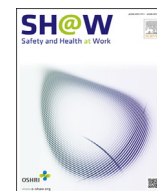


Contents lists available at ScienceDirect

Safety and Health at Work

journal homepage: www.e-shaw.org

Original Article

Evaluating Interactive Fatigue Management Workshops for Occupational Health Professionals in the United Kingdom

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ARTICLE INFO

Article history:

Received 25 February 2014

Received in revised form

10 May 2014

Accepted 14 July 2014

Available online 27 July 2014

Keywords:

chronic fatigue syndrome

diagnosis

education

fatigue

occupational health

ABSTRACT

Background: Disabling fatigue is common in the working age population. It is essential that occupational health (OH) professionals are up-to-date with the management of fatigue in order to reduce the impact of fatigue on workplace productivity. Our aim was to evaluate the impact of one-day workshops on OH professionals' knowledge of fatigue and chronic fatigue syndrome (CFS), and their confidence in diagnosing and managing these in a working population.

Methods: Five interactive problem-based workshops were held in the United Kingdom. These workshops were developed and delivered by experts in the field. Questionnaires were self-administered immediately prior to, immediately after, and 4 months following each workshop. Questionnaires included measures of satisfaction, knowledge of fatigue and CFS, and confidence in diagnosing and managing fatigue. Open-ended questions were used to elicit feedback about the workshops.

Results: General knowledge of fatigue increased significantly after training (with a 25% increase in the median score). Participants showed significantly higher levels of confidence in diagnosing and managing CFS (with a 62.5% increase in the median score), and high scores were maintained 4 months after the workshops. OH physicians scored higher on knowledge and confidence than nurses. Similarly, thematic analysis revealed that participants had increased knowledge and confidence after attending the workshops.

Conclusion: Fatigue can lead to severe functional impairment with adverse workplace outcomes. One-day workshops can be effective in training OH professionals in how to diagnose and manage fatigue and CFS. Training may increase general knowledge of fatigue and confidence in fatigue management in an OH setting.

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1. Introduction

Fatigue and chronic fatigue syndrome (CFS) are commonly reported in primary care and in the working population. The estimated prevalence of CFS in the general population varies between 0.42% and 2.6% [1,2], and the estimated prevalence of CFS-like cases in the working population is 3.6% [3]. By contrast, the estimated prevalence of excessive fatigue in the general population is 18.3% [4], and the prevalence of fatigue in the working population is estimated to be around 22% [5].

CFS is characterized by disabling fatigue, which is persistent or relapsing and occurs more than 50% of the time, for at least 6 months [6,7]. Symptoms of fatigue can be associated with poor memory and lack of concentration [6], both of which can adversely affect productivity in the workplace. The impact of fatigue is even greater in a job that necessitates long working hours or shift work and is likely to increase the risk of workplace accidents [8]. Employees with severe disabling fatigue may find it difficult to attend work and therefore may be more likely to take long and frequent absences. This loss of productivity has wider

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implications in terms of the potential economic impact and cost to society.

Previous studies suggest that short training courses can be successful in training health professionals about conditions such as depression and somatization [9,10]. Madan et al [11] recently showed that a short, intensive workshop was effective in training occupational health (OH) professionals on how to help employees manage mental health difficulties in a workplace setting. The study reported that the OH professionals showed significantly higher levels of confidence in the diagnosis of mental health problems. General knowledge of mental health also improved significantly after the training.

Because of the potential negative impact of fatigue on workplace productivity, it is important that OH professionals are adequately trained to properly diagnose and manage employees who present with fatigue and CFS in the workplace. OH professionals have a pivotal role in assisting employees with disabling fatigue to remain at or return to work. However, it is not known whether a one-day workshop can improve the skills of OH professionals sufficiently for them to feel confident in managing fatigue and CFS in an occupational setting.

Our study investigated whether a short, interactive workshop could be used to improve the skills of OH professionals in managing and diagnosing fatigue in a workplace setting. We also wanted to investigate whether OH professionals who had received previous specialist training in fatigue would be more confident in diagnosing and managing fatigue in the workplace. Furthermore, we wished to establish the current level of knowledge of fatigue and CFS in different groups of OH professionals, in order to utilize teaching resources appropriately in the future.

2. Materials and methods

2.1. Procedure

An expert in fatigue and a consultant OH physician developed an interactive, bespoke workshop. Five one-day workshops were held in different regions of the United Kingdom between 2011 and 2012. Each workshop was delivered by a psychotherapist or clinical psychologist from a specialist CFS clinic in England, and a consultant OH physician.

This study used convenience sampling; the workshops were advertised and trainees paid a fee to attend. All attendees were invited to take part in the evaluation and to complete questionnaires. Workshops consisted of a combination of didactic teaching, group work, and case discussions. The program of workshops included teaching on the diagnosis, assessment, and measurement of fatigue and CFS in the workplace. A detailed list of workshop topics can be found in Table 1. Participants were presented with case studies that were typical of those that would be referred to an OH professional. Participants discussed these cases in small groups and then with the group as a whole. Participants were also encouraged to share cases that they had encountered in their own daily practice.

Workshops were evaluated using self-administered questionnaires, which were distributed at three time points: immediately prior to the workshop (T1); immediately after the workshop (T2); and 4 months following the workshop via an online questionnaire (T3).

2.2. Ethical approval

The research and development department of the authors' institution confirmed that this study was considered to be an evaluation of an educational program, and that no ethical approval was required.

Table 1
Content of fatigue workshops

Fatigue
Fatigue as a continuum
Prevalence, epidemiology, and etiology of fatigue
Risk factors for fatigue
Perpetuating factors of fatigue
Psychological, social, and biological factors that contribute to fatigue
Occupational aspects of fatigue
Glandular fever and fatigue
How to diagnose and assess fatigue and chronic fatigue syndrome (CFS)
How fatigue is measured
Treatment of fatigue and CFS
Overview of evidence-based treatments for fatigue and CFS
Overview of cognitive behavior therapy for CFS
Activity in CFS and graded exercise therapy
Rest/convalence in CFS
Prognosis of fatigue and CFS
Evidence for cognitive behavior therapy; graded exercise therapy and other treatments
A randomized controlled trial of treatment in CFS – the PACE trial
Evidence from routine clinical practice
Optimal management of workers with disabling fatigue and how to support them to remain at work
Early interventions for fatigue
Case Discussion

2.3. Measures

Questionnaire measures assessed whether participants retained information about the workshops and whether there was an impact on their confidence with regards to diagnosing and managing fatigue. These measures were based on Kirkpatrick's [12] model of evaluating training, and tailored to assess specific aspects of the course content. The first three levels of Kirkpatrick's [12] model (reaction, learning, and behavior) were assessed using questionnaire measures of learner satisfaction, confidence, general knowledge, and implementation. Specifically, measures of learner satisfaction were used to assess the reaction level of the model; knowledge and confidence measures were used to assess the learning level of the model; and measures of implementation were used to assess the behavior level of the model.

The questionnaires at T2 and T3 also included open-ended questions that elicited feedback from participants about the workshops. Participants were asked about what they had gained from the workshops, what they found helpful and unhelpful, and whether they had any suggestions for improving the workshop. Participants who had not implemented any knowledge were asked to elaborate on why they had not been able to do so.

Kirkpatrick's [12] model was chosen for this study because it has been used in previous evaluations of training for health professionals [11] and because it allows for training to be evaluated in a quantifiable and systematic way. Also Kirkpatrick's [12] model is beneficial in that it provides a simplified way of evaluating training [13], which can be easily replicated.

General knowledge of fatigue was assessed using a series of statements about fatigue, which participants were asked to identify as "True" or "False". These statements were based on topics that had been taught during the workshops. Each correct answer was assigned a score of 1, and summing scores for all of the items created a total score. The maximum possible total score was 11. This measure was given at T1 and T2.

Participants were also asked about how confident they were at: diagnosing CFS, managing CFS, giving fatigued patients information about activity scheduling, giving patients advice about sleep, and advising managers about reasonable adjustments to the workplace for fatigued workers. Five questions were scored on a seven-point

Likert scale between 1 (not at all confident) and 7 (very confident). This measure was administered at all three time points of the study.

In addition, participants rated their overall satisfaction with the course from 1 (strongly disagree) to 7 (strongly agree). Participants were also asked to rate their satisfaction with specific course components by rating how helpful they found several aspects of the course. Helpfulness was rated on a Likert scale ranging from 1 (very unhelpful) to 7 (very helpful).

At T3, OH professionals were asked about how participation in the workshops impacted upon their day-to-day clinical practice. Specifically, participants were asked if they had used the knowledge they had gained about: (1) management of CFS in the workplace; and (2) management of general fatigue in the workplace. Participants rated their implementation on a scale of 1 (strongly disagree) to 7 (strongly agree). There were two items, and a total implementation score was calculated by summing the scores to give a total score out of 14.

2.4. Analysis

The quantitative results were analyzed using IBM SPSS Statistics version 19 [IBM Corp (International Business Machines Corporation), Version: IBM SPSS Statistics for Windows, Version 19.0, 2010, Armonk, New Castle, New York, USA]. Preliminary analyses showed that the data were not normally distributed. Therefore the data were analyzed using nonparametric tests. Wilcoxon signed-rank tests were used to compare knowledge scores and confidence scores between the different time points in the study (i.e., between T1 and T2, and T2 and T3). Mann–Whitney *U* tests were used to analyze differences between OH physicians and OH nurses in their scores on knowledge, confidence, and implementation. Also, the scores of OH professionals who had received previous training in fatigue were compared with the scores of those who had no previous training in fatigue. McNemar's tests were used to compare responses to individual items of the knowledge questionnaire at T1 and T2.

For the qualitative part of the study, thematic analysis [14] was used to analyze responses to open-ended questions. An inductive, data-driven approach was employed, whereby participants' responses were coded and established into themes. Another researcher then used these themes to analyze a subset of the data, and any discrepancies were discussed.

3. Results

3.1. Quantitative analysis

On average, 20–30 people attended each workshop, and there were 106 attendees in total. The majority of attendees were OH nurses and OH physicians. Participants were eligible to take part in the study if they had attended one or more of the workshops and returned at least one questionnaire. None of the participants were excluded from the analysis. Baseline demographic characteristics of participants are illustrated in Table 2. Out of 106 people who attended the workshop and returned questionnaires, 105 participants (99%) returned pre-workshop (T1) questionnaires and 104 participants (98%) returned post-workshop (T2) questionnaires. Seventy-three participants (69%) returned questionnaires at 4 months follow-up (T3). The majority of participants (71%) were OH nurses. Around 53% of these nurses had been working in the OH field for > 15 years.

3.1.1. Knowledge

Overall, a Wilcoxon signed-rank test showed that there was a significant increase in general knowledge of fatigue scores between T1 (median = 8.0; interquartile range = 2.0) and T2 (median = 10.0;

Table 2
Baseline demographic characteristics of study participants

	n (%)
Gender	
Male	21 (19.8)
Female	84 (79.2)
Missing	1 (0.9)
Age (y)	
25–39	18 (17.0)
40–54	59 (55.7)
> 55	27 (25.5)
Missing	2 (1.8)
Occupation	
Occupational health nurse	75 (70.8)
Occupational health physician	25 (23.6)
Other	5 (4.7)
Missing	1 (0.9)
Number of years in occupational health field	
< 5	18 (17)
5–10	21 (19.8)
> 10–15	12 (11.3)
> 15	53 (50)
Missing	2 (1.9)
Has previous training in fatigue/fatigue management	
No/don't know	94 (88.7)
Yes	11 (10.4)
Missing	1 (0.9)

interquartile range = 1.0), $Z = -6.8$, $p < 0.001$; $r = 0.47$. Table 3 shows the correct response for each question on the knowledge questionnaire. This table also shows the percentage of accurate responses to each item. McNemar's test was used to compare the percentage of accurate responses at T1 and T2.

Table 3

Percentage of correct responses to individual items on the general knowledge questionnaire ($n = 103$)^{*}

Questionnaire item	Correct answer	Percentage of correct responses	
		T1	T2
Chronic fatigue syndrome (CFS) is caused by muscle dysfunction	FALSE	87.6	94.2
Less than 10% of the population feel fatigued at any one time	FALSE	82.9	88.5
Glandular fever is associated with the onset of CFS	TRUE	85.7	87.5
CFS is another form of depression	FALSE	73.3	90.4 [§]
CFS affects people of all social classes	TRUE	94.3	92.3
Left untreated the majority of people with CFS will get better with time	FALSE	64.8	77.9 [‡]
It is important to advise patients with CFS to rest in response to their symptoms.	FALSE	55.2	87.5 [§]
There is evidence that in those aged > 50 y, women have more difficulty in regulating sleep than men	TRUE	70.5	88.5 [‡]
A good outcome of fatigue is predicted by a belief that the consequences of the fatigue are minor.	TRUE	62.9	76.5 [†]
Adaptive pacing therapy is the treatment of choice for CFS	FALSE	21.9	69.2 [§]
Self-monitoring diaries are an important component of cognitive behavior therapy	TRUE	96.2	91.3

^{*} McNemar's test. Contains some missing values.

[†] $p < 0.05$.

[‡] $p < 0.01$.

[§] $p < 0.001$.

Table 4
Mann–Whitney tests comparing knowledge scores of occupational health (OH) nurses and OH physicians

	OH physicians			OH nurses			Mann–Whitney <i>U</i>	<i>Z</i>	<i>p</i>	<i>r</i>
	<i>n</i>	Median	Mean rank	<i>n</i>	Median	Mean rank				
T1	25	9.00	64.14	75	8.00	45.95	596.50	–2.78	<0.01	0.28
T2	25	10.00	64.04	75	10.00	45.26	574.00	–2.94	<0.01	0.29

Table 5
Mann–Whitney tests comparing knowledge scores of occupational health professionals with previous training in fatigue and those without previous training in fatigue

	Previous training in fatigue			No previous training in fatigue			Mann–Whitney <i>U</i>	<i>Z</i>	<i>p</i>	<i>r</i>
	<i>n</i>	Median	Mean rank	<i>n</i>	Median score	Mean rank				
T1	11	8.50	61.86	94	8.00	51.96	419.5	–1.05	0.30	0.10
T2	10	9.50	56.10	93	10.00	51.56	424.00	–0.48	0.63	0.05

We used Mann–Whitney *U* tests to compare the scores of OH physicians and OH nurses on the knowledge questionnaire. In the same way, we compared scores of participants who had received previous training in fatigue and those who had not. Tables 4 and 5 show between-group comparisons at T1 and T2.

3.1.2. Implementation of knowledge

Implementation of knowledge was assessed at T3 using two Likert-scored items. Over 52% of participants had a total implementation score over 10 (out of a possible total of 14), indicating that they agreed or strongly agreed that they had implemented the training. Moreover, a Mann–Whitney *U* test showed that participants who had received previous training in fatigue management had significantly higher implementation scores (median = 13; interquartile range = 5) than those who had no previous training in fatigue management (median = 10; interquartile range = 6), $U = 126$, $p < 0.05$, $r = 0.23$.

3.1.3. Confidence

Participants were assessed on their confidence in diagnosing fatigue and helping employees to manage their fatigue. A Wilcoxon signed-rank test showed that there was a significant increase in confidence scores from T1 (median = 16; interquartile range = 10) to T2 (median = 26; interquartile range = 7), $Z = -7.3$, $p = 0.001$, $r = 0.51$. Levels of confidence were maintained at T3, in that there was no significant difference between T2 and T3 (median = 26; interquartile range = 8.50), $Z = -1.1$, $p = 0.30$, $r = 0.09$.

As can be seen in Tables 6 and 7, confidence levels of OH physicians and OH nurses were compared using Mann–Whitney *U* tests. Comparisons were also made between participants who had previous training on fatigue management and those who did not.

Table 6
Mann–Whitney tests comparing confidence scores of occupational health (OH) physicians and OH nurses

	OH physicians			OH nurses			Mann–Whitney <i>U</i>	<i>Z</i>	<i>p</i>	<i>r</i>
	<i>n</i>	Median	Mean rank	<i>n</i>	Median	Mean rank				
T1	25	21.5	77.04	75	14	41.65	274	–5.29	< 0.001	0.53
T2	25	28.5	66.54	73	25	43.66	486.5	–3.48	0.001	0.35
T3	22	28	47.02	50	24	31.87	318.5	–2.84	0.005	0.33

Table 7
Mann–Whitney tests comparing confidence scores of occupational health professionals who have had previous training in fatigue and those who have not

	Previous training in fatigue			No previous training in fatigue			Mann–Whitney <i>U</i>	<i>Z</i>	<i>p</i>	<i>r</i>
	<i>n</i>	Median	Mean rank	<i>n</i>	Median	Mean rank				
T1	11	22	75.18	94	15	50.4	273	–2.56	0.011	0.25
T2	10	29	57.5	92	26	50.85	400	–0.68	0.499	0.07
T3	7	29	55.5	68	25	36.2	115.5	–2.24	0.025	0.26

3.1.4. Satisfaction

Participants rated their overall satisfaction with the course highly; with a median satisfaction score of 6 (interquartile range = 2) out of a maximum score of 7, and 89.5% of participants rated their satisfaction between 5 and 7. Participants also rated their satisfaction with specific course components: the continuum of fatigue, assessment and management of fatigue; discussion of case studies, treatment and prognosis of CFS, and occupational aspects of fatigue. All course components were rated highly, with a median score of 6 out of a maximum possible score of 7.

3.2. Qualitative analysis

The themes that emerged from the qualitative analysis are described below.

3.2.1. Theme 1: knowledge

Many participants stated that they had greater knowledge and understanding of chronic fatigue syndrome and an insight into how to assess and manage CFS:

“I thoroughly enjoyed the workshop and took away knowledge to support my practice and identify when to signpost on.”

“The workshop built upon my existing knowledge base.”

3.2.2. Theme 2: confidence

Several participants reported that they gained confidence from the workshops and felt more able to manage fatigue in an OH setting:

"I found it a useful overview of the evidence based management of chronic fatigue syndrome; I will feel a lot more confident when advising employees and giving advice to management..."

Attending the workshops also seemed to reinforce and validate existing knowledge:

"The workshops: reinforced knowledge that the work I am already undertaking is the correct way forward."

"Case studies were excellent for eliciting views of OH colleagues – [I] learnt new approaches and also reassured that what I do is echoed by others."

3.2.3. *Theme 3: the identification of fatigue*

During workshops, participants gained knowledge of assessment techniques and the different diagnostic criteria and measurement tools that can be used for fatigue and CFS:

"It [was] helpful to learn about assessment of the client with chronic fatigue... it will help with consultations at work, i.e. knowing which questions to ask."

3.2.4. *Theme 4: the management of fatigue*

Many participants stated that they gained an understanding of fatigue management strategies and the evidence-based treatments that can be used to manage fatigue and CFS. Participants also gained an understanding of prognosis and recovery in CFS.

"[I] gained a good depth and breadth of knowledge in CFS and the variety of ways to manage this within the workplace."

Several participants also highlighted the importance of assessment for early intervention in CFS. For example:

"Chronic fatigue would be helped with early intervention. Identifying signs in staff and giving support is helpful at OH level."

3.2.5. *Theme 5: implementation*

Another major theme that emerged was related to implementation. During workshops, participants gained knowledge that could be implemented in an OH setting:

"[I] gained knowledge about CFS. Some useful guidelines on assessing clients and factors which would be impacting on their recovery."

"[I] had an increased awareness of evidence for various strategies, useful info to take as starting point for departmental strategy."

Participants also gained practical techniques and skills that they could use to help employees suffering from fatigue:

"The workshops reinforced some techniques and management I use. Given me ideas to introduce some support plans for staff."

"[I have] improve[d] my approach to supporting and advising on return to work of someone with CFS."

Some participants found it useful to have resources to give to patients and to be able to signpost patients to other sources of help while others valued being given examples of "best practice" and guidelines for fatigue management.

At the follow-up stage several participants explained how they had implemented the knowledge in their clinical practice. One participant commented: "Most of the knowledge gained has been used in my day to day clinical judgment as and when required."

Another commented: "I frequently use some of the slides as a summary for a handout and frequently refer to the books advised."

Some participants stated that they were not able to implement their CFS knowledge because of potential limitations of their particular job role. For example:

"The nature of my practice is non-NHS and I tend to give advice at one point in time rather than actively manage patients."

"Because of my actual work role I have limited opportunity to use the knowledge in day-to-day clinical practice. However it has been helpful in my advisory role."

Another barrier was related to organizational factors:

"Difficult to utilize treatment modules in an NHS setting as managers not as understanding of CFS and thus timescales become an issue."

"I see a lot of patients with fatigue but unfortunately I am unable to refer them, and even though I write asking their GP to refer them on, I do not know if the GP has access to a fatigue clinic and what happens to the patients."

3.2.6. *Theme 6: research*

Many participants gained knowledge of evidence-based treatments for CFS and the different theoretical approaches to treatment:

"[I] found it useful to have information about the evidence of effectiveness of different treatments. Useful tips on what to advise managers when an employee has CFS or age related fatigue. Useful to have the evidence that rest is not the best treatment."

However, some participants reported that they found it difficult to understand some of the statistical aspects of the research. This appeared to make the workshop content less accessible to some of the participants.

3.2.7. *Theme 7: collaboration*

Participants appeared to enjoy the interactive aspect of the course and sharing ideas with other workshop attendees. Many commented that they found the case studies useful as they were based in an OH setting:

"Realizing that most of us would get the same histories and give the same advice to clients managers and HR."

Moreover, the interactive nature of the workshops appeared to be beneficial in that they reinforced and validated existing knowledge and allowed participants to compare their views with others in a similar role:

"The group work [was] helpful to brainstorm and compare or contrast own approach with other OH professionals."

Several participants also commented on the possibility of disseminating the information to other colleagues who had not attended the workshops.

3.2.8. *Theme 8: satisfaction with the program/general feedback*

Many participants gave positive feedback about the workshops:

"I found the workshop very useful and would recommend it to my colleagues."

Participants also described the workshops as "helpful", "beneficial", and "informative."

4. Discussion

The aim of this study was to investigate whether workshops on fatigue management could increase knowledge of fatigue and confidence in diagnosing fatigue in OH professionals. The results of the quantitative analysis showed that after the workshops, participants were significantly more knowledgeable about the diagnosis and management of fatigue and CFS. Furthermore, after the workshops, OH professionals reported significantly higher levels of confidence in diagnosing fatigue and CFS, and these levels were maintained at follow-up. Participants who had received previous training in fatigue and CFS reported higher levels of confidence than those who had not. OH physicians scored higher in general knowledge of fatigue than OH nurses. OH physicians were also more confident in diagnosing and managing fatigue in the workplace than OH nurses. Four months following the training, over half of the responders had implemented the knowledge they had gained at the workshop. Participants who had received previous training in fatigue were more likely to implement their knowledge than those who had not had any previous training.

Similarly, in the qualitative analysis we found that participants gained greater knowledge and understanding of fatigue and CFS. Some participants felt that the workshop gave them more confidence to assist employees with CFS. Interactive discussions with other OH professionals helped to reinforce and validate participants' existing knowledge of CFS. Several participants were able to implement the knowledge they gained at the workshop, for example by referring to the workshop content and signposting fatigued employees towards other resources. By contrast, some participants were not able to implement the knowledge they gained due to barriers such as job role limitations and organizational factors.

A strength of our study was that it had a high response rate, and a retention rate of 98% at T2. The response rate was lower at T3 (69%), but this still surpasses the response rates of many existing postal and electronic surveys of healthcare professionals [15]. Furthermore, our study provided a prospective measure of skill implementation after the workshop.

This evaluation was based upon Kirkpatrick's model of evaluating training [12]. An advantage of this model is that it can be applied to a diverse range of training topics and can be used in many different settings. A disadvantage of the Kirkpatrick model, however, is that it does not consider individual differences or contextual effects that may affect training outcomes [13].

The study had some limitations. Firstly, there is a possibility of self-selection bias, in that workshop attendees may have been more motivated to learn than non-attendees. Moreover, we used self-report measures to assess knowledge, confidence, and implementation of skills acquired during the workshop. Ideally, we would have assessed skill implementation by asking independent observers to record the OH practitioners' clinical practice following the training. This would have enabled us to verify whether the skills and knowledge were actually being implemented in practice. Moreover, if funding had allowed we would like to have assessed level 4 of the Kirkpatrick model [12]; that is, whether clinical outcomes improved following an improvement in practitioner practice. Also, the follow-up period of 4 months may not have been long enough to assess the effect of training on practice. Indeed, at the follow-up stage, many of the workshop attendees stated that they had not yet been referred any fatigue cases. A longer follow-up period may have helped to assess whether the workshops had had any impact.

The findings of this study provide support for previous research, which suggests that clinical skills can effectively be taught during short, interactive workshops [9,10]. Our findings are similar to the

results of a study of primary care physicians who took part in a "train the trainers" program on CFS [16]. The physicians who attended trainer workshops demonstrated increased knowledge of CFS and increased self-efficacy in diagnosing this illness.

The majority of OH professionals in our sample reported that they had not received any previous training in fatigue management. Given that fatigue is commonly reported in the workplace [5], this finding highlights a need for OH professionals to receive specialized training in fatigue and CFS. Our study showed that OH nurses performed less well on general knowledge measures of fatigue and were less confident about the diagnosis and management of fatigue, compared to OH physicians. This is an important finding as OH nurses often work without the support of an OH physician, particularly when providing services to small to medium size employers. The discrepancy between the knowledge scores of OH physicians and OH nurses may reflect gaps in the education and training that nurses had previously received, and therefore OH nurses in particular may benefit from specialized training in fatigue. Future studies could evaluate the effects of training on worker outcomes, such as changes in fatigue severity, productivity, and absenteeism.

In conclusion, our study has shown that a short, interactive training program can successfully increase knowledge of fatigue and CFS, confidence in diagnosis, and competence in fatigue management in OH professionals. The study has also highlighted a need for specialized training for OH professionals in how to diagnose and manage fatigue in a workplace setting.

Conflicts of interest

TC is the author of *Coping with chronic fatigue* published by Sheldon Press, and with *Mary Burgess, Overcoming Chronic Fatigue*, published by Constable and Robinson.

Acknowledgements

This work was supported by a grant from the Department of Work and Pensions, UK. We would like to thank Dr Evie Kemp, Dr John Shepherd, Dr Ali Hashtroudi, Dr Mary Burgess, Dr Antonia Dittner, Suzanne Roche, Sue Wilkins, and Barbara Smiley for facilitating the workshops. We would also like to thank Federica Picariello for assistance with data analysis and Alicia Hughes for helpful comments on an earlier version of this paper. TC receives salary support from the National Institute for Health Research (NIHR) Mental Health Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. IM was supported by funding from Guy's and St Thomas' NHS Foundation Trust. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Work and Pensions. Funding organizations did not have any involvement in the study design, data analysis or writing up of this study.

References

- [1] Jason LA, Richman JA, Rademaker AW, Jordan KM, Plioplys AV, Taylor RR, McCready W, Huang CF, Plioplys S. A community-based study of chronic fatigue syndrome. *Arch Intern Med* 1999;159:2129–37.
- [2] Wessely S, Chalder T, Hirsch S, Wallace P, Wright D. The prevalence and morbidity of chronic fatigue and chronic fatigue syndrome: a prospective primary care study. *Am J Public Health* 1997;87:1449–55.
- [3] Huibers MJ, Kant IJ, Swaen GM, Kasl SV. Prevalence of chronic fatigue syndrome-like caseness in the working population: results from the Maastricht cohort study. *Occup Environ Med* 2004;61:464–6.
- [4] Pawlikowska T, Chalder T, Hirsch SR, Wallace P, Wright DJ, Wessely SC. Population based study of fatigue and psychological distress. *BMJ* 1994;308:763–6.
- [5] Bültmann U, Kant I, Kasl SV, Beurskens AJ, van den Brandt PA. Fatigue and psychological distress in the working population: psychometrics, prevalence, and correlates. *J Psychosom Res* 2002;52:445–52.

- [6] Fukuda K, Straus SE, Hickie I, Sharpe MC, Dobbins JG, Komaroff A. The chronic fatigue syndrome: a comprehensive approach to its definition and study. International Chronic Fatigue Syndrome Study Group. *Ann Intern Med* 1994;121:953–9.
- [7] Sharpe MC, Archard LC, Banatvala JE, Borysiewicz LK, Clare AW, David A, Edwards RH, Hawton KE, Lambert HP, Lane RJ. A report—chronic fatigue syndrome: guidelines for research. *J R Soc Med* 1991;84:118–21.
- [8] Swaen GM, Van Amelsvoort LG, Bültmann U, Kant IJ. Fatigue as a risk factor for being injured in an occupational accident: results from the Maastricht Cohort Study. *Occup Environ Med* 2003;60:i88–92.
- [9] Gask L, Usherwood T, Thompson H, Williams B. Evaluation of a training package in the assessment and management of depression in primary care. *Med Educ* 1998;32:190–8.
- [10] Walters P, Tylee A, Fisher J, Goldberg D. Teaching junior doctors to manage patients who somatise: is it possible in an afternoon? *Med Educ* 2007;41:995–1001.
- [11] Madan I, Henderson M, Hashtroudi A, Hope V, Harvey SB. Prospective evaluation of mental health training for occupational health practitioners. *Occup Med (Lond)* 2013;63:217–23.
- [12] Kirkpatrick DL. *Evaluating training programs: the four levels*. San Francisco: Berrett-Koehler; 1994.
- [13] Bates R. A critical analysis of evaluation practice: the Kirkpatrick model and the principle of beneficence. *Eval Program Plann* 2004;27:341–7.
- [14] Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
- [15] Cook JV, O'Dickinson H, Eccles MP. Response rates in postal surveys of healthcare professionals between 1996 and 2005: an observational study. *BMC Health Services Research* 2009;9:160.
- [16] Brimmer DJMK, Lupton TA, Faryna KM, Hynes K, Reeves WC. A train-the-trainer education and promotion program: chronic fatigue syndrome- a diagnostic and management challenge. *BMC Med Educ* 2008;8:10.