Improving the effectiveness of short-term courses for multidisciplinary health care professionals

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Abstract
The Practical Diabetology (PD) course for multidisciplinary health care professionals (HCPs) is directed at building a team-based approach to diabetes care delivery. Participants were asked to apply course learning to identify deficiencies in care delivery in their own settings and develop action plans to improve care and continuing self-development.

The objective of the study was to evaluate the short- and mid-term impact of seven PD courses held between March 2011 and March 2012. Three methods of assessment were carried out: an end of course evaluation; pre- and post-tests to assess gain in knowledge and change in attitudes; and self-assessment of action plan implementation at six months to determine level of behaviour change.

In total, 327 multidisciplinary HCPs participated in the seven PD courses. End of course evaluation indicated that the PD course was valued by course participants in terms of relevance of the topics and learning experience. A significant gain in knowledge and positive changes in attitudes were seen immediately post course in both groups. Of the 160 action plans prepared by participating teams (consisting of at least two members each – one medical and one non-medical HCP), 68 (42.5%) were implemented. At six months, continued positive change was demonstrated through self-assessment of action plan implementation.

PD courses were appreciated by the participants; significant gain in knowledge and positive change in selected attitudes were seen in the short term. Implementation of action plans helped enhance participants’ competency for teamwork, problem solving and self-development skills. Copyright © 2015 John Wiley & Sons.

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Introduction
Current estimates indicate that there are 387 million people with diabetes worldwide and this number is likely to increase to 552 million by 2030.1 Optimum management of diabetes requires a multidisciplinary approach, where trained health care professionals (HCPs) working in teams organise and deliver care as well as empower people with diabetes for effective self-management.2

Studies show that multi-professional team care leads to significant reduction in HbA1c levels and improves long-term outcomes.3

Most multi-professional education courses result in gain in knowledge and positive changes in attitude to teamwork, and better understanding, awareness and acceptance of other health professionals’ skills and capabilities.4–10 Only a few studies have been conducted so far; the research demonstrates how even short multi-professional courses can sustain long-term changes in awareness of professional responsibility11,12 and result in improved community care of diabetes.7

The Practical Diabetology (PD) course for multidisciplinary HCPs is directed at building a team-based approach to diabetes care delivery and has been previously described in a study by Rossing et al.8 The different sessions in the course are: ‘try to live as a diabetes person’, nutrition, communication, blood glucose lowering treatment, foot care, late complications, quality assurance, motivating people, working together – team building and improving your own clinic. Various teaching methods, such as lectures, workshops, hands-on practice sessions, discussions and reflections are used in the course.

On the last day of the course, participants are asked to prepare action plans for team-based projects to be implemented in their clinics on their return. Making an action plan follows a constructivist approach to learning, as the learner is active and self-directed.13 Action plans encourage learners to take control of their...
own programmes using reflection and strategic thinking to identify needs and make necessary changes to achieve desired goals.14

PD participants are encouraged to self-reflect, identify current deficiencies in their own care provision and prepare a time-bound plan for corrective actions and ongoing self-development. Developing and writing action plans are a useful tool to motivate and self-monitor behavioural change among course participants15,16 and help identify any need for further resources or training.16

PD courses were initially only held in Denmark for all international participants. But, due to increasing demand from India and the higher cost associated with travel to Denmark, it was decided to hold separate courses in India while continuing the international course in Denmark for participants from other countries. The course content at both sites is almost identical; and the overall framework is the same – with focus on practical aspects of diabetes care, workshops, interactive games and discussions with participants on team-based care. The course is relevant internationally, despite contextual differences, as it is focused on the practical aspects of care and the attitudes of the care providers. This allows participants to reflect on their current practice and make appropriate changes relevant to their context and need.

This paper seeks to answer the following key questions:

• Is the PD course valued by the participants (HCPs)?
• Do participants attending the short-term PD course gain knowledge on practical aspects of diabetes management, and does the course lead to changes in attitudes to diabetes care in a multidisciplinary team setting?
• Do creation and implementation of action plans change individual behaviour and improve practice?

In order to answer the above questions, three methods of assessment were planned:

• End-of-course evaluation.
• Pre- and post-tests to examine any gain in knowledge and change in attitude among the HCPs attending the PD course.
• Self-assessment of implementation of action plans to determine the level of behaviour change.

Methods

A total of 327 course participants from seven consecutive diabetes courses held between March 2011 and March 2012 were the subjects of this study. Four courses held in India had 225 (122 medical and 103 non-medical) HCPs from different regions of India, and three courses held in Denmark had 102 (66 medical and 36 non-medical) HCPs from 16 different countries across Africa, Europe and South America. The non-medical HCPs were nurses, dietitians, diabetes educators, laboratory technicians and podiatrists.

End-of-course evaluation. The evaluation form consisted of two parts. Part 1 asked participants to rate each session, while part 2 asked participants to evaluate the overall course. Participants responded on a five-point rating scale, ranging from 1 = ‘no value or not at all relevant’ to 5 = ‘great value or very relevant’.

Pre- and post-test assessments.

Identical tests were conducted at the beginning (pre) and end of the course (post) to determine any gain in knowledge and change in attitude. To ensure a true paired sample of pre- and post-course assessment, each participant was randomly assigned a nine digit personal identification code (PIC) and given two copies of the PIC sticker. The participants were then asked to paste one sticker on the top page of the pre- and the other on the post-test answer sheets. The answer sheets with the same PIC code were then compared.

The test instrument consisted of:

1. a knowledge measure with 10 multiple choice questions (MCQs), representing topics from different sessions in the course; and
2. an attitude measure with 10 statements. The attitude statements focused on ‘patient autonomy’, ‘treatment of diabetes’, ‘skills training for diabetes team’ and ‘diabetes teamwork’, and were adapted from a previously validated instrument17 that used a five-point Likert scale, ranging from totally agree to totally disagree. Both the knowledge and attitude measures were piloted and tested for content, time taken to answer, and ease of comprehension. A scoring key was developed to calculate the scores for both the knowledge and attitude measures.

Self-assessment of action plans. The action plans were recorded in duplicate, along with complete details of the person responsible for the plan (referred to as the Action Plan Owner). One copy of each plan was retained by course facilitators. Six months post course, all Action Plan Owners were contacted to complete an online self-assessment form. Participants who did not respond by the deadline were sent at least three reminders by email or phone. The self-assessment form contained both open- and close-ended questions, to capture perceptions and experiences of implementing the plans. The close-ended questions used a five-point rating scale to assess the degree of plan implementation, ranging from 1 = ‘only a small part’ to 5 = ‘totally’. Open-ended questions captured perceptions and experiences of implementing the plans. The purpose of this assessment was to see if action plans had facilitated further learning or resulted in improved care delivery.

Data analysis. The data were entered in a Microsoft Excel (2007) worksheet for analysis. The t-test for paired samples was used to analyse gain in knowledge. The attitude statements were analysed for any significant differences using the Wilcoxon signed-rank test, SPSS version 15.0 for Windows (Chicago, USA). Only paired data points were used for analysis.

Two researchers in the Steno team (KK and FP) created the initial framework for doing qualitative analysis of the self-assessment of action plans. Open-ended questions were analysed using descriptive statistics and content analysis using the framework method – by first reading the responses several times, followed by indexing and recording the emerging themes in a framework, and finally mapping and interpreting the findings.18

Planned activities were first categorised into 18 sub-themes and...
The mean score was significant at both sites ($p<0.0001$). There was no significant difference in the change between the two sites. The improvement in knowledge score at the India site was higher (87%), compared to Denmark (62%).

There were 10 multiple choice questions in the knowledge instrument with 5 choices each.

### Table 1. Pre- and post-test scores

<table>
<thead>
<tr>
<th></th>
<th>Pre-test Mean (SD)</th>
<th>Post-test Mean (SD)</th>
<th>Change</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark (n=93)</td>
<td>4.68 (1.53)</td>
<td>7.61 (1.37)</td>
<td>62.6%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>India (n=215)</td>
<td>3.29 (1.43)</td>
<td>6.14 (1.64)</td>
<td>86.6%</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Finally, grouped into nine themes. The degree of plan implementation at six months was rated on a scale of $1=’$only a small part’ to $5=’$totally’.

Ethics approval in Denmark where the study was conducted was not required as the research did not involve any biomedical material or collecting patient information.10 Course participants were invited to anonymously complete the end of course evaluation and pre- and post-test forms; return of the filled form was taken as consent to participate.

### Results

#### End-of-course evaluation.

All seven courses were rated positively by the participants in the end-of-course evaluation. Out of a maximum score of 5, the overall mean rating (standard deviation) was 4.4 (0.7) and 4.6 (0.7) by the participants for courses in India and Denmark respectively. The individual sessions in the programme were also positively rated and showed participants’ preference for interactive sessions involving group work and reflections.

#### Pre- and post-test assessments.

Of the 225 HCPs who enrolled for the courses in India, 215 (96%) completed pre- and post-test, for both knowledge and attitude, while for the courses in Denmark it was 93 out of 102 (91%).

Table 1 shows the pre- and post-test mean knowledge scores with standard deviation. The change in mean score was significant at both sites ($p<0.0001$). There was no significant difference in mean scores between the two sites. The improvement in knowledge score at the India site was higher (87%), compared to the Denmark site (63%).

The paired attitude scores at the two sites are shown in Table 2. Change was considered positive when the score moved towards the desired direction and negative when it moved away from the desired direction. A positive change was noticed for most of the statements, but was significant for only three attitude statements at the Denmark site, and five at the India site. The attitude statement ‘advice on changes in insulin dose can be given by a trained diabetes nurse’, focusing on the importance of teamwork, significantly changed for both the sites.

### Self-assessment of action plans.

In total, 160 action plans were developed. Of these, 111 were made by teams attending courses in India, and 49 by teams attending courses in Denmark. Completed self-assessment forms were received from 81 teams at the end of six months, giving an overall response rate of 50% (Denmark 61%, and India 46%). The filled self-assessment forms received at six months contained 125 activity plans. The top five action plan themes identified for both groups are shown in Figure 1.

The highest number of action plans made related to staff development, followed by clinic management and patient education. The top five action plan themes covered 88% of the planned activities, clearly showing the key areas taken up for further development, and these were consistent across both of the groups. Of those submitting self-assessment at six months, the rate of implementation was 80% (24/30) and 86% (44/51) for teams attending courses in Denmark and India, respectively. The degree of implementation (on a scale of 1 to 5) was rated 3 and above in 79% of responses (73% for Denmark and 83% for India), and was not correlated with the type or the number of action plan activities.

Ninety percent of the respondents felt that action plans helped create new learning and increased knowledge. Seventy-six statements about knowledge gain were grouped into 14 sub-themes, and further consolidated into seven themes. The top five themes regarding increase in knowledge are shown in Figure 2. More than 80% of the participants in the courses held in Denmark and 60% in India found making action plans totally useful, rating it 5.

Participants found organising care, teamwork, and the opportunity to discuss and reflect most valuable. In India, they particularly valued patient focus.

Common features of teams’ successful in implementing action plans (rating 4 or 5) were: team discussion of their action plans; information sharing and empowerment of the teams; minimal changes made to the plan on return back to their clinic; and maintaining the implementation timeframe. This led to key positive changes in the area of team development such as enhanced cooperation, interaction and communication between HCPs.

Writing down action plans helped teams clarify thoughts about the changes required at work. Self-assessment of implementation of action plans at six months by course participants demonstrated continued positive changes.

### Discussion

Participants liked the PD courses, and found them to be useful and relevant to their work. Positive change in select attitudes in the short term as observed in this study has been reported previously in another study on the PD course, but is different from studies of other short courses. This may be because the PD courses are multifaceted containing both lectures and workshops to enhance practical skills, and are interspersed with reflection time, which may contribute to better understanding, gain in knowledge and positive change in attitude. The fact that a paired data set was used may have improved the sensitivity of the assessment.

Creating course content and evaluation relevant for all groups in a multi-professional course remains a challenge. Despite the lower overall scores seen in courses at the India site with a larger proportion of
non-medical HCPs, the average gain in knowledge was higher (87% versus 63%), indicating that the course content was relevant and applicable to both medical and non-medical groups. Generally, greater percentage gain in knowledge is seen in study groups with more non-medical health professionals. 21

Significant changes in attitude to specific statements were seen in the present study in both of the study groups, particularly relating to ‘skills training for the diabetes team’ and ‘teamwork’. Changes in attitude to patient autonomy have been reported after a continuing medical education programme on diabetes. 22 This was also noticed in the present study, but only in courses held in Denmark, and not in India. The difference may be explained by the contextual basis of practices in particular regions. In an overburdened health system with limited time for interaction, doctors are unable or unwilling to hand over autonomy to patients, 23,24 and physicians’ attitudes are shared by non-medical HCPs. 25,26

Attitudes and perceptions concerning insulin initiation and resistance on the part of the patient and physician remain a problem. 23–27 A shift in such attitudes can lead to improvement in insulin treatment. One such shift that occurred with the participants from India was that, in the post-course evaluation, initiating insulin for a patient was no longer perceived as a failure of treatment, as shown in Table 2.

<table>
<thead>
<tr>
<th>Attitude statement</th>
<th>Denmark</th>
<th>India</th>
<th>P-value</th>
<th>Denmark</th>
<th>India</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The important decisions regarding daily diabetes care should be made by the person with diabetes</td>
<td>No. 88</td>
<td>Pre-test Mean (SD) 1.0 (1.2)</td>
<td>Post-test Mean (SD) 1.4 (1.0)</td>
<td>0.0074</td>
<td>No. 193</td>
<td>Pre-test Mean (SD) 0.8 (1.1)</td>
</tr>
<tr>
<td>2. Starting on insulin means that the diabetes treatment plan has failed for the type 2 patient</td>
<td>No. 91</td>
<td>Pre-test Mean (SD) -1.1 (1.2)</td>
<td>Post-test Mean (SD) -1.3 (1.1)</td>
<td>NS</td>
<td>No. 190</td>
<td>Pre-test Mean (SD) -0.8 (1.2)</td>
</tr>
<tr>
<td>3. Health care professionals should be taught how daily diabetes care affects patients’ lives</td>
<td>No. 91</td>
<td>Pre-test Mean (SD) 1.5 (0.8)</td>
<td>Post-test Mean (SD) 1.7 (0.6)</td>
<td>NS</td>
<td>No. 191</td>
<td>Pre-test Mean (SD) 1.4 (0.8)</td>
</tr>
<tr>
<td>4. The motivational skills of a health care provider can influence the adherence to treatment of the person with diabetes</td>
<td>No. 85</td>
<td>Pre-test Mean (SD) 1.6 (0.6)</td>
<td>Post-test Mean (SD) 1.8 (0.6)</td>
<td>NS</td>
<td>No. 183</td>
<td>Pre-test Mean (SD) 1.4 (0.9)</td>
</tr>
<tr>
<td>5. Quantity and not quality of carbohydrates is important in food for people with diabetes</td>
<td>No. 88</td>
<td>Pre-test Mean (SD) -0.1 (1.4)</td>
<td>Post-test Mean (SD) -0.2 (1.6)</td>
<td>NS</td>
<td>No. 94</td>
<td>Pre-test Mean (SD) 0.0 (1.3)</td>
</tr>
<tr>
<td>5a.* Macronutrient recommendations (percent of carbohydrates, protein and fat in the diet) should vary according to individual metabolic goals and preferences</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>91</td>
<td>Pre-test Mean (SD) 1.2 (0.8)</td>
</tr>
<tr>
<td>6. People with diabetes should have the final say in setting their blood glucose goals</td>
<td>No. 89</td>
<td>Pre-test Mean (SD) 0.2 (1.2)</td>
<td>Post-test Mean (SD) 0.7 (1.3)</td>
<td>0.0009</td>
<td>No. 180</td>
<td>Pre-test Mean (SD) 0.1 (1.4)</td>
</tr>
<tr>
<td>7. People with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care</td>
<td>No. 90</td>
<td>Pre-test Mean (SD) 1.5 (1.0)</td>
<td>Post-test Mean (SD) 1.4 (0.9)</td>
<td>NS</td>
<td>No. 196</td>
<td>Pre-test Mean (SD) 1.2 (1.0)</td>
</tr>
<tr>
<td>8. Advice on changes in insulin dose can be given by a trained diabetes nurse</td>
<td>No. 89</td>
<td>Pre-test Mean (SD) 1.0 (1.1)</td>
<td>Post-test Mean (SD) 1.6 (0.7)</td>
<td>&lt;0.0001</td>
<td>No. 194</td>
<td>Pre-test Mean (SD) 0.5 (1.2)</td>
</tr>
<tr>
<td>9. Prevention of foot ulcers is primarily the responsibility of the person with diabetes</td>
<td>No. 90</td>
<td>Pre-test Mean (SD) -0.4 (1.4)</td>
<td>Post-test Mean (SD) -0.4 (1.5)</td>
<td>NS</td>
<td>No. 195</td>
<td>Pre-test Mean (SD) -0.1 (1.4)</td>
</tr>
<tr>
<td>10. What the patient does has more effect on the outcome of diabetes care than anything a health professional does</td>
<td>No. 85</td>
<td>Pre-test Mean (SD) 1.1 (0.9)</td>
<td>Post-test Mean (SD) 1.1 (1.0)</td>
<td>NS</td>
<td>No. 173</td>
<td>Pre-test Mean (SD) 0.9 (1.1)</td>
</tr>
</tbody>
</table>

*Statement no. 5 for the PD course held in India in 2012 was changed as the focus of the nutrition lecture had changed.

Table 2. Pre- and post-test attitude statement scores
Previous studies have failed to show a sustained effect of a single short-term course, unless accompanied by other complementary interventions. The data at six months relating to the self-assessment of action plans is a complementary intervention and indicates a positive movement, but whether these changes can be sustained and translate into a long-term change in behaviour will require a follow-up study.

Writing down action plans helped teams clarify thoughts about the changes required at work; as described by one respondent: ‘It is good to have a blueprint of what we want to do, how we want to do it, who will do it and when we have to do it.’

This gave an opportunity for teams to apply what they had learned as described in the Kolb cycle of adult learning, by reflecting on one’s needs and making changes to fulfil those needs. And as stated by another respondent: ‘Making an action plan was first an excellent way to identify the problems and to choose which problem we should treat in priority, and to forecast obstacles in order to prepare an in-time solution.’

Making action plans reinforced the objective of the course – to work as teams – and, as expressed by many respondents, changed their outlook. For example: ‘By making an action plan, we were allowed to work as a team, sharing knowledge. And also I was able to learn more about diabetes practically.’ Making action plans rekindled earlier thoughts for change as expressed in one comment: ‘I already had the idea, but when you asked us to contribute with an action plan, the plan became clearer in my mind.’ Not everyone found it easy; for some it was time consuming and difficult. ‘It is very important but it is difficult, consuming a lot of time but nothing is impossible’, while others felt ‘writing just on paper is very easy but implementing them in action is not that easy’.

Analysis of action plan self-assessments revealed many similarities: self-realisation for the need and value of staff/team development, teamwork, and structured care, understanding patient needs, and better clinic and data management. However, the focus of the action plans differed between the two course sites. The need for clinic management, structured care delivery and data management was expressed more clearly among teams from India where the participants were primarily from self-owned private clinics. In Denmark, where the participants were predominantly from public institute settings, the need for staff development, teamwork and motivation...

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**Figure 1. Top five action plans themes**

<table>
<thead>
<tr>
<th>Action plan</th>
<th>Denmark</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff development</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Clinic management</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Patient education</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Data management</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Improve medical care</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

**Examples of specific activities outlined in action plans include:**
- Staff development: training staff for eye care, foot care, diabetes education, dietary modification
- Clinic management: 24-hour telephone service for patients
- Patient education: healthy food education programme
- Data management: build a database of all diabetes patients
- Improve medical care: develop a small foot care clinic

**Figure 2. Knowledge gain in implementing action plans**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Denmark</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient focus</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Team development</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Diabetes care</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Clinic management</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Data management</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Examples of some of the knowledge themes:**
- Patient focus: patient education, patient education tools
- Team development: staff development, value of teamwork
- Diabetes care: foot care, improve knowledge, healthy food
- Clinic management: organising work
- Data management: build a database of all diabetes patients
was expressed more emphatically. Completing the self-assessment form at six months encouraged further reflection. Recognising and exploring both positive and negative events that occur during practical implementation enhance the development of professional skills and knowledge. A major strength of the study is the range of evaluation methods employed. One limitation is that it is not possible to separately identify change in knowledge and attitudes among different HCPs as the data were collected anonymously. Another limitation of the study is that self-assessments were used to evaluate action plan implementation and the results were self-reported, and not based on independent audit or external third-party evaluation. Furthermore, there was no way of knowing whether 50% of the participants who did not respond to the call for self-assessment actually implemented the action plan, and benefited from doing so. Nonetheless, self-assessment has been shown to help identify weaknesses and strengths of the action plans, and to enable HCPs to set reachable goals and take corrective action.

**Conclusion**

PD courses were appreciated by the participants, who found them useful and relevant to their work. The courses helped enhance the participants’ competency for teamwork, problem solving and self-development skills. This is based on the number of action plans made focusing on staff development – including training staff for eye care, foot care, diabetes education, dietary modification – and then, while implementing actions plans, through self-assessment of gain in knowledge where the key themes were staff development and the value of teamwork.

Whether these changes seen at the end of course and at six months can be sustained over a longer term requires further research.

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**Declaration of interests**

There are no conflicts of interest declared.

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