Evaluation of the implementation fidelity of an ergonomic training program designed to prevent back pain

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Abstract

The aim of this study was to evaluate the implementation fidelity of a multidimensional ergonomic program designed to prevent back pain injuries among healthcare personnel. The program, provided by peer trainers included training intended to modify patient handling and transfer behaviour, trainee follow-up, prevention activities aimed at work environment improvements and follow-up monitors training. Two hundred twenty-one peer trainers at 139 Quebec healthcare institutions participated in our study. Only 61.5% were involved in training; most of them taught safe patient handling, positioning, transfer, and preparation techniques, which are the cornerstones of the program; 72.7% were involved in prevention activities, 46.1% in follow-up activities, and 10.7% in follow-up monitors training. The study results should help organizations anticipate and prevent potential discrepancies between prescribed and implemented programs.

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1. Introduction

All industrialized countries report a high prevalence of occupational back pain and related costs (Nachemson and Jonsson, 2000). In the province of Quebec, Canada, the latest statistics indicate that back pain accounted for 27.2% of all occupational injuries compensated between 2000 and 2002 (Duguay et al., 2008). The health and social services sector is particularly concerned about this type of problem, as the most common anatomic site of injury is the back (Duguay et al., 2003). Studies have found relationships between patient handling and transfer techniques and the incidence of back pain (Best, 1997; Jansen et al., 2004; Kjellberg et al., 2003; Kutash et al., 2009; Venning et al., 1987). The multidimensional ergonomic program under study, the Safe Patient-Transfer Training Program (SPTTP), focuses on these tasks.

The SPTTP has been implemented in Quebec healthcare institutions since 1985 and has the primary prevention of back pain among healthcare workers as its objective. This program was designed and developed by the Association for Health and Safety in the Workplace – Social Affairs Sector (ASSTSAS), one of 13 organizations created under Quebec’s Act Respecting Occupational Health and Safety, to provide training, information and guidance to organizations in its activity sector. Master-instructors from the ASSTSAS train healthcare personnel, who become peer trainers in their respective hospitals after earning accreditation. The objective of the present study was to evaluate the implementation fidelity of the program provided by peer trainers to their healthcare colleagues. In agreement with Hasson (2010), by implementation fidelity we mean the extent of the discrepancies between the SPTTP as implemented in hospitals and as prescribed by the organization that designed the training program.

SPTTP, provided by peer trainers included four interventions: 1) training of healthcare colleagues intended to modify their patient handling and transfer behaviour, 2) trainee follow-up in order to prevent problems that could hinder application of the principles learned, 3) prevention activities aimed at work environment improvements and 4) follow-up monitors training which should provide hospitals with competent human resourcesdevoting a part of their working time to back pain prevention. Given that back pain related to patient handling and transfer techniques is multicausal, SPTTP is intended to address all the risk factors involved.

Primary back pain prevention programs that concentrate on worker training have been popular for several years (Best, 1997). With the exception of one study (Scopa, 1993), results indicate that such programs improve skills (Amosun and Falodun, 1991; Daltroy et al., 1993; Kindblom-Rising et al., 2011; Schenk et al., 1996; Walsh and Schwartz, 1990) and increase adoption of the principles of body mechanics or ergonomic work techniques in experimental...
situations (Amosun and Falodun, 1991; Fanello et al., 2002; Feldstein et al., 1993; Johnsson et al., 2002; Kindblom-Rising et al., 2011; Lagerström et al., 1998; McCauley, 1990; Nygard et al., 1998; Schenk et al., 1996; Trevelyan, 2002; Videman et al., 1989) and field intervention (Robertson et al., 2009). However, observational studies in the workplace indicate that certain work constraints, such as small work spaces or a shortage of personnel, hinder adoption of the ergonomic techniques recommended in prevention programs (Best, 1997; Fanello et al., 2002; Nygard et al., 1998; St-Vincent et al., 1989; Trevelyan, 2002). Epidemiological studies on the ultimate outcomes of such training programs do not provide evidence of their effectiveness. Whether in terms of the prevalence or incidence of back pain, either self-evaluated or diagnosed by a professional, most studies did not show statistically significant differences between experimental and control groups, or between pre-test and post-test data (Best, 1997; Bigos et al., 2009; Daltroy et al., 1997; Fanello et al., 2002; Johnsson et al., 2002; Lynch and Freund, 2000; Maher, 2000; Morken et al., 2002; Smedley et al., 2003; Van Poppel et al., 1998, 2004; Versloot et al., 1992; Videman et al., 1989; Warming et al., 2008; Yassi et al., 2001). One of the two exceptions is the case of sub-groups composed of individuals already suffering from back pain at pre-test time (Fanello et al., 2002). The other is a recent study (Kindblom-Rising et al., 2011) that showed a statistically significant decrease in the number of nurses reporting a physical disorder among a group exposed, for one year, to a two half-day patient transfer course. The authors did not observe such a reduction in their control group. In two systematic reviews, Martimo et al. concluded that there was limited to moderate evidence that training with or without assistive devices do not prevent back pain (Martimo et al., 2007) and that there was "...no evidence to support use of advice or training in working techniques with or without lifting equipment for preventing back pain..." (Martimo et al., 2008). Furthermore, in their systematic review, Bos et al. (2006) concluded that training and education combined with an ergonomic intervention were effective in preventing musculoskeletal symptoms, including back pain, in healthcare workers.

In general, studies evaluate simple programs that focus on training only or on training combined with making patient lifting equipment available in the workplace, whereas in theory, to be effective, a primary back pain prevention program must address all the risk factors for back pain present in the work environment, namely, the physical and biomechanical characteristics of work (Daltroy et al., 1993; Engholm and Holmström, 2005; Lagerström et al., 1998; Lynch and Freund, 2000), the management of work environments (Lynch and Freund, 2000) and equipment (Feldstein et al., 1993; Miller et al., 2006; Smedley et al., 2003) and the psychosocial aspects of work (Chokar et al., 2004; Koehoorn et al., 2006; Smedley et al., 2003; Truchon and Fillion, 2000; Westgaard and Winkel, 1997; Yassi et al., 2005). Moreover, in accordance with the Ottawa Charter for Health Promotion (World Health Organization, 1986), the programs implemented in hospitals should target workers, care units and the organizations themselves. The likelihood of simple training programs that target only behavioural changes reducing the incidence of back pain is therefore low. More research is therefore needed on multidimensional programs because back pain is multicausal.

Our study was part of a broader evaluative research project on SPTTP effectiveness in its natural environment. This type of evaluation is rare (Chen, 2004). However, it is necessary if application limitations and the ethical problems often characterizing the randomized controlled trials used to evaluate public health interventions (Victoria et al., 2004) are to be mitigated. The present evaluation sought to identify discrepancies between the SPTTP as implemented in hospitals and as prescribed by the ASSTSAS in order to prevent the occurrence of a Type III error in the second phase of our project, i.e., a bias consisting in erroneously concluding that a program is inefficient when the absence of effect is actually due to incomplete or inadequate program implementation (Dobson and Cook, 1980).

2. Methods

An advisory committee was created at the outset of the project. It consisted of the general manager of the ASSTSAS, his assistant, the SPTTP coordinator and the two principal investigators. The committee’s goals were to interface between universities, the organization responsible for the program (ASSTSAS) and the general, specialized or long-term care hospitals in which the program was implemented, and to optimize the validity of the study results. An interactive approach of this type increases the probability of research results being used by decision makers (Landry et al., 2001).

In order to identify the key aspects of the SPTTP whose implementation in hospitals was to be evaluated, the theory underlying the SPTTP was described first, i.e., the characteristics of both the process and the human and physical resources prescribed by the ASSTSAS as a means of achieving the program’s intermediate and final objectives. The following three conceptual frameworks were used. First, the educational objectives were organized hierarchically using Bloom’s taxonomy (1969), according to whether they refer to knowledge, comprehension, application, analysis, synthesis or evaluation. Second, Weston and Cantor’s conceptual framework (Weston and Cantor, 1986) was used to classify the pedagogical methods recommended: instructor-centred (lecture, questions or demonstrations), interactive (discussions, group projects or peer teaching), individualized (individual work with feedback) or experiential (learning in a natural context or through simulations). Finally, the Ottawa Charter for Health Promotion (World Health Organization, 1986) was used to identify at which of the following levels the SPTTP recommended action be taken in order to improve work situations: worker, care unit or the organization itself.

In order to describe the SPTTP underlying theory, theoretical sampling (Patton, 2003) was used to select, for purposes of direct observation, three SPTTP training sessions given by different master-instructors in the two cities where training took place: Montreal and Quebec City. The third case was selected after the ASSTSAS had introduced some changes into the SPTTP. The training sessions were audio-taped and transcribed. The transcripts and content of the master-instructors’ and trainers’ pedagogical materials were analyzed using our conceptual frameworks, and the results validated with the program designers and master-instructors (Leduc et al., 2008). Then, a self-administered questionnaire was developed for the purpose of collecting data to be used to determine the degree of SPTTP implementation in the hospitals. The questionnaire was designed in such a way as to describe the SPTTP as prescribed in 2000 and 2003, when the ASSTSAS had made changes to the program. It is conceivable that these recent changes were not implemented by all trainers. An initial version of the questionnaire was submitted to two members of the ASSTSAS advisory committee for validation. After introducing a first set of changes to improve question formulation, data accuracy and completeness, the revised questionnaire was sent to the 14 ASSTSAS master-instructors. They were asked to complete it and add any comments they deemed useful. Eight master-instructors answered the questionnaire. The time taken to complete the questionnaire varied from 60 to 90 min. Their suggestions aimed at clarifying questions, facilitating completion and optimizing the completeness of the data collected were taken into consideration. Multiple-choice questions were used, except for questions referring to dates or numbers, which were open-ended. TELEform software was used to format the final version of the questionnaire, perform the automatic coding of the data obtained.
from the completed questionnaires and transform the collected data to SPSS format.

The questionnaire’s reliability was evaluated using the test-retest method. The first 60 trainers who completed the questionnaire received a second questionnaire one month later, and 33 subjects returned it duly completed. The reliability of the measurement instrument was assessed through correlation analysis. Pearson’s coefficient of correlation ($r$) was used for continuous variables, and Cohen’s Kappa coefficient ($k$) for nominal variables. Overall, our results indicated fair to excellent reliability (Leduc et al., 2008). See Electronic Annex 1 in the online version of this article.

The study population comprised 444 SPTTP trainers who had been accredited for at least one year (before February 28, 2004) or re-accredited (before February 28, 2005), and were working in either general, specialized or long-term care hospitals. The type of organization where each healthcare professional worked was verified using the list of 1784 facilities in Quebec’s 18 healthcare administrative regions published by the Ministry of Health and Social Services and available over the Internet.

This article presents the results obtained regarding the following seven categories of variables included in the final self-administered questionnaire to the peer trainers: (a) characteristics of the study participants, (b) experience as SPTTP trainers, (c) involvement in an occupational health and safety committee, (d) characteristics of the training, (e) follow-up, (f) prevention, and (g) training activities given to follow-up monitors in the previous 12 months. These categories of variables were chosen according to the SPTTP underlying theory.

Data was collected by mail between March 31, 2005, and May 23, 2005, and two reminders were sent. Eleven of the 444 subjects in the study population no longer worked in the organization where they had been trained. Our research concerned the entire study population, i.e., 433 active trainers working in general, specialized or long-term care hospitals. Version 16.0 of the SPSS Statistics package was used for descriptive analysis.

3. Results

3.1. The underlying theory of the program under study

The SPTTP was designed for healthcare organizations. The program trainers have to be recruited by their employer from among their healthcare peers. Future trainers must receive 42 h of training by ASSTAS master-instructors and achieve at least 80% on the examination in order to be accredited. Then, colleague trainees are selected on a voluntary basis in their respective organization.

The SPTTP features four types of interventions. First, trainers must deliver a training program to healthcare staff in their establishment concerning safe patient handling and transfer techniques. According to the SPTTP designers, healthcare personnel should acquire the skills needed to identify factors that may be responsible for hazards in their work situation and the risk of back pain. They should then develop the ability to use the ergonomic principles learned regarding safe patient handling. More specifically, the objectives of this training program are to render workers capable of:

1. Analyzing the elements involved in various situations requiring patient handling and transfer.
2. Identifying deficient or unsafe aspects of patient handling and transfer techniques and take corrective measures.
3. Choosing safe and efficient methods appropriate to the work situation.
4. Providing clear guidelines to their work partners.
5. Moving and transferring patients safely.
6. Sharing safe patient handling and transfer information and skills with team members.

The recommended duration of the training program is 16 h, spread over 15–18 weeks. The 20 notional content items prescribed in 2000 are as follows:

- Work-related statistics
- Identification of the sources of hazards that hinder patient autonomy and caregiver safety
- Components of the work situation
- Interrelationships among the work situation components
- Prevention
- Back anatomy and physiology
- Impacts of work-related injuries
- Ability to prevent work-related injuries
- Patient preparation principles
- Patient needs and levels of assistance
- Level of assistance: patient supervision
- Communication with the patient
- Partial assistance given to the patient
- Patient positioning principles
- Patient holding/gripping principles
- Patient handling and transfer principles
- Total assistance
- Equipment use principles
- Barriers to application of principles, and solutions
- Problem-solving process

In 2003, ASSTAS prescribed to exclude the notional content on work-related injury statistics and back anatomy and physiology. Training is built around the level of assistance required by patients when they have to be moved, i.e., supervision, partial assistance or total assistance. The results of this study show that trainers are supposed to pursue all the pedagogical objectives in Bloom’s taxonomy, analyze the work situations at hand, choose the appropriate methods and perform the required patient handling and transfer tasks. The pedagogical methods recommended in the program must gradually shift from instructor-centred methods involving lectures to experiential methods involving role-plays and trials in the real workplace.

Following the SPTTP, the trainer has to follow-up on trainees in order to prevent problems that could hinder application of the principles learned. Follow-up is the second SPTTP intervention. The training given by the master-instructors does not specify the required frequency of the follow-up sessions or their duration.

Third, trainers must lead prevention activities for trainees within their organizations, identify occupational injury risk factors and recommend implementation of appropriate preventive measures for specific units or the hospital as a whole. The training received by the trainers is vague about the ways in which these activities must be carried out. For example, only the knowledge and comprehension objectives are covered for the notional content items pertaining to the identification of corrective measures and the sharing of safety-related information. No concrete information is provided on ways to implement the solutions retained by the personnel when such solutions require involvement on the part of the care unit, occupational health and safety committee or any other governing body in the organization. There appears, therefore, to be limited learning of the actions required in the workplace to change situations that pose risks. In addition, the information conveyed concerns mainly the worker’s and employer’s rights and obligations, and describes some of the activities to be performed and strategies for promoting adoption of safe patient handling and transfer principles. The focus is on changing individual caregiver behaviours rather than on their work environment. With regard to strategies promoting the adoption of principles, the notional content covers the following: (1) the acquisition of movement...
analysis skills in order to identify the causes of discrepancies between prescribed movements and those used by caregivers, (2) the trainer’s adoption of the behaviours he or she recommends, thus providing a role model for the caregiver staff, and lastly, (3) the promotion of patient handling by teams of two caregivers in situations requiring total assistance, for patient well-being rather than simply for caregiver safety. The pedagogical methods used are instructor-centred and involve lectures. In some cases, the skills/techniques to be acquired are practiced in the classroom or the workplace. However, the notional content is minimally developed, which would suggest, since the knowledge and comprehension objectives were only partially attained, that the trainers’ acquisition of skills and their implementation of prevention activities will be limited and will vary greatly from one trainer to the other.

The fourth SPTTP intervention is the training of follow-up monitors by peer trainers. At the end of their training, follow-up monitors should be able to help colleagues recognize hazards, look for solutions, use safe work methods, help identify and apply prevention solutions, and pass on this information in collaboration with the trainer and unit manager. The prescribed notional content is limited to identifying the topics to be covered during training. No details are provided regarding training content or duration, recommended teaching methods or materials, or activities to be carried out by follow-up monitors. Only the criteria for selecting possible follow-up monitors were specified. Since the intervention prescribed was not formally described, it is impossible to identify the means whereby it is supposed to produce the desired effects or to evaluate their plausibility.

3.2. SPTTP implementation fidelity

The survey response rate was 51.04% (n = 221). Eighteen respondents failed to complete the questionnaire, explaining that they had not undertaken any activities in the previous 12 months due to lack of time, absence from work or a change of employer or employment. A total of 203 subjects from 139 healthcare institutions returned their completed questionnaires. 72.7% of the settings had one peer trainer. In 19.4% and 5.8% of the institutions, the number of peer trainers per setting was two or three.

More than three-quarters of the respondents were women (77.8%). The average age was 44 (SD 6.8) years. More than one-third had either a college diploma (37.9%) or a university degree (33.5%). The 203 trainers who responded had an average of 7.15 (SD 5.3) years of experience as trainers and had been re-accredited on average 2.76 (SD 1.9) times. The most recent accreditation dated back 1.6 (SD 0.7) years on average; none of our respondents delivered the SPTTP without having been re-accredited within the previous two years as prescribed by the ASSTAS.

187 respondents were active trainers, i.e., they had trainer status within their organizations even if they had not led any SPTTP activities within the previous 12 months. Nearly 97% fell into the professional categories targeted by the ASSTAS in its recruitment of SPTTP trainers: 29.9% were physical therapists and 24.1% were orderlies, with nurses (15.5%) and nurse’s aides (12.8%) occupying the third and fourth positions respectively. They were followed by physiotherapists (8.6%) and occupational therapists (5.9%). The other respondents indicated that they had no training (1.1%), or were administrators (1.1%), special educators (0.5%) or domestic nurses (0.5%). The active SPTTP trainers had extensive experience in Quebec’s healthcare network, with an average of 19.7 (SD 7.7) years. Average seniority within the same organization was 16.6 (SD 8.2), and within the same category of employment, 16.5 years (SD 12.3).

However, the range of standard deviations reveals a strong variation.

The trainers came from 15 of Quebec’s 18 healthcare administrative regions, with those from Montreal predictably representing the largest proportion of respondents (33.2%), as it is the region with the highest hospital density in the province. The active trainers worked in 139 hospitals and over two-thirds of them in short- and long-term care facilities (70%). The average bed capacity was 200, but the number varied greatly (SD 157.2). The majority of the organizations in our study belonged to the public sector (86.6%), and a large majority (96.2%) had departments providing diagnostic services and healthcare directly to patients.

Although the SPTTP program does not prescribe involvement in occupational health and safety committees, it was observed that half of the active trainers had been (16.1%) or were (32.6%) members of such committees within their organizations. The average length of their committee membership was 63 months (SD 109.7), while the average number of hours dedicated to committee activities per month was 4.4 (SD 3.7).

61.5% (n = 115) of the active trainers had been engaged in training activities over the previous 12 months; they gave courses to over ten categories of professionals, of whom orderlies, nurses and nurse’s aides were the most frequent. These categories correspond to the ASSTAS target groups. The groups were generally homogeneous, as prescribed. The reasons cited by the 72 trainers who had not delivered SPTTP training in the previous 12 months were as follows: insufficient resources at their hospital (41.7%), requests from the SPTTP program administrator that they devote themselves to SPTTP follow-up activities (31.9%), insufficient numbers of people to train (15.3%), personal health or family problems (6.9%), changes made to the SPTTP by the ASSTAS (2.8%) and their organization’s loss of an SPTTP training mandate (1.4%).

The characteristics of the training sessions varied greatly, as shown by the standard deviations (Table 1). Classroom training duration varied from 0.5 to 21 h, and the average number of hours spent in class per session was lower than the prescribed minimum, with only 11.4% of the trainers providing the recommended 16 h of classroom training.

78.3% of the trainers covered the maximum number of notional content items, while the minimum number of items covered was 16.9. The results showed that nearly all the trainers taught safe patient preparation, positioning, handling and transfer principles. These results are reassuring, as these principles constitute the cornerstones of the SPTTP. Furthermore, all the notional content items of the training manual, introduced by the ASSTAS in 2003, were addressed by the majority of the trainers (Table 2).

Virtually all the trainers (98.3%) used instructor-centred pedagogical methods: lectures, questions addressed to the group or demonstrations of content they had previously presented. A large majority (93.5%) also used interactive methods, such as classroom discussions or demonstrations involving active trainee participation. 85.1% of the respondents opted for experiential pedagogical methods, enabling trainees to participate actively in the class, while 35% used instructor-centred methods and 25.5% combined these two approaches. 40.9% of the trainers did not use experiential methods at all, while 5.2% used them as recommended for 12 notional content items.

The training methods varied according to the content. The more complex the subject matter and the more practical exercises it

| Table 1: Characteristics of Training Sessions (n = 115). |
|---------------------------------|---|---|
| Mean | SD |
|-----------------------------|---|---|
| Number of training sessions per trainer | 5.1 | 4.0 |
| Number of participants per training session | 9.4 | 8.5 |
| Number of hours spent in class per session | 16.3 | 4.8 |
| Number of meetings with group participants | 2.0 | 2.7 |
| Number of half-days between each training period | 8.9 | 8.4 |
representatives. The situation varied greatly from trainer to trainer. Department supervisors and 11.1% (SD 18.2) from management. These requests came from workers, 28.2% (SD 23.9) from unit or the organization regarding prevention activities only, followed by those who combined prevention with SPTTP training activities. A little over 5% of the trainers offered all the SPTTP-prescribed activities.

4. Discussion

The results of this study revealed the weak implementation fidelity of the SPTTP provided in Quebec’s general, specialized and long-term care hospitals, with just over 5% of the trainers having offered the four ASSTAS-prescribed interventions in the previous 12 months. This overall result may partly be explained by the shortage of qualified manpower in the health and social service sector. As both trainers and trainees were healthcare workers, heavy workloads caused by such shortages may have reduced their availability to participate in the SPTTP.

More than 60% of the trainers had provided training during the previous 12 months. The groups trained generally comprised the personnel categories targeted by the ASSTAS and were homogeneous, as prescribed. Classroom training duration varied greatly, averaging 10.3 h. Only 11.4% of the trainers provided the recommended 16 h of instruction. Shortage of qualified manpower as well as high turnover rates may reduce the time that healthcare workers can devote to their training.

The results show that all the notional content items were addressed by a majority of the trainers. The training methods varied, depending on the content. The more complex the subject matter and the more practical exercises it required, the more likely trainers were to integrate some experiential methods into their teaching activities.

Less than 50% of the active trainers engaged in follow-up activities, dedicating an average of 1 h to each group. Although there was wide variation, given that the average number of participants per group was 9.4, the question may well be asked whether less than 10 min per trainee is sufficient. Since the training provided by the master-instructors did not specify the required duration of this follow-up, the level of implementation fidelity of this intervention is unclear.

Although a large majority of the peer trainers were involved in prevention activities, the results showed that they focused mainly on the workers and less so on changes that could be made at the organizational level. This study showed that the active trainers who did not get involved in prevention activities cited the same reasons as those cited to explain the absence of SPTTP training, notably, insufficient resources or organizational requests that they devote themselves solely to follow-up activities.

Trainers who trained follow-up monitors were rare (10.7%), and they gave 1.9 (SD 1.4) sessions on average per year. Each of them trained 8.5 (SD 4.7) follow-up monitors on average.

This study made it possible to identify nine practice profiles for 162 trainers who had provided SPTTP services in the previous 12 months (Table 5). The most frequent profile was trainers who provided prevention activities only, followed by those who combined prevention with SPTTP training activities. A little over 5% of the trainers offered all the SPTTP-prescribed activities.

required, the more likely the trainers were to integrate some experiential methods into their teaching activities. This was the case for the principles applicable to preparing, positioning and transferring patients, and to communication with the patient, as well as to levels of care. Only the handling principles involved fewer hands-on exercises.

46.1% of the active trainers engaged in follow-up activities after classroom training. These activities lasted an average of 1 h and took place more than three weeks after the end of training. The ASSTAS does not prescribe any characteristics for such activities. While follow-up activities were usually performed during day shifts, a substantial percentage of follow-up time was offered in the evenings or at night (Table 3), providing contact with the trainees who worked during those hours.

A large majority of the active trainers led prevention activities (72.7%), on average devoting 8.35 (SD 10.0) hours per month to them (Table 4). The ASSTAS does not prescribe a minimum number of hours for these activities. Each trainer received an average of 6.77 (SD 7.1) requests per month. On average, 50% (SD 28.3) of these requests came from workers, 28.2% (SD 23.9) from unit or the department supervisors and 11.1% (SD 18.2) from management representatives. The situation varied greatly from trainer to trainer.

Trainers taught their colleagues safe handling and transfer techniques appropriate to the patient’s capacities, as well as problem-solving strategies and how to use equipment (Table 4). Recommendations intended for units or the organization regarding needed improvements in the facilities or purchases of or changes to equipment varied substantially. Less than 15% of the trainers made such recommendations often or very often. Prevention activities therefore centred mainly on the workers and less so on changes that could be made at the organizational level.
and safety committees, as a strategy for obtaining other colleagues' support in their efforts to attain primary prevention objectives.

Only 10.7% of the trainers trained follow-up monitors. The low implementation of this activity could well be attributable to the fact that the ASSTSAS does not provide trainers with pedagogical materials to help them give this type of training.

To the best of our knowledge, this study is the first to evaluate discrepancies between prescribed and implemented occupational health and safety training programs in a population of trainers. The patient transfer techniques included in the program studied are comparable to those in the Stockholm Training Concept (Johnsson et al., 2002), and the notion content of the SPTTP is similar to that of most training programs targeting musculoskeletal injury prevention (Lagacé, 2005). However, the SPTTP is more complex than most back pain primary prevention programs that have been the subject of evaluative research since the ASSTSAS recommends complementing training through follow-up activities and prevention counselling for workers, but also for unit managers and administrators in their organizations.

The content of the questionnaire was exhaustive and subject to validation by master trainers and program designers, which are irrefutable assets. Moreover, its overall reliability was fair to excellent. Its validity and reliability make it a useful tool for program monitoring and for other researchers interested in investigating similar programs.

The modest 51.04% response rate obtained nonetheless remains satisfactory as it applies to the entire study population rather than just a sample, which is the case in most studies on occupational health and safety interventions implemented in the workplace. One of the main reasons a higher response rate was not obtained is that several trainers who had not performed activities in the previous 12 months did not complete the questionnaire. Although we identified 18 such trainers, the actual number was probably higher. It is therefore impossible to compare the non-respondents’ characteristics to those of the survey respondents, particularly since the ASSTSAS data bank did not include socio-demographic data. The time required to complete the questionnaire may also have been an obstacle to obtaining a higher response rate. However, the response rate obtained was more than satisfactory, given the heavy workload borne by healthcare workers due to the shortage of qualified man power in the health and social service sector prevailing in Quebec, as in other industrialized nations, at the time of the study.

5. Conclusion

Our results were useful to the ASSTSAS, which became aware of the problems associated with the implementation of its program and was prompted to seek solutions. Furthermore, the results will allow any organization studying the feasibility of implementing a program similar to the SPTTP to anticipate discrepancies likely to arise between the prescribed and implemented programs. The results could also guide administrators seeking to appraise their own program implementation and introduce corrective measures.

Based on their systematic review of clinical trials, Maher (2000) and Van Poppel et al. (1998, 2004) found limited evidence that training did not help prevent back pain in the workplace. Most epidemiological studies of back pain training programs have adopted the black box approach (Chen and Rossi, 1983), in which the authors neglect to specify the underlying program theory. Without knowledge of the underlying program theory, it is difficult to ascertain the external validity and usefulness of the study’s inferences.

In the systematic reviews, when clinical trial results are available, the authors often exclude the other types of designs, which are described as methodologically weaker and as coming from disciplines other than epidemiology, such as evaluative research or ergonomics (Neumann et al., 2010). The results of observational evaluations must be taken into account in practical evidence-based guidelines. Without them, such guidelines would be biased, reflecting interventions that are easy to evaluate using epidemiological methods but that are not necessarily more efficient or are characterized by a high cost/benefit ratio (Des Jarlais et al., 2004).

Given the prevalence of occupational back pain and the lack of scientific evidence on the effectiveness of multidimensional programs designed to prevent its incidence, more evaluative research is needed. However, the implementation fidelity of such complex programs must be appraised and ensured before their effectiveness is evaluated in real work settings. Otherwise, studies may conclude erroneously that the program is ineffective when the real problem could be faulty implementation (Dobson and Cook, 1980; Hasson, 2010).

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Appendix. Supplementary data

Supplementary data associated with this article can be found in the online version, at doi:10.1016/j.apergo.2011.05.008.
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