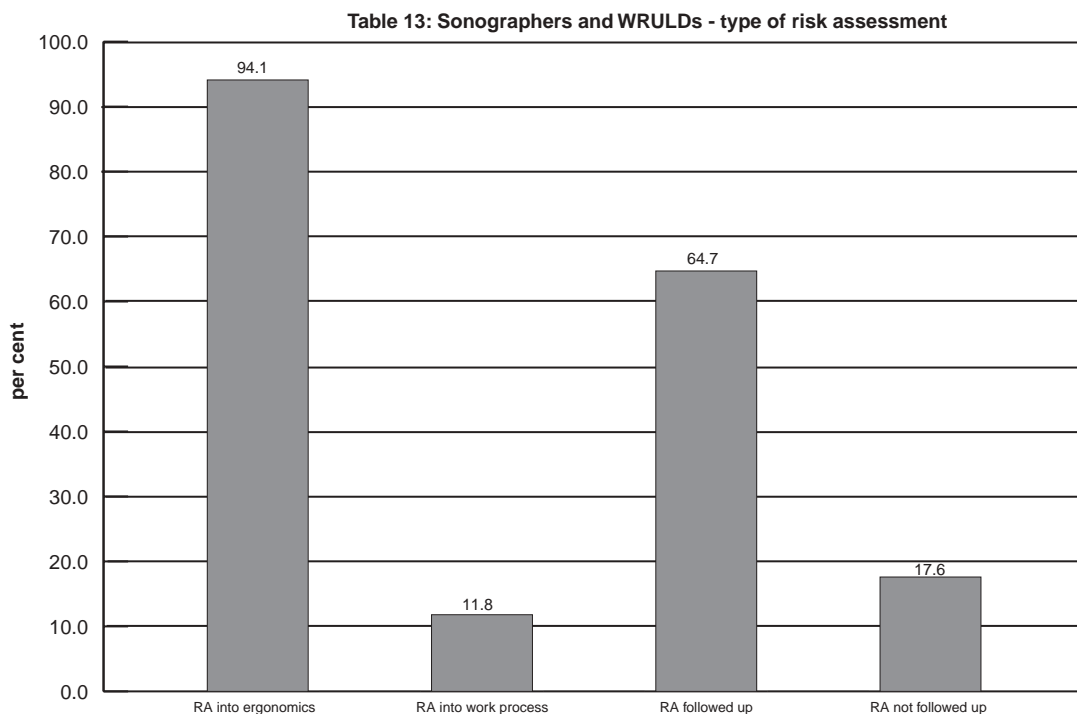




Of those employers who had carried out risk assessments, 94.1 per cent had looked at the ergonomics of scanning, but only 11.8 per cent had looked at the whole work process (Table 13). Some lifting and handling assessments had been carried out, but this is only part of the story as the biggest portion of the process involves repeated awkward movements and body posture and continuous working with no breaks.

Those employers which had asked questions about the work process came up with some useful recommendations, such as two people scanning, three rooms and two lists and more breaks. However, as with the recommendations for adjustable tables, better seating and slave monitors, the main barrier to acting on those recommendations appears to have been lack of funding. In 64.7 per cent of cases, recommendations had been followed up, but many had taken a long time to come to fruition because of budgetary problems. In 17.6 per cent of cases, recommendations had simply not been followed up. This raises serious issues where injuries are concerned, as the longer the status quo is maintained, the more serious the injury is likely to become.

Under the Health and Safety at Work Act 1974 (HASAWA), an employer is responsible for providing a safe working environment and safe systems of work. The Management of Health and Safety at Work Regulations 1999 (MHSWR) extended the duties of employers under HASAWA to assess risks arising out of work activities or undertakings. There are further specific requirements set out in the Display Screen Equipment Regulations 1992 (DSE Regs).



This research also shows that many trusts do not identify sonographers as VDU users under the Display Screen Equipment (DSE) Regulations 1992. Table 14 shows that only 16 respondents (29.1 per cent) had been recognized by their employer as VDU users.

The DSE Regulations refer to “display screen equipment” as meaning any alphanumeric or graphic display screen, regardless of the display process involved. Accompanying guidance explains this statement further, stating the Regulations cover both conventional (cathode ray tube) VDUs and other processes such as liquid crystal displays and any emerging technologies. The definition is not limited to typical office VDUs and can apply to display screens which show line drawings, graphs, charts, computer generated graphics, text and numbers.



Regulation 1 defines a user as “an employee who habitually uses DSE as a significant part of his (sic) normal work”. The Health and Safety Executive (HSE) guidance says it is generally appropriate to classify a person as a user if most of the following apply:-

- a) **the individual depends on a VDU to do the job, as alternative means are not readily available to achieve the same results;**
- b) **the individual has no discretion as to the use/non-use of the VDU;**
- c) **the individual needs significant training and/or particular skills in the use of DSE;**
- d) **the VDU is normally used by the individual for continuous spells of an hour or more at a time;**
- e) **the individual uses the VDU in this way more or less daily;**
- f) **fast transfer of information between the user and screen is an important requirement of the job;**
- g) **the performance requirements of the system demand high levels of attention and concentration by the user, for example where the consequences of error may be crucial.**

Based on the above criteria, the Society considers sonographers definitely to be users, along with radiographers who use computerized patient record systems, radiographers working in MRI, CT, therapy and angiography.

At the time of the HSE’s consultation on the DSE Regulations, there were strong misgivings among those consulted that employers would try to avoid the necessity to comply with the legislation by arguing that certain operators do not fall within the HSE’s remit of ‘user’. This has indeed happened within the NHS, where managers argue that because point d) in the list above does not apply to sonographers, they are not users. However, it is clear that most of the other points do apply and this managerial attitude has been challenged in the past by Health and Safety reps and their views upheld by the HSE.

THE LAW SAYS:-

- employers are required to carry out a suitable analysis of workstations to assess the health and safety risks to people using them and to make changes if risks are identified;
- guidance on workstation minimum requirements, as laid down by the HSE, should be complied with;
- the employer has to plan work activities of VDU users to incorporate frequent breaks;
- regulation 5 requires employers to provide users, on request, with an appropriate eye and eyesight test (including a vision test and eye examination by a registered ophthalmic optician or a registered medical practitioner) before commencing VDU work and at regular intervals or if they experience visual difficulties attributable to the work. The provision of tests and of any corrective appliances prescribed specifically for VDU work must be paid for by the employer;
- employers must provide health and safety training and re-training when modifications are introduced such as changes to hardware, software, workstation, environment and job. Training should be aimed in particular at reducing or minimizing musculoskeletal problems, visual fatigue and mental stress;
- employers have to provide information on health and safety risks, which should include reminders and measures taken to reduce risks and how to make use of them.



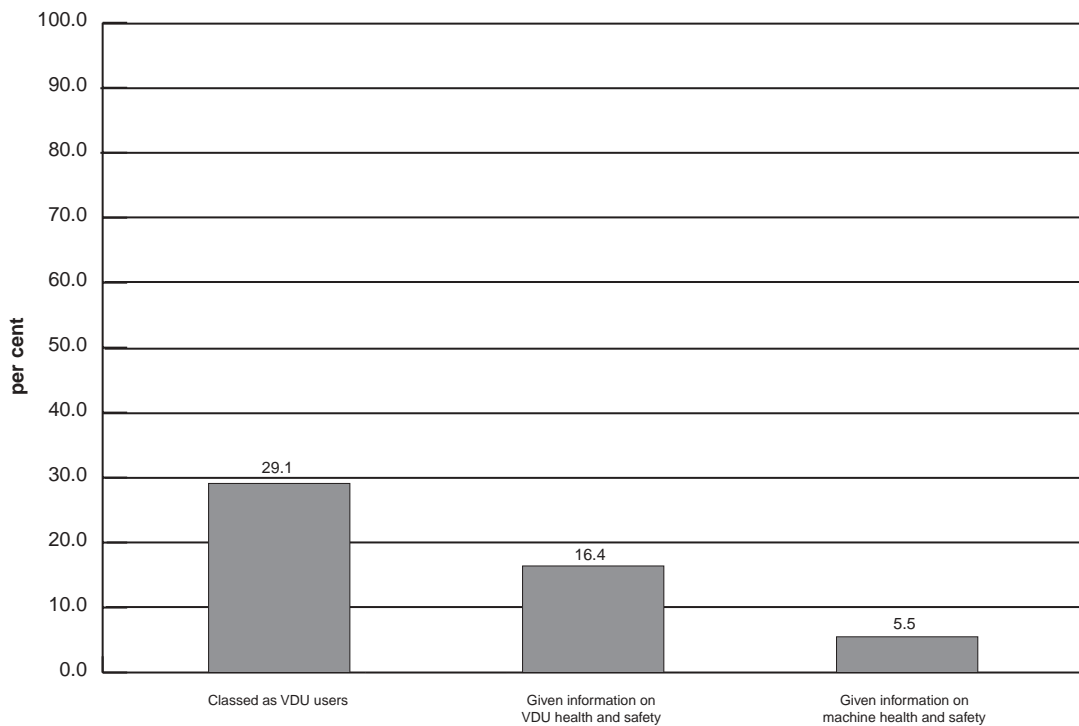
HEALTH AND SAFETY INFORMATION

The importance of adequate information and training provision cannot be emphasized too highly, especially regarding health and safety aspects of operating VDUs. It is very much in an employer's interest to educate employees in how to avoid problems, as it can work out to be very expensive in terms of employee absence and claims for damages to compensate later for injuries resulting from operating the equipment.

Annex B to the Regulations sets out possible effects on health which employers have a duty to protect employees from – these include upper limb disorders and stress. The Annex states that the range of symptoms attributable to VDU use often reflects bodily fatigue and can be prevented “by applying ergonomic principles to the design, selection and installation of display screen equipment, the design of the workstation, and the organisation of the task”.

It is obvious from the interviewees' responses (Table 14) that in only a small number of cases had the employer given employees any information on VDU health and safety (16.4 per cent) or on health and safety aspects of operating ultrasound machines (5.5 per cent). Given that adequate information and training are important safeguards against injury, this suggests that many employers are still not complying with Health and Safety Law.

Table 14: Sonographers and WRULDs - health and safety information

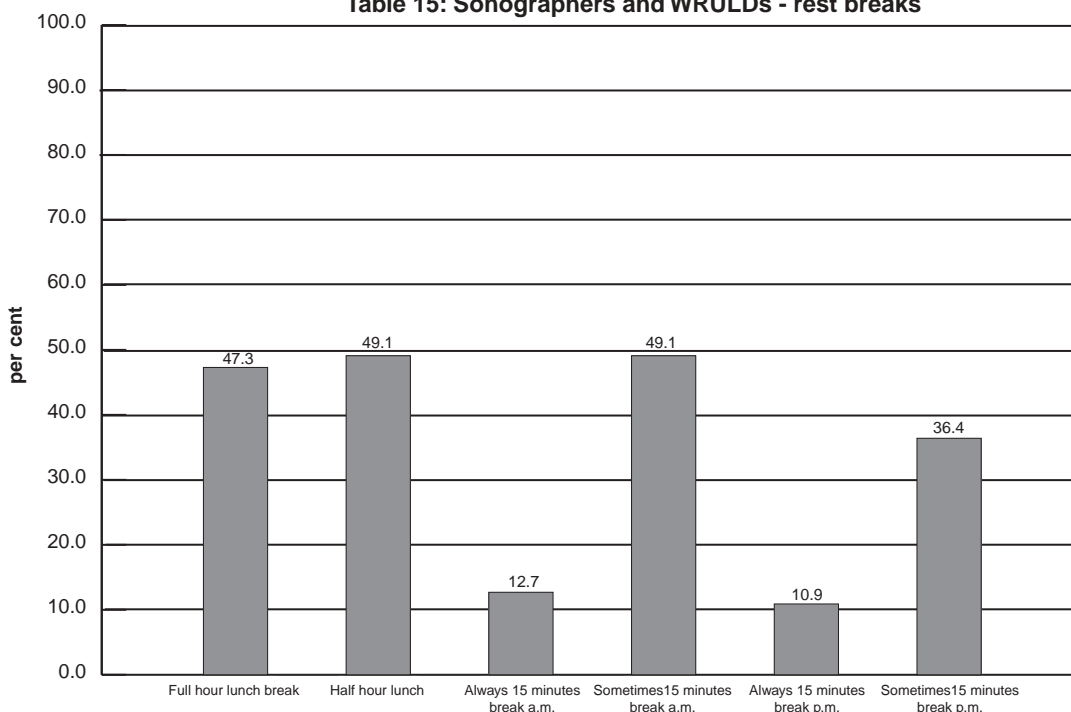




REST BREAKS

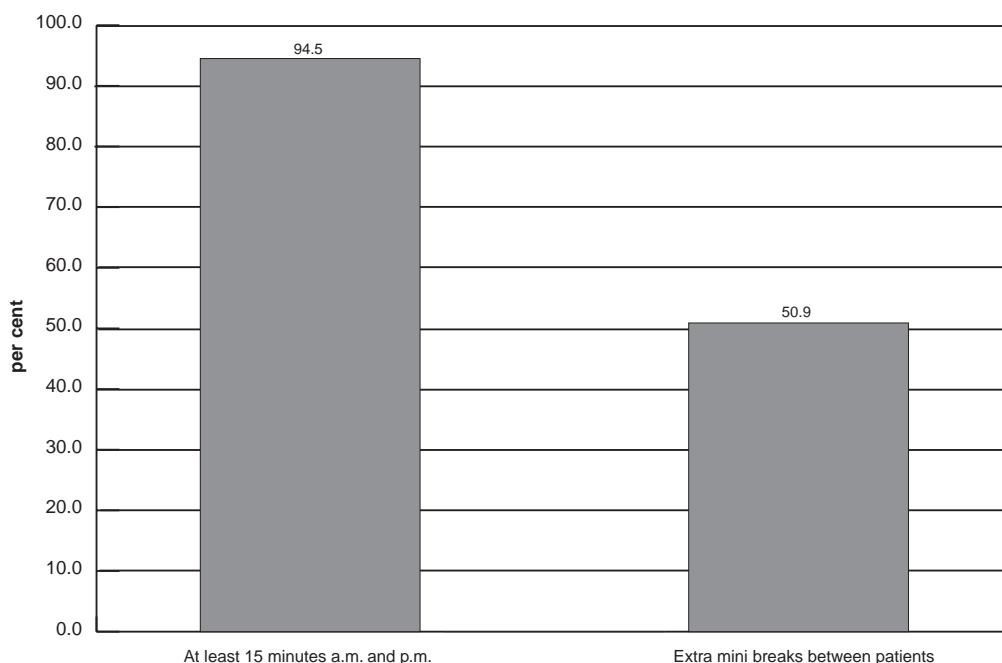
Table 15 shows that under half the respondents managed to take a full hour's lunch break, with 49.1 per cent only having half an hour. Similarly, only the minority always managed to take a 15 minute break in the morning (12.7 per cent) and in the afternoon (10.9 per cent), largely due to pressure of work. Perhaps more alarmingly, under half of the interviewees even sometimes managed to take those breaks. This means that more than half of the respondents were scanning either all morning or all afternoon or both without a break other than lunch. One respondent said "rest breaks? Dream on! If we were lucky we got a lunch hour, but usually it was only half an hour to 40 minutes".

Table 15: Sonographers and WRULDs - rest breaks



When we turn to Table 16, however, 94.5 per cent of respondents stated they would like at least one 15 minute break in the morning and again in the afternoon, while 50.9 per cent said they would like extra mini breaks between patients.

Table 16: Sonographers and WRULDs - ideal rest breaks





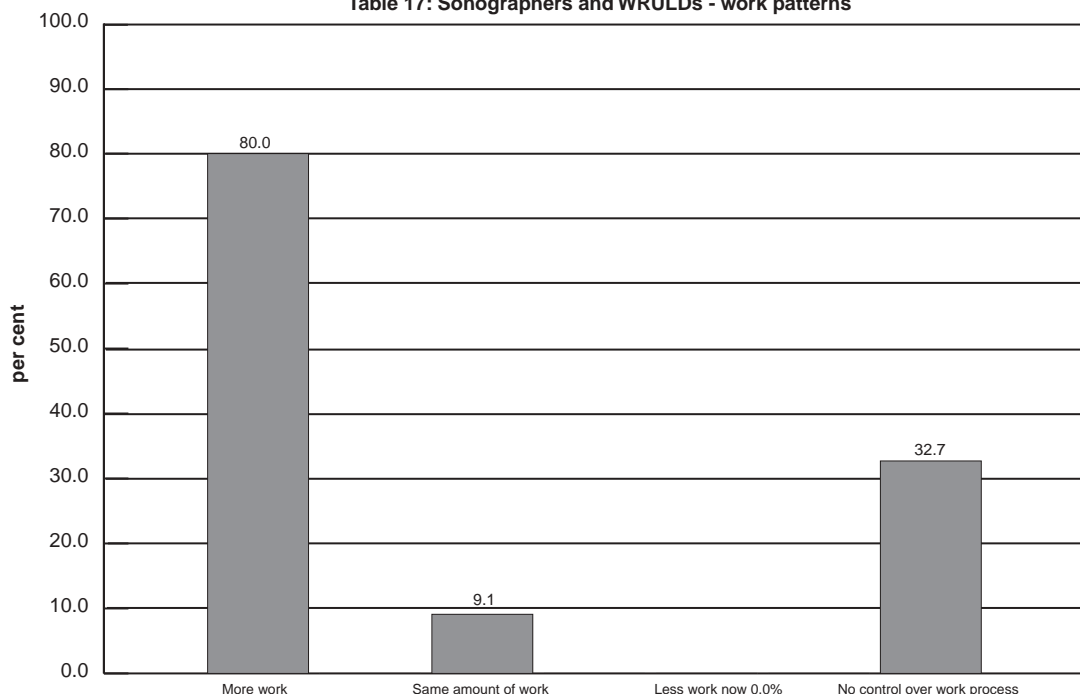
There is a specific requirement to provide DSE users with rest breaks. Under the DSE Regulations, Regulation 4 states that “Every employer shall so plan the activities of users at work in his (sic) undertaking that their daily work on display screen equipment is periodically interrupted by such breaks or changes of activity as reduce their workload at that equipment.”

THE HSE GUIDANCE STATES THAT:-

- where possible, jobs should be designed to consist of a mix of screen-based and non screen-based work to prevent fatigue and to vary visual and mental demands. Any activities carried out during breaks from the VDU should be of a different character;
- “breaks should be taken before the onset of fatigue, not in order to recuperate and when performance is at a maximum, before productivity reduces. The timing of the break is more important than its length;
- “breaks or changes of activity should be included in working time. They should reduce the workload at the screen, i.e. should not result in a higher pace or intensity of work on account of their introduction;
- “short, frequent breaks are more satisfactory than occasional, longer breaks: e.g. a 5-10 minute break after 50-60 minutes continuous screen and/or keyboard work is likely to be better than a 15 minute break every 2 hours;
- “if possible, breaks should be taken away from the screen;
- “informal breaks, that is time spent not viewing the screen (e.g. on other tasks), appear from study evidence to be more effective in relieving visual fatigue than formal rest breaks;
- “wherever practicable, users should be allowed some discretion as to how they carry out tasks; individual control over the nature and pace of work allows optimal distribution of effort over the working day.”

In the interviews, some sonographers stated that pressure of work and lack of staff led to them working more intensively. Table 17 indicates that 80 per cent of the sample believed there to be more work to do currently, while only 9.1 per cent said the amount of work was the same as it’s always been and no-one said there was now less work. Almost one third of respondents (32.7 per cent) identified the fact that they had no control over the work process. One respondent said that “more appointment spaces have been created for patients to fit more onto a list. The superintendent was told by the Radiology manager that we weren’t scanning enough patients per machine, although we thought we did.” Another said “within a year we needed extra staff, but there was always not enough staff for the work. Expectations of patients increased and the culture was that we couldn’t say no, we’re too busy – we felt like machines”. A further respondent said “I felt as though I was trapped behind the machine – I couldn’t even get up between scans.”

Table 17: Sonographers and WRULDs - work patterns





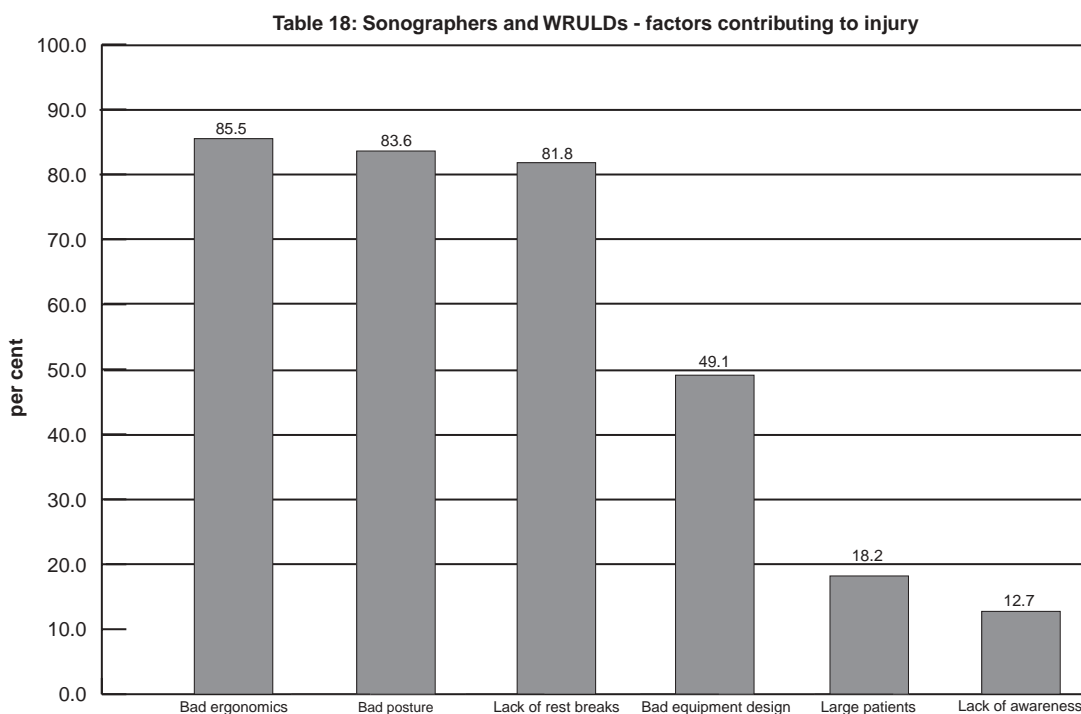
Some employers appeared to believe that reporting on scans and escorting patients in and out of the room were sufficient breaks from scanning. However, especially in those respondents who reported on a computer or by hand, the activities carried out are too similar to those of scanning to be credible as resting.

The importance of general all-round fitness is not disputed in preventing musculoskeletal injury, and some respondents had taken it upon themselves to exercise regularly, go to a gym or some other kind of activity. Many had already been fit before they had experienced an injury. However, unless this is combined with frequent breaks in scanning activity, it is unlikely to be enough to cure an injury once it presents itself, or even to prevent the injury in the first place.

FACTORS CONTRIBUTING TO INJURY

Interviewees were invited to identify in their own words those factors they believed had contributed to their injuries.

Table 18 shows that the vast majority believed that bad ergonomics (85.5 per cent), bad posture (83.6 per cent) and lack of rest breaks (81.8 per cent) had been major contributory factors. Other factors raised included bad equipment design (49.1 per cent), large patients (18.2 per cent) and lack of awareness, both of the employer and the employee (12.7 per cent).



Ergonomics is clearly of great importance where working with machinery is concerned. In the case of DSE users, workstations have to comply with regulations and risk assessments must take this into consideration. However, ergonomic consideration appears to be relatively unusual in the case of respondents. One respondent said that a bucket chair had been provided in one instance and that the equipment was so badly designed that it was not possible to put the knees under it. Another said that there was simply not enough time between scans to adjust the equipment so that it was comfortable for the user. Some respondents were convinced that manufacturers did not take account of how user-friendly the equipment would be and that it was unsuitable and cumbersome. It appeared that older equipment was worse than newer machines, but that all presented ergonomic difficulty.

Additionally, employers were still using unadjustable couches and chairs, making it very difficult to adapt the equipment to the user. One respondent said that one couch “had originally been recovered from a skip!” Often the space is too cramped to have room to adjust the equipment. There were problems with the shape of the probe, sometimes necessitating a pincer-like grip for long periods of time.

Posture is important when carrying out any task and a high percentage of respondents felt that theirs was less than ideal. One respondent said that they were in an “incorrect position whilst scanning, plus twisting and



unnatural movements. Often scans were long and unnatural positions had to be maintained for long period.” Another said she was forever “leaning over, trying to insert trans-vaginal probe and manipulate keyboard and see the screen at the same time”. Prolonged periods of upper limb abduction, with weight loading to the scanning arm, was cited by many as a problem as well as holding the neck, arm and shoulder in the same place for long periods.

For those who were expected to report on their scans onto a computer, they had not been allocated sufficient space to type in comfort, thus exacerbating their upper-limb problems.

The pressure under which sonographers perform their duties has been recorded earlier in this report and rest breaks are often curtailed or omitted completely. If a sonographer is not allowed to rest adequately, it is little wonder that injuries are likely to occur. One respondent said that their breaks were not rostered in any more, due to a more intense work schedule. Another said that she got stressed physically and mentally if she was busy.

The problem with scanning large patients is that more pressure has to be applied in order to get a clear image. Recent research has shown that the population in the UK is generally getting more obese (National Audit Office 2001). This leads to more strain on the arm and shoulder muscles of the sonographer and more likelihood of injury. One respondent, who subsequently became a manager of the department, has found that the only way to combat this problem was to instruct sonographers not to attempt to obtain perfect scans on larger patients and to explain in as tactful a way possible the difficulty.

Although health and safety legislation has been in place for a number of years, there appeared to be widespread ignorance of the possible consequences of not carrying out risk assessments on the health of workers. This suggests that many departmental heads may not be receiving relevant health and safety training in the first place. Many colleagues had not been affected by injury also were not aware of the potential problems and gave little sympathy when they manifested themselves in the department.

The despair felt by sufferers is apparent – one respondent said “if I am to look after my wrist I am probably going to have to move jobs – find somewhere I can scan part of the time left-handed and where the workload is much more varied” and others had considered moving profession altogether. One had moved from sonography to general radiography after experiencing injury, but found this job much less stimulating or rewarding. Another said that management’s initial solution had been “to put me back into the main department, but by this stage I had not done any general radiography for about 8 years and so strongly resisted this move.” For many respondents who had chosen sonography as a career, the fact that they had become injured was a bitter disappointment and a threat to their continuing their chosen career path.

Although health and safety legislation has been in place for a number of years, there appeared to be widespread ignorance of the possible consequences of not carrying out risk assessments on the health of workers.



CONCLUSIONS

The three main conclusions this research comes to are that there is a lack of health and safety organization in the workplace; lack of control over the pace of work; and the use of equipment which is not ergonomically designed with the user in mind.

LACK OF HEALTH AND SAFETY ORGANIZATION

The findings of the survey point to a disproportionate lack of health and safety organization and assessment of risk in the workplace, demonstrated by numerous problems with ergonomics, posture and process. These problems would have been highlighted in legally required risk assessments and subject to adequate controls to at least minimize the risk as far as possible. One likely cause of the lack of organization within the department is that heads of department may not have been aware that they were responsible for seeing that risk assessments were carried out, due to lack of communication and information from the employer.

Although risk assessments have specifically been referred to in legislation since 1993, over one third of respondents identified that none had ever been carried out in their workplace. More alarmingly, very few employers (5.5 per cent) had carried out assessments until a problem with injury presented itself. It is unlikely that the risk of musculoskeletal injury would occur to sonographers or managers without a suitable and sufficient risk assessment being carried out.

The nature of the assessments carried out in many cases was inadequate – in some cases only a lifting and handling assessment was done and, although most of the employers that had carried out assessments look at the ergonomics of scanning (94.1 per cent), very few (11.8 per cent) had also considered the whole work process of being a sonographer. This brings into question whether the assessments done were indeed “suitable and sufficient”, as the legislation requires.

Where assessments had been carried out in many cases any recommendations were either not followed up or took a long time to be followed up, largely due to funding restrictions. This would increase the likelihood of injuries progressing from the curable to the disabling stages.

The lack of information and training into the health and safety aspects of carrying out the job was mostly lacking, with only 16.4 per cent of employers giving staff information on the DSE Regulations and only 5.5 per cent giving information relating to the safe operation of ultrasound machines. If sonographers do not have the risks pointed out to them by the employer, it is unlikely that the hazards would occur to them until the aches and pains started to appear.

LACK OF CONTROL OVER THE PACE OF WORK

As reported under the previous point, very few employers considered the whole process of scanning over a substantial period of time, for example a whole day. This has serious implications, as carrying out two fifteen minute scans an hour would be unlikely to carry the same level of risk as performing four, as there would be more time to recover between scans.

Four out of five respondents identified the fact that they were working under more pressure now than they used to be, as the number of patients increased disproportionately to the increase in staffing levels. There were many respondents who were reluctant to take sick leave, because of the adverse impact this would have on those sonographers remaining in the department. This would also be true when staff took annual or maternity leave.

Because sonography is a patient-led occupation, there is an element of moral pressure to provide the best possible service to patients with the least possible delay. Often this pressure is also applied to the department manager from above and passed on to individual sonographers accordingly.

Many respondents (49.1 per cent) did not even manage to take a full hour’s break at lunchtime, let alone morning and afternoon breaks due to pressure of work. Activities squeezed in between scanning one patient and the next were often of a similar type, such as reporting on scans, with or without the help of a computer.

Pressure of work often leads to the sonographer feeling stressed. This in itself presents a hazard, but in combination with the problems already faced by respondents, stress is likely to lead to tense muscles, further exacerbating the injury.



UNSUITABLE EQUIPMENT

Although it is true that some ultrasound machines are less user-friendly than others, many respondents identified the awkwardness of the machines as a factor they felt contributed to their injury. Most machines have little space for the sonographer's knees and necessitate prolonged abduction of the scanning arm and often the keying in arm also. This would lead to bad posture, identified by 83.6 per cent of the respondents as one of the factors contributing to their injury.

Many respondents also pointed out that the couches, chairs and space to report in were inadequate. Some couches were not adjustable and many chairs would not help the sonographer to sit comfortably while performing scans.

RECOMMENDATIONS

RISK ASSESSMENTS

As the findings suggest that many employers appear to have a poor record of risk assessment and control, it is an essential part of the process of identifying risks to employees to carry out suitable and sufficient risk assessments into the ergonomics and process of ultrasound scanning. Before this is done, it would be extremely difficult to pinpoint the risks and therefore almost impossible to do anything to rectify the problems.

The Health and Safety Executive identifies two main approaches to use in order to find out whether there is a problem in the workplace. Firstly, managers can look for any signs of problems or symptoms among with workforce and secondly, work tasks can be observed in order to see if risk factors for musculoskeletal injury are present. This can be done using a simple initial assessment of risks or risk filter, prior to conducting a complete risk assessment. An example of a risk filter form is attached at Annex B. It is important to realize that a full risk assessment will need to be carried out if the answer to any of these initial questions is yes. The Health and Safety Executive provides an example of a Risk Assessment Worksheet in its publication "*Upper Limb Disorders in the Workplace.*"

Assessments should be carried out at regular intervals and whenever there is any change to the process or machinery. It is important to build a culture of health and safety organization in the workplace, with employers and employee representatives working in partnership in order to solve problems. Employers should ensure that sonographers are aware of the potential risks and ways of combating them.

Where assessments show that there are ergonomic problems, steps should be taken to counter them, such as adjustable couches and seating, positioning of patient and monitor and sufficient room to produce a report.

If assessments find that the design of the ultrasound equipment is part of the problem, then questions may need to be directed at equipment manufacturers, so that they can reconsider the ergonomics of the equipment to the user's benefit.

MORE BREAKS, LESS PRESSURE

The research shows that, although the DSE Regulations emphasizes the importance of taking frequent rest breaks in order to prevent fatigue rather than to recuperate from it, many NHS employers fail to make the connection between an ultrasound machine and Display Screen Equipment and do not recognize sonographers as DSE users, for the purpose of fulfilling the requirements of the Regulations.

Most sonographers in this research identified the fact that they are working under extreme pressure, with too many patients to scan to enable them to take satisfactory breaks. The HSE points out that frequent short breaks are preferable to a few long ones. Five to ten minutes break an hour are better than working flat out all morning with one fifteen minute break somewhere in the middle. The breaks should allow a complete change in activity – it is not enough to argue that writing a report would provide this, as many of the same muscle groups are used in producing a report, often in cramped circumstances.



JOB DESIGN

Risk assessments may show that it is a combination of the ergonomic factors and the intensity of workload that produces the injury. Many departments appear to be understaffed as a norm and staffing crises occur when sonographers take leave or are absent due to maternity leave or sickness.

The obvious answer to relieving the pressure on individual sonographers would be to provide more staff, although it is recognized that this would involve the question of financial resources. However, the consequences of ignoring this issue may eventually cost more in terms of sick absence, replacement and retraining and possibly personal injuries claims.

The HSE suggests managers could consider adding extra activities to a job in order to provide variety in posture and speed of work or rotating the worker to perform other tasks, which vary body part action and speed. Another suggestion would be to try alternating the scanning arm – some respondents had tried this and found it to be helpful.

Finally, the question needs to be asked as to whether the risks of working as a full-time sonographer under the current understanding of the job outweigh the obvious benefits to the service. Thought will need to be given to redesigning sonographer's jobs in order to vary the type of work, while at the same time maintaining the skill and responsibility level. It is a challenge, but of the utmost importance and urgency in order to remove the risks of injury and permanent disablement throughout the sonographer population.

*The question needs to
be asked as to
whether the risks of
working as a full-time
sonographer under
the current
understanding of the
job outweigh
the obvious benefits
to the service.*



REFERENCES

- Arrowsmith, I. M., (September 2000)** "The Prevalence of Work-related Upper Limb Disorders Amongst Radiographers"
- Baker, Joan P., (2001)** Letter re- "Ergonomics Comments – Docket No. S-277A" to Elaine L. Chao, Secretary of Labor, OSHA Docket Office, US Department of Labour, August 3 2001
- Baker, Joan P., (2000)** "Understanding and Preventing Musculoskeletal Injury in Sonography"
- Buckle, Dr Peter and Hoffman, Joanne, Robens Institute, (1994),** "TUC Guide to Assessing WRULDs Risks", TUC
- Canadian Society of Diagnostic Medical Sonographers, (November 1999),** "Work, Health and Ergonomics Survey", Vancouver
- Chapman-Jones, Dr David, (April 2001),** "Musculoskeletal Injury: Is it a problem for Sonographers?", Synergy, Society of Radiographers, April 2001
- Feather, Chris, (October 2001)** "WMSD: an occupational hazard for sonographers", Synergy, October 2001
- Gregory, Val, (September 1998)** "Musculoskeletal Injuries: An Occupational Health and Safety issue in Sonography", Sound Effects, September 1998
- Habes, Daniel J and Bacon, Sherry, (August 1999)** "Health Hazard Evaluation Report 99-0093-2749" University of Medicine and Dentistry of New Jersey
- Health and Safety Executive, (February 2002)** "Upper Limb Disorders in the Workplace", HSE
- Murphy, Carmel and Russo, Andre, (July 2000)** "An Update on Ergonomic Issues in Sonography", Employee Health and Safety Services, Healthcare Benefit Trust
- Magnavita, Nicola, et al, (1999)** "Work-Related Musculoskeletal Complaints in Sonologists", Journal of Occupational and Environmental Medicine, 41, 1999
- National Audit Office (1991)** "Tackling Obesity in England"
- Ransom, E., (August 1997)** "Does RSI affect Radiographers?", Synergy, Society of Radiographers, August 1997
- Woo, Dr Joseph, (1998)** "A short History of the developments of Ultrasound in Obstetrics and Gynecology"



ANNEX A

SONOGRAPHERS AND UPPER LIMB DISORDERS

INTERVIEW QUESTIONS

Name?

Date of Birth?

Employment history since qualifying as radiographer

How long have you worked as a sonographer and where?

Was this work full time/part time or other?

How many hours a day were you scanning?

What kind of sonography did you perform? (% of time if possible)

Describe the pattern of work in a typical working day.

Do you type, write or dictate reports?

Where is/was the pain?



When did the pain begin?

Describe its onset and development.

Have you any previous record of similar pain?

Did you visit your GP? If yes, when and what was the diagnosis?

Did you visit Occupational Health? If yes, when and what was the diagnosis and recommendations?

Have you taken sick leave?

Are there any other sufferers that you know about in the department?

Did you talk to your employer when the pain started or since? If so, who was it and what was their reaction and recommended solution to the problem?

Did you fill out an incident form? If yes, when?

Did you contact your local H&S rep? If yes, when?



Did you contact a Society full-time officer? If yes, who and when?

What advice did the Society give you?

Has your employer ever carried out a risk assessment into your work process? If so, when?

If yes, was the Society's H&S rep involved?

**What was the result and recommendations of the risk assessment?
Have they been implemented? If not, why?**

Are you classified as VDU users?

**Has the employer ever given you information on the health and safety risks associated
with display screen equipment work? If yes, what kind?**

**Has the employer ever given you information about the possibility of risks associated
with operating the equipment used by you in your job? Give details.**

**Did you take rest breaks? If so, please describe how often and how long for.
Also, what tasks or actions did you carry out during rest breaks?**



What do you see as being an adequate rest break, in terms of length, frequency and tasks?

**Did your work patterns change in any way during the course of your employment?
If yes, describe the reasons for the changes and the nature of the changes.**

What, in your opinion, were the factors that contributed to your injury?

**Did you make or consider making an industrial injuries claim against the employer?
If yes, please describe progress, result, etc.**

Any other comments.



ANNEX B

RISK FILTER

RISK FILTER

Task:

Assessor:

Date: Location / Work area:

IF YOU ANSWER YES TO ANY OF THE STEPS, YOU SHOULD THEN MAKE A FULL RISK ASSESSMENT OF THE TASK. REMEMBER TO CONSIDER EACH OF THE BODY PARTS OF THE UPPER LIMB (FINGERS, HANDS, WRISTS, ARMS, SHOULDERS AND NECK). ANSWER ALL QUESTIONS.

STEP 1: SIGNS & SYMPTOMS

Are there any:

- | | | | |
|--|----------|--------------------------|-----------|
| <input type="checkbox"/> Medically diagnosed cases of ULDs in this work? | Are any | YES | Move on |
| <input type="checkbox"/> Complaints of aches or pains? | of these | <input type="checkbox"/> | to step 2 |
| <input type="checkbox"/> Improvised changes to work equipment, furniture or tools? | present? | NO | |
| | | <input type="checkbox"/> | |

STEP 2: REPETITION

Are there any repetitive elements such as:

- | | | | |
|---|--------------------------|--------------------------|-----------|
| <input type="checkbox"/> Repeating the same motions every few seconds? | For more | YES | Move on |
| <input type="checkbox"/> A sequence of movements repeated more than twice per minute? | than | <input type="checkbox"/> | to step 3 |
| <input type="checkbox"/> More than 50% of the cycle time involved in performing the same sequence of motions? | 2 hours total per shift/ | NO | |
| | | <input type="checkbox"/> | |

STEP 3: WORKING POSTURES

Are there any working postures such as:

- | | | | |
|---|--------------------------|--------------------------|-----------|
| <input type="checkbox"/> Large range of joint movement such as side to side or up and down? | For more | YES | Move on |
| <input type="checkbox"/> Awkward or extreme joint positions? | than | <input type="checkbox"/> | to step 4 |
| <input type="checkbox"/> Joints held in fixed positions? | 2 hours total per shift? | NO | |
| <input type="checkbox"/> Stretching to reach items or controls? | | <input type="checkbox"/> | |
| <input type="checkbox"/> Twisting or rotating items or controls? | | | |
| <input type="checkbox"/> Working overhead? | | | |

STEP 4: FORCE

Are there any forces applied such as:

- | | | | |
|--|---|--------------------------|-----------|
| <input type="checkbox"/> Pushing, pulling, moving things (including with the fingers or thumb)? | Sustained or repeated application of force for more than 2 hours total per shift? | YES | Move on |
| <input type="checkbox"/> Grasping / gripping? | | <input type="checkbox"/> | to step 5 |
| <input type="checkbox"/> Pinch grips ie holding or grasping objects between thumb and finger? | | NO | |
| <input type="checkbox"/> Steadying or supporting items or work pieces? | | <input type="checkbox"/> | |
| <input type="checkbox"/> Shock and / or impact being transmitted to the body? from tools or equipment? | | | |
| <input type="checkbox"/> Objects creating localised pressure on any part of the upper limb? | | | |

STEP 5: VIBRATION

- | | | | |
|--|---|--------------------------|--|
| <input type="checkbox"/> Do workers use any powered hand-held or hand-guided tools or equipment or do they hand-feed work pieces to vibrating equipment? | Regularly (ie. at some point during most shifts)? | YES | |
| | of force for | <input type="checkbox"/> | |
| | | NO | |
| | | <input type="checkbox"/> | |

If you answer YES to any of the steps, you should make a full-risk assessment of the task.

Source of information is HSE