Effectiveness of postgraduate education in occupational medicine

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Evaluation of a postgraduate educational programme for occupational physicians on work rehabilitation guidelines for patients with low-back pain

A before-after comparison

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Abstract

Objective was to evaluate the educational programme on work rehabilitation guidelines in a group of the Corvus school of occupational medicine. After the educational programme the scores on a knowledge test about the guidelines was significantly increased. The score on performance indicators was also significantly increased. The performance indicator score weights the application of the guidelines in daily practice. The performance indicators seem applicable as a means of feedback in the educational programme and as a means of evaluation of the educational programme. The performance indicators give an impression of the occupational physicians’ competence and performance. The conclusion is that the educational programme probably attributed to the improvement of the participants’ knowledge of the guidelines on low back pain and to the improvement of the participants’ application of the guidelines in daily practice.
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Introduction

The Corvu school of Occupational Medicine in Amsterdam, The Netherlands is a cooperation of the Coronel Institute of the Academic Medical Centre of the University of Amsterdam and the department of social medicine of the Free University of Amsterdam. The Corvu organises the postgraduate medical education for occupational physicians. This is a four year programme after graduation as a doctor. In these four years the physicians in training work in practice, the practical part of the programme. Further, the education consists of a theoretical part of 96 days, twelve weeks of working places in for example another occupational practice and insurance medicine and the writing of a report on an own research project. The education takes an average of about one day a week.

The Corvu school of Occupational medicine is a well functioning educational institute with seventeen years of experience in training of occupational physicians. There have been publications on the tasks and responsibilities of occupational physicians in The Netherlands. In the Coronel Institute studies are carried out on the effectiveness of occupational rehabilitation, for example for workers with low back pain.

Both projects are combined in a research project on the evaluation of a postgraduate educational programme for occupational physicians on work rehabilitation guidelines for low back pain patients. In this article we describe this study.

The educational programme on the guidelines of low back pain takes one and a half day in a module of six days on rehabilitation by occupational physicians. The programme consists of an oral explanation of the guidelines. The physicians had the possibility to read a written version of the guidelines in advance. The guidelines of general practitioners on low back pain are also discussed, just as the possibilities of referral to a expert centre for low back pain patients. Finally, feedback is given on the practice cases delivered by the participants before the start of the programme.

This study is mend as a first step in getting insight in the effectiveness of education in training rehabilitation guidelines. Because occupational
physicians in their postgraduate training work in real practice in an occupational health service for about 70 to 80 percent of their time, and are in training for about 20 to 30 percent, we are not only interested in the increase of knowledge and skills, but especially in the effect of education on the improvement of their performance in practice. The results of this study are of immediate interest for the quality of the Corvu training programme and, indirectly, for the quality of rehabilitation of low back pain patients in occupational health. Besides that, this investigation is of interest for the insight in the relation between the acquisition of knowledge and the application of knowledge in practice during the postgraduate training period. The relation between knowledge, skills and the application in practice is described in literature. In the pyramid of Miller a mutual relationship is assumed between four successive levels of competence. The basic level, ‘knows’, encloses theoretic knowledge; the second level, ‘knows how’, encloses knowledge on how to perform skills; the third level, ‘shows how’, shows the competence to perform skills and the fourth level, ‘does’, shows what a participants can do in real practice. The first three levels are called ‘competence’ and the fourth level ‘performance’.

The research question in this study is double: to what extent participants’ knowledge of the guidelines on management of workers with low back pain does increase and second: do the participants follow the guidelines better in their practice after the programme.

Methods

The study was carried out in one group of the Corvu school of Occupational Medicine. A group consists of 25 doctors in training for occupational medicine. The study design contained tests before and after the programme. This is called a pre - experimental design. Two knowledge tests were taken to measure knowledge of the guidelines: one immediately before and one, after a week, immediately after the training. The tests consisted of 45 true/false questions without a question mark option. The instruction given was to answer all questions. The 90 questions were random divided over the two tests. All questions could be answered with the help of the guidelines of the
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occupational physicians and the applicable guidelines of general practitioners. The questions were a reflection of these guidelines. The knowledge test scores were expressed as a percentage good answers and statistically compared with a paired t test. The reliability of the items in the questionnaire has been analysed with Cronbach’s alpha. Six questions of the first test were not enclosed in the calculation and Cronbach’s alpha for this pre-test was 0.66. The post test consisted of 45 questions and Cronbach’s alpha was 0.61. The correlation (Pearson) between pre test and post test was 0.213 (not significant).

Performance indicators are used in this research to measure to what extent the physicians used and followed the guidelines on work rehabilitation of low back pain patients in their practice and if this changes after the educational programme. These performance indicators appeared to be useful for the measurement of performance in practice.4,8 A performance indicator is an essential part of the process of care and an indicator of the quality of medical care. Each performance indicator contains criteria, marking the difference between good and bad quality of care.9 For example: making a correct diagnosis is seen as an essential part of the performance of the occupational physician in cases of low back pain patients. Criteria are given to define if the diagnosis is correct. When these criteria are not met, the quality of care is supposed to be bad.

To assess the physicians’ performance we asked them to randomly collect from their own practice five cases of low-back pain patients who had been absent from work in the months before the educational programme and five cases in the months after. The students were asked to fill in a form for each of these cases. By comparing these forms with the performance indicators the researcher scored to what extent the students had followed the guidelines. The performance indicators consisted of twelve well defined features. These twelve indicators (table 3.1) are characterized as indicators of the quality of the rehabilitation process.

The measurement of these indicators produce an estimation of the participants’ guidelines performance. Because the cases delivered in the months before the education were used in the educational pro-
Table 3.1. Description of the twelve performance indicators which are used in this study.

<table>
<thead>
<tr>
<th>Performance indicator (P)</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 0 diagnosis</td>
<td>medical diagnosis; classification in aspecific back pain, radiating back pain, specific back pain, still unclear</td>
</tr>
<tr>
<td>P 1 activating approach</td>
<td>Activating approach if diagnosis is aspecific back pain</td>
</tr>
<tr>
<td>P 2-1 psycho-social judgement</td>
<td>Request for and assessment of psycho-social problems</td>
</tr>
<tr>
<td>P 2-2 psycho-social approach</td>
<td>Actions in consulting hour if necessary</td>
</tr>
<tr>
<td>P 3-1 evaluation of medical treatment</td>
<td>Is medical treatment adequate and / or impediment for rehabilitation</td>
</tr>
<tr>
<td>P 3-2 action / consultation of medical colleagues</td>
<td>Action or consultation of medical colleagues if necessary</td>
</tr>
<tr>
<td>P 4-1 evaluation of work disabilities</td>
<td>Request for and assessment of disabilities for own current work and necessary work adjustments</td>
</tr>
<tr>
<td>P 4-2 action for work adjustment</td>
<td>Actions for (temporary) work adjustment if necessary</td>
</tr>
<tr>
<td>P 5-1 evaluation of organisational obstructions</td>
<td>Request for and assessment of organisational obstructions to work rehabilitation</td>
</tr>
<tr>
<td>P 5-2 action towards the organisation / the employer</td>
<td>Actions to remove organisational obstructions if necessary</td>
</tr>
<tr>
<td>P 6 advice on return to work</td>
<td>Advice given or revision in appointment if necessary</td>
</tr>
<tr>
<td>P 7 revision policy</td>
<td>For aspecific low-back pain: revision within three weeks</td>
</tr>
</tbody>
</table>

Programme to give feedback, the researchers knew which cases were delivered before and which after the programme. The forms of cases before the programme were divided and assessed by three researchers and verified by one of them. The forms of the cases after the pro-
gramme were assessed by one researcher. The possible score for each of the twelve performance indicators was: 'good', 'not good', 'not applicable' and 'could not be assessed'. The score was expressed per case as a percentage of the performance indicators that met the criteria versus all the assessed performance indicators that were applicable. For feedback purposes, this was done per case. For every student we calculated a mean percentage of the performance scores over all cases before and after the training. The scores and differences were calculated with a paired samples t-test. The correlation between the measurement of performance before and after the education was -0.036 (not significant).

**Results**

For the knowledge test a before and after comparison was possible in nineteen participants. Two participants did not take part in the pre test and four participants did not take part in the post test. Fourteen out of nineteen participants had a better result on the post test. Five participants had a worse result. The mean difference between pre test and post test are significant (paired samples t-test, p < .01).

**Table 3.2.** Results of knowledge tests and performance indicator scores and statistical significance before and after the educational programme.

<table>
<thead>
<tr>
<th></th>
<th>Before the educational programme</th>
<th>After the educational programme</th>
<th>Differences tested with the paired samples t test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of participants</td>
<td>19</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Number of cases</td>
<td>92</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Knowledge test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>percentage correct answers ± standard deviation</td>
<td>76 ± 8.0</td>
<td>83 ± 6.9</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>Performance indicator score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>percentage correct ± standard deviation</td>
<td>81 ± 10.2</td>
<td>94 ± 6.2</td>
<td>p &lt; .001</td>
</tr>
</tbody>
</table>
Before-after comparison

A comparison of the performance scores before and after the programme was possible also for nineteen participants. The other six participants filled in to little forms (less than three before and less than three after the programme) for an assessment. Seventeen out of nineteen participants had a better performance indicator score after the educational programme. For one participant the score did not change and one had a lower score after the programme. The differences in performance indicator scores are statistically significant (paired samples t test, p < .001). The results of the knowledge tests and the performance indicators are summarized in table 3.2.

Discussion

In this study the participants' score on a knowledge test after the educational programme is higher than before this programme. The same outcome is seen on the outcome parameter performance. This study is a non controlled study with a pre test and a post test. With 25 participants the group size for research purposes is small. This pre-experimental design is not suitable for drawing direct conclusions about the impact of the educational programme. For there can be other factors, which were not under study, that have played a part. This applies especially for the outcome measure of performance. These are assessed over a longer period of time, so other influences have been possible. Also a training effect in making the test and filling in the forms is possible. Especially for the knowledge tests, for these have been assessed in a period of only one week. And perhaps the post knowledge test was without intention easier than the pre test. A study as described here can be regarded as an evaluation study. In an evaluation study is tested whether an expected outcome has occurred.7 It might be expected that in this case the educational programme has contributed to the improvements on knowledge and performance. The internal consistency of the knowledge tests appeared to be limited, but sufficient for the evaluation purposes of this study. For purposes of individual selection a higher internal consistency is necessary.10,11 The correlations between pre tests and post tests were low and not significant. This is caused particularly by a number of participants that scored low in the pre test and very high in the post test. The con-
tent validity was good. The questions constituted a good reflection of the guidelines. Based on a well balanced judgement of the data in this study, we can draw some conclusions. We will use the experiences of this study in an improved design. We already started a next, controlled, study with two Corvu groups to investigate and to check the results of the described study. With the quasi experimental design we also can check whether the results of this study are reproducible. For the time being we conclude that the educational programme actually contributed to a better knowledge of the guidelines and performance in practice.
Before-after comparison

References


8. Weide WE van der, Verbeek JHAM, Dijk FJH van, Hulshof CTJ. The development and evaluation of a quality assessment instrument for occupational physicians. Occup Env Med 1998 (accepted for publication).


