



A study of the experiences of participants following attendance at a workshop on methods to prevent or reduce work-related musculoskeletal disorders amongst sonographers

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ABSTRACT

A growing number of sonographers are being affected by pain and disability associated with their working practices. Many of these individuals are scanning whilst in considerable discomfort, or having to take sick leave when the pain makes scanning impossible. Severe cases will result in sonographers being unable to scan, and forced into a change of career, or early retirement.

In order to help address this problem it was decided in June 2009 to host a workshop for sonographers at the University of the West of England, to introduce participants to a variety of ideas and techniques which could potentially prevent or reduce musculoskeletal disorders associated with working practices.

Following the overwhelming popularity of this first session, three further workshops were organized. A total of 96 students have attended these four workshops, and all participants have been asked to complete detailed evaluation questionnaires. In order to determine any long-term benefits of the workshops, participants were also asked for their permission to be followed up at six week and twelve week intervals after attendance. A total of 23 participants were telephoned six weeks after attending the workshop and ten were telephoned at twelve weeks.

Results demonstrated that the workshop was extremely beneficial for the majority who attended. The positive effects lasted for several weeks following the event, however, after three months the majority felt they needed additional reinforcement of the information, ideas and techniques learnt during the original workshop.

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Introduction

Work-related musculoskeletal disorder (WRMSD) is a problem affecting growing numbers of sonographers.^{1–3} The nature of the work, which involves repetitive fine movements using the upper limbs, whilst concentrating on images displayed on a screen, may result in damage to joints, muscles and tendons.^{4,5} The condition often leads to considerable pain for the individuals concerned, and problems for departments struggling to cope with increasing workloads.^{6,7} The incidence of WRMSD amongst sonographers is increasing rapidly.^{2,3,6,7} A number of causative factors have been proposed as reasons for this alarming rise^{8,9} but chief among them appear to be increasing workloads and lack of suitable breaks during the day.^{6,7,10} Growing numbers of referrals for ultrasound

scans and targets to reduce waiting lists, puts constant pressure on overstretched departments to increase throughput of patients.^{6,8,11} Often no extra funding is available to recruit additional staff, and even when there is, a shortage of experienced sonographers results in little, if any, response to attempts to recruit new staff.¹² One study¹³ suggested that sonographers who perform more than 100 scans a month are at risk of WRMSD. As the majority of sonographers perform at least three times this figure, it is inevitable that problems are occurring on such a large scale.¹⁴

Whilst these factors are important and need to be addressed, there are also ways in which practitioners can think about their own practice and make personal changes.^{11,15} In order to facilitate this process, the University of the West of England, decided to introduce into the postgraduate Medical Ultrasound programme, workshops for students to raise the awareness of WRMSDs and to demonstrate different approaches. It is particularly important for students embarking on a future new career, to be aware of the possible harm they can do to their bodies by incorrect scanning practice. If they can be taught methods of good practice to prevent bad habits forming, potentially they may be less likely to suffer

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from problems later in their career.^{11,15} It is also apparent amongst sonographers who have scanned for a number of years, that not all of them do suffer from WRMSDs, which suggests that they, consciously or unconsciously, employ techniques or scanning practices which reduce the onset of problems.¹⁵ There may well be benefits to be gained therefore from the sharing of good practice amongst sonographers

Workshops were introduced into the postgraduate clinical practice modules,¹⁴ to raise the awareness of these students, of the potential harm they could be doing to their bodies if they did not establish good working practices at an early stage in their careers, and to help them to develop new approaches to prevent problems occurring. Feedback from these workshops was positive, and requests for additional workshops from these students' departments began to appear, as it soon became apparent that qualified sonographers were also interested in learning about how they could benefit from information on techniques which could potentially help to prevent or reduce the causes of WRMSD. As a result, a workshop was set up in June 2009 where 28 sonographers were invited to participate in a day of lectures, discussions and demonstrations. Numbers of participants were limited to a maximum of 28 to ensure all had opportunities for individual advice. This workshop was oversubscribed, and three further sessions were organized during 2009 and 2010.

The workshops

The workshops were designed to give sonographers the opportunity to discuss problems, share examples of good practice, and participate in interactive sessions with a range of specialists demonstrating various methods which could potentially help with the problem of WRMSDs. Sonographers were introduced to a variety of techniques to help to overcome the stress and damage to the body caused by repetitive movements. These techniques included ergonomics advice from a physiotherapist; lessons from Alexander Technique teachers; information from a Health and Safety Executive representative on legislation to support sonographers.

The workshop began with the participants discussing what specific WRMSD problems were being experienced. Individuals identified a range of problems, including pain or discomfort in the shoulders, neck, wrist, hand, elbow, thoracic and lumbar spine, plus headaches. The discussion then centred around the reasons for the growing number of MS problems amongst sonographers. Individuals who had been scanning for many years expressed concern that although they had been scanning for long periods, it was only during the last decade that they had noticed problems, whilst others who had only qualified within the past ten years, were already experiencing problems. This suggests that changing working practices are leading to an escalation of WRMSD problems. A variety of possible aggravating factors were highlighted, including:

- Lack of breaks during the working day;
- Too many scans to perform in a day and too few staff;
- Inadequate staffing levels for the volume of work;
- Management targets leading to pressure on the workforce;
- Inadequate length of time allowed for each scan;
- Increasing numbers of patients with large body mass index (BMI);
- Increasing numbers of TV scans without appropriate equipment, resulting in a lack of support for the arm;
- Increasing numbers of nuchal translucency scans requiring long periods of fine adjustment of the transducer;
- Staff sickness due to WRMSD, putting pressure on remaining staff;

- Different sonographers using the same room during the day resulting in the requirement to continually readjust the equipment, couch and chair height. Often work pressures resulted in there being insufficient time for this readjustment;
- Lack of variety of work during the day resulting in a series of identical scans being performed.

Participants were asked to identify what, if any, help or guidance they had been given in the workplace in relation to WRMSDs and scanning practice. A number of points were identified:

- Exercises recommended and given in the form of an exercise sheet or poster;
- Advice on seating and positioning;
- Assessments of the working environments by the occupational health department with recommendations on seat and couch height;
- New equipment, such as saddle chairs, purchased;
- Some superintendents had tried to reduce workloads and/or mix the caseload to provide more variety in the type of scans performed;
- New ergonomically designed ultrasound equipment purchased;
- One sonographer was currently trialing a new covering for the transducer to enhance grip;
- Some had tried using a strap on the scanning forearm to help to support the transducer;
- One person had tried blue tooth operation of equipment controls;
- Voice activated ultrasound equipment controls;
- Limiting the number of repeat scans offered to patients where imaging was suboptimal due to increased BMI.

Methodology

Following each of the four workshops, evaluation forms were given to each participant to establish how useful the information and ideas had been. In addition to providing personal background information, participants were asked for comments on their experiences of the sessions, and to evaluate various aspects of the workshop using a Likert scale.¹⁶ The Likert scale is a refined measurement scale requiring respondents to give opinions on a series of statements. The results were analysed and recorded (see [Tables 1 and 2](#)).

To find out whether there were any long-term benefits of the workshop, it was decided to follow up a percentage of the participants to determine what, if any, of the principles from the day were particularly useful, and how much of what they learnt, they were still using several weeks later. During the four workshops a total of twenty three participants volunteered to participate in a telephone interview six weeks after the event. It was not felt to be appropriate to contact all participants without their permission, however, all participants were invited to volunteer to participate in these interviews. Whilst this may potentially have introduced an element of bias into the findings, because the group was self-selecting, it was not considered that this would significantly affect the findings as the objective was to obtain sample experiences following the workshop, rather than evaluate their views of the workshop. Ethics approval was obtained for the research from the Faculty of Health and Life Sciences, Ethics Committee at the University of the West of England, Bristol. These volunteers were all telephoned by the workshop leader, and the conversations recorded with participant consent. Anonymity was guaranteed for the interviews, and complete security of the results was assured and established. The interviews were semi-structured, with a series of questions put to

Table 1
The ergonomics session.

The Ergonomics Session <i>n</i> = 65	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Left blank
The session was relevant to me at this stage in my career	27	34	2	1	0	1
The session was relevant to the practice of ultrasound in general	29	33	1	0	0	2
I have learned to think about the <i>process</i> of a movement as well as the <i>goal</i>	28	31	5	0	0	1
I was aware of changes to my scanning position after the instruction from the teacher	27	31	4	1	0	2
I have learned a new way to think about how I use US equipment	16	37	6	2	1	3
I will be able to apply what I have learned in my work	19	41	4	0	0	1
I will be able to apply what I have learned in contexts other than work	14	46	4	0	0	1
I have found the session useful	31	32	1	0	0	1

each of the participants (see Table 3) and further probing of pertinent points made where necessary. An additional telephone call was made to ten individuals at twelve weeks, to determine any longer term benefits of the workshop. These individuals were selected randomly by the workshop leader from the list of earlier interviews, to represent a cross-section of follow-up responses.

Results from the telephone interviews were transcribed and analysed. Two cases were selected, anonymised and recorded in more detail to demonstrate personal experiences of sonographers participating in the workshop. These are discussed in more detail in the Results section below.

Results

The participants were asked to complete a detailed questionnaire anonymously, at the end of the workshop, where they were asked for their age range, details of any existing musculoskeletal problems, and any help or guidance received in the workplace. The questionnaire also asked participants to evaluate both the Ergonomics session and the Alexander Technique session, using separate Likert scales, and results are displayed in Tables 1 and 2. The respondents were asked to rate their views on each statement using a range from 'strongly agree' to 'strongly disagree', and was designed to provide a convenient but effective method to obtain evaluation.

Evaluation for the first workshop only included a Likert scale for the Alexander Technique, but the subsequent workshops included two separate Likert scales, one relating specifically to the Ergonomics session and one to the Alexander Techniques session. As a consequence, the Alexander Technique results include a greater number of responses ($n = 93$) than for the Ergonomics ($n = 65$) because responses were not obtained for the first Ergonomic session.

The majority of students thought that the ergonomics session was useful and relevant at this stage in their career. All respondents agreed that they had learnt to think about the process of movement as well as the goal. Three respondents disagreed that they had learnt a new way of thinking about how they use ultrasound

equipment, and three left this question blank, but this may have been due to a lack of opportunity to put into practice the ideas discussed. The majority of the respondents were aware of changes to their scanning position with only one disagreeing and two left it blank. All participants thought the concepts could additionally be used in areas other than work.

Nearly all participants agreed or strongly agreed that the AT workshop was relevant to them as sonographers and at this stage in their career. One respondent strongly disagreed about whether they had learnt to think about the process of movement rather than just achieving a goal, although five had left this blank. This may suggest either a lack of understanding of the concepts involved, or that they actually had not learnt anything about movement processes. On reflection, this question may need re-phrasing for future forms, in order to bring greater clarity to the purpose of the question. The majority of participants were aware of changes to their scanning position after instruction from the AT teacher, but five respondents disagreed and six left this blank. These responses could have been due to the fact that not everyone chose to have an individual turn within the class. On a few occasions, time pressures prevented all participants having an opportunity. The majority of respondents agreed that they had learnt a new way of thinking about using ultrasound equipment, and most thought they would be able to apply what they had learnt back in the workplace. One strongly disagreed but this needed further exploration because it was unclear as to whether this was due to weaknesses in the workshop instruction, or pressures in the workplace making introduction of the new ways of working impossible. Similar results were recorded for the question on whether the information was applicable to other contexts outside of work, with only one responding equivocally to this. Overall, just under 4% of the responses were left blank. Whilst potentially leading to slightly equivocal overall results in some areas, this is not surprising when many of the concepts involved in the workshop were new to the participants, and possibly would have required more time to reflect on responses. It was therefore felt by the researchers that the follow-up interviews were an opportunity to explore these areas more fully.

Table 2
The Alexander technique.

The Alexander technique <i>n</i> = 93	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Left blank
The session was relevant to me at this stage in my career	48	29	9	3	1	3
The session was relevant to the practice of ultrasound in general	45	35	6	2	1	4
I have learned to think about the <i>process</i> of a movement as well as the <i>goal</i>	44	41	2	0	1	5
I was aware of changes to my scanning position after the instruction from the teacher	40	28	14	3	2	6
I have learned a new way to think about how I use US equipment	38	34	11	4	1	5
I will be able to apply what I have learned in my work	35	42	8	2	1	5
I will be able to apply what I have learned in contexts other than work	40	38	8	0	1	6
I have found the session useful	48	34	3	3	1	4

Table 3
Questions for telephone interviewees.

How long have you been scanning and how many hours a week do you scan?
What types of scan do you perform?
What if any MS problems were you experiencing prior to the workshop?
What if anything had you tried to alleviate the problem before the workshop?
What were the main lessons you learnt from the workshop?
What have you put into practice since the workshop?
Are you aware of any difference to the pains/discomforts you feel during scanning, since attending the workshop?
If yes, what do you attribute this to/what have you been doing to cause this difference?
Did you think the workshop was beneficial to you and your scanning?
Are there any changes you suggest are made to the workshop in the future?

In order to provide more qualitative information on the workshop, participants were additionally asked on the questionnaire for:

- One key point they would take away
- Something they particularly liked
- Something they did not like
- Any ideas for improvements for future workshops

The responses to the invitation to report '*one key point will I take away*' suggest that respondents had learnt to think more about how they used themselves in scanning procedures; there were a number of responses along the lines of 'think more about how I scan'. A number of respondents referred to the importance of relaxation, reporting they had learnt to 'take more time to relax' and also to relax particular parts of the body, for example relaxing shoulders. Respondents mentioned change in a number of ways: becoming aware that 'small changes make a big difference', but also that 'change takes a conscious effort'. Several indicated they would take away the idea of varying the ways they used themselves in scanning; changing positions frequently and also adjusting the equipment. From both the ergonomics lecture and the Alexander Technique lessons, they took away an understanding that habitual movements which are not beneficial can feel normal: 'what feels normal may not be good but just bad habit'. One message in particular that several respondents mentioned, was learning that 'I'm not alone in suffering' and that 'I'd never realized the extent of the problem amongst sonographers'.

Responses to '*something I particularly liked*' indicated that respondents had found the practical session both inspiring and relaxing. The variety of techniques and ideas available during the workshop meant that everyone was able to take away something relevant particularly to them. The 'interactive style of teaching' by the presenters was mentioned by several people as being enjoyable. Statements such as 'the opportunity to experience the Alexander Technique with a personal teacher' and 'one-to-one practice with someone who understood the problem' showed that the workshop gave participants opportunities to experience a new approach to their problems. The 'sense of calm after working with the teacher' and 'being able to see changes in myself and others' made the sessions particularly relevant and enjoyable.

When asked for '*something I did not like*' respondents seemed to have difficulty identifying anything in particular. 'Nothing – I enjoyed it all' or 'there wasn't enough time in one day' were common statements. One person thought there was 'not enough real explanation of the theory of the Alexander Technique' and would have liked to obtain a greater understanding of the technique; another would have liked 'more time to practice the ideas'.

Ideas for '*an improvement would be*' included: 'more Alexander Technique teachers to enable more one-to-one time' or 'having the teachers visit us in our departments during a busy session'. One person would have liked 'more opportunities for discussing different

scenarios e.g. Transvaginal scanning, DVT scanning'. Others suggested that 'I think this would have been very helpful if I had been able to do it during my training at the start of my career'.

The telephone interviews with the volunteers from the workshop were carried out at six week and twelve week intervals. A series of questions was put to each interviewee (see Table 3), and further exploratory questions made, as appropriate, in order to explore certain areas in more depth.

During the four workshops, a total of twenty three participants volunteered to participate in the telephone interview six weeks after the event. An additional telephone call was made to ten of these individuals, selected randomly to provide a cross-sectional representation, at twelve weeks, to determine any longer term benefits of the workshop. Results from the telephone interviews revealed a general raised awareness amongst the participants of the potential problems, and the importance of taking action to reduce the risks. The majority of the interviewees were suffering from a particular Musculoskeletal (MS) problem, which they attributed to their role as a sonographer because the symptoms were exacerbated or triggered during scanning. Many had been suffering for several years and had tried a variety of approaches to alleviate the problem, such as physiotherapy treatment, exercises, massage, or reducing their working hours. Four people were taking medication for their symptoms and one had resorted to surgery.

Some interviewees had received considerable support from their workplace, such as purchase of new equipment, varied case-mix, more frequent breaks or exercise sheets. Others however, found they were working with a culture of denial that a problem existed, and were made to feel they were alone in complaining of MS problems, or that the problem was not work-related. Three people found that after they had taken back some of the ideas from the workshop, the department had instigated new working practices, such as increased numbers of breaks, maximum number of two referrals for patients with large BMI, or slave monitors for patients. Others had presented their ideas to their department managers and were waiting for responses. One department had organized for an Alexander Technique specialist to attend their department on a Saturday morning to give instruction to all the sonographers. One sonographer had taken her problem to one of the imaging companies and was trialing a product that had been developed specifically to help her problem.

All interviewees had found the workshop beneficial, with some aspects more useful to some than others. With the exception of three respondents, all those who had been experiencing problems reported that their symptoms had decreased or were no longer apparent in the intervening six weeks since attendance. They did say, however, that it was difficult to put into practice all the advice and good practice they had gained from the workshop during a busy scanning session. These sonographers found they were having to make a conscious effort to remind themselves of the importance of prioritising their health needs.

The ten participants who were followed up at twelve weeks had mainly found that, although elements of good practice had stayed with them during the intervening weeks since the workshop, they felt that they needed reinforcement of the principles they had learnt.

In particular, two participants described dramatic changes to their level of discomfort immediately after the workshop, but at the twelve week interview, they sounded discouraged as symptoms had returned. These two cases are presented anonymously as follows.

Case number one (Laura)

Length of time scanning: Laura had been scanning for over thirty years, and for the past five years has been scanning for three days a week. She scans mainly obstetrics patients, but also gynaecology and upper abdominal cases.

Problems experienced: Laura had been suffering neck ache and headache on the left for the past ten years. She considers it to be caused by work, because during holidays the problem is less noticeable. She is aware that an increasing workload is exacerbating the problem.

Preventative action taken: Laura reduced her scanning time five years ago to three days a week which helped initially, but the problem is now worse than it was before

Workshop: Laura found the workshop overall very informative

Ideas put into practice: She is more aware of posture during scanning; she now tries to move the patient nearer to her during scanning; she moves the machine to a better angle before scanning, even though this takes additional time, in order to avoid stretching; she tries to alternate standing and sitting during scanning; she tries to vary her position during the day as much as possible, to avoid being in the same position for every scan; attempts have been made to alter the caseload to alternate types of scan, although this is not always possible; the AT taught her to relax at the start of the scan to reduce tension; generally the workshop has increased her awareness of avoiding problems;

Outcome: At six weeks she had only had one bout of pain since the workshop, but thought it was too early to draw any conclusions. At twelve weeks the pain had returned more frequently, however, she was aware that it was associated with very busy sessions at work when she was forced, due to pressure of workload, to ignore many of the principles acquired during the workshop.

Suggestions for future workshops: Laura thought that the AT was a difficult technique to learn and needed more one-to-one time. She is considering finding a local AT teacher to book additional sessions with. She felt that a follow-up session would be useful, either attending another workshop or having a specialist visit the department.

Case number two (Mary)

Length of time scanning: Mary has been scanning for ten years and is currently scanning for four days a week. She was scanning full-time until two years ago. She scans only obstetrics and gynaecology patients.

Problems experienced: She has had problems with her right arm and neck. Three years ago she was unable to move her arm and had to take time off work. She also experiences intermittent headaches and has concluded that this is related to tension in her neck.

Preventative action taken: Mary has reduced her scanning sessions from five days to four days. She has had workplace assessments performed, but this did not achieve anything useful. She saw a physiotherapist last year and was given tips to try, but no significant improvement was evident.

Workshop: She thought it was excellent and very inspiring. It was a relief to learn she was not alone in suffering problems, and to know that various possibilities exist to try to alleviate these problems. It was good to speak to other sonographers with similar experiences, and with other professionals with a particular knowledge of the subject. A longer AT session would have been useful, but she has been given the inspiration to book further sessions after the opportunity to try it at the workshop. The HSE lecture was very useful and provided relevant contact details which she intends to follow up.

Ideas put into practice: Mary is now more aware of the importance of core muscle stability. She realises the importance of continually adjusting the equipment and makes more effort to move and change position during scanning. She has asked the department superintendent to introduce a mixed caseload into the scanning sessions, and this is already starting to happen. The department is negotiating to try to achieve a minimum scan time of

thirty minutes per patient, but this is unlikely to happen imminently. She has found it helpful to alternate with one scan sitting and one standing. She puts her health first now, and tries not to add to her pressure by worrying about keeping patients waiting.

Outcome: Since the workshop she has not experienced any pain in her shoulder, neck or head. She was aware however, that it was becoming increasingly difficult to maintain the good habits she had initially put into practice after the workshop because of the realities of a busy working environment, and was concerned that the positive benefits would not be longlasting. Mary was telephoned twelve weeks after the workshop to obtain a more long-term picture of any benefits, and reported that her pain had gradually returned over the subsequent weeks, although not as severely, and she had not experienced headaches since the workshop. She felt that she needed to attend a follow-up workshop and more sessions with the AT teacher, because gradually she had noted it was increasingly difficult to maintain the good habits and practices she had initiated immediately after the workshop.

Suggestions for future workshops: Mary thought refresher workshops for delegates to attend in order to reinforce learning points would be really useful.

Discussion

The workshop organisers were surprised at the extent of the WRMSD problems being experienced by the participants, and the lack of support in many workplaces. Whilst it is acknowledged that attendees at these workshops are more likely to consist of those who are suffering, the findings do support the outcomes from other studies where numbers of sufferers appear to be increasing.^{2,3,6,7} The results from this study showed that participants overall found the workshop to be extremely valuable. A number of benefits were noted, including: opportunities to share experiences and discuss problems with other sonographers also suffering from WRMSDs; exchange of ideas from other departments and individuals who have tried different ways of working to reduce problems; specific advice from ergonomics specialists on how to improve the working environment; demonstrations from physiotherapists on how to improve body awareness during scanning; access to new techniques such as the AT, which offer a different way of approaching the problem; information from Health and Safety experts on how to approach the problem. One unexpected benefit of the workshop was that participants were given opportunities to know they were not alone in suffering problems, but that a number of departments and individuals suffered from WRMSD. Participants found this reassuring, particularly those working in departments where a culture of denial of the problem existed.

Opportunities were available during the workshop for an exchange of ideas on what features had been tried in the workplace to alleviate WRMSD problems. Discussions amongst the participants revealed a variety of successful ideas had been introduced. Some sonographers had begun ambidextrous scanning¹⁷ an idea that the HSE representative had found to be beneficial in several departments, by enabling sonographers to rest one shoulder whilst developing a more balanced usage of neck and back muscles. Others had tried alternating sitting and standing whilst scanning, which was found to be advantageous. All sonographers agreed that scanning obese patients was a major contributing factor to their problems,^{18,19} due, not just to the awkward arm positions required to access the correct imaging plane, but also the additional time required to obtain diagnostic images.^{20,21} Additional monitors for obstetric patients to view were found to be of great benefit by most departments, but some had not been aware of, nor considered, this idea. One department was fortunate to have obtained funding for voice activated ultrasound controls, and was in the process of

trialing them. Most departments had managed to obtain height adjustable chairs and couches, which were valuable, but often were not fully utilised because of the time required to adjust them. One sonographer was trialing a new probe covering which involved using less grip, thereby reducing the effort involved in holding the transducer. Others had found that draping the transducer cable around the neck took some of the weight off of moving the transducer. Overall, the workshop provided a useful forum for a sharing of ideas and examples of best practice.

Information was provided by ergonomics and HSE expert with experience in the field. For many of the participants, this provided a wealth of ideas to put into personal practice. It was acknowledged that stress in the workplace is often a contributory factor in WRMSDs, and that these issues may need to be addressed more strategically. Ideas such as varying the case-mix, to introduce more variety into a scanning session, were suggested. The importance of mini-breaks was also emphasised. Several suggestions required discussions with heads of departments to negotiate changes in working practices, but hearing that these had already been instigated in other departments, gave confidence to the sonographers to approach their own managers.

Participants were also introduced to new concepts, such as the Alexander Technique.^{22,23} Many had heard of the technique, but were unaware of its application to the practice of sonography. The majority of the participants experienced benefits during the workshop, and realized the potential of this technique to provide improvements for their scanning practice. Several expressed a desire to progress further with the AT in order to experience the further benefits that a more in-depth knowledge would provide. F M Alexander, who originally devised the educational programme, recommended that a minimum of thirty sessions are provided to individuals in order for them to obtain maximum benefit from the technique.²³ A study by Little et al.²⁴ suggested that 6 sessions produced good results for patients with back pain.

Participants were generally enthusiastic about the workshop. The variety of opportunities for discussion, sharing of best practice, and trying new techniques, was of great benefit to the sonographers. A particular strength of the workshops was the variety of techniques and ideas the participants were introduced to, which provided everyone with something useful they could take away. Some were more enthusiastic over the various techniques, than others, but all took away useful ideas with them to put into practice. Many had funded themselves to participate in the workshop, and several had taken annual leave in order to avoid taking time off work to attend. All participants, without exception, found the day to have been well worth attending.

The follow-up of participants at the telephone interviews revealed that, although the workshops had provided much needed help, the benefits were noted to reduce over time. At six weeks, most interviewees were still experiencing reduced discomfort, but at twelve weeks the pressures of a busy working environment had overshadowed attempts to improve scanning practices, and MSK symptoms were beginning to return. Additional workshops were felt necessary by most of those interviewed, in order to provide long-term reinforcement of the learning points.

Undoubtedly, the multifactorial nature of WRMSD means that sonographers need to be aware that no single solution can solve the problem, but that a variety of approaches need to be used. This study aimed to establish whether participants attending the WRMSD workshop obtained beneficial outcomes. Whilst there were some limitations in the study, for example, in completely excluding bias, the objective was to achieve a cross-sectional sample of responses in order to introduce enhancements into future workshops. The results provided the researchers with data which can be utilised in the attempts to help sonographers prevent or reduce WRMSDs.

Conclusion

The workshop organisers were aware prior to the workshop of the growing problem of WRMSD amongst sonographers, however, the full extent of the problems being experienced and the lack of support in many workplaces was surprising. Delegates also expressed surprise to learn of the numbers of sonographers experiencing severe problems, and many from smaller departments were relieved to discover that they were not alone in their suffering.

Overall, the results of this study demonstrate that the workshop was considered a success by the presenters and the participants. The collated results revealed a wide number of benefits were experienced by the participants. The majority reported that they took away many useful ideas to put into practice on their return to work. Many noted that they had experienced improvements almost immediately after introducing just minor changes. Others reported that benefits had been noted initially, but that these were temporary, and the pressures of work had overwhelmed any attempts to improve working practices. The Alexander Technique elicited the most positive feedback, with many participants stating that the information obtained during this session had a dramatic effect on the way they thought about scanning, and that as a result, scanning was noticeably more comfortable. However, the majority acknowledged that they needed further sessions in order to reinforce the learning that had occurred.

In the search to help alleviate WRMSD problems amongst sonographers, this study has demonstrated that workshops have a significant role to play in raising the awareness of participants to potential problems. Without support of this nature, many sonographers will continue to suffer problems and may well be forced to prematurely leave the profession.

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