

Multi-professional education in diabetes

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SUMMARY *Multi-professional education (MPE) is a forward-looking educational strategy that is both innovative and clinically needed. The primary goal of this program was to assess the potential of MPE in diabetes care. Objectives included knowledge increase in type 2 diabetes care and examining the effect of uni-professional versus multi-professional small groups on learning outcomes. A total of 61 baccalaureate nursing students, four pharmacy students and 56 family practice residents participated in a half-day program. Participants were randomly assigned to multi-versus uni-professional groups. A questionnaire assessing knowledge, attitudes and perceived role responsibilities was anonymously completed in a pre-test/post-test manner. The program was delivered in two sessions that combined larger and small group activities. Quantitative data were analyzed using repeated measures Anova/Manova, Wilcoxon signed rank and Pearson chi-square tests. Participants and educators showed interest in multi-professional education. While no change in knowledge was found, moderate changes in attitudes (with a lessening of attitudinal differences) and significant changes in perceptions of role (from uni-professional responsibility to shared responsibilities) were noted. Nurses in uni-professional groups demonstrated the greatest attitudinal and role perception changes. The contribution of the patient as teacher was prominent. Further exploration and rigorous analysis of the utility of MPE in diverse settings is warranted.*

Introduction

Primary care systems are presently under revision in many parts of the world. A central feature of many of these reform efforts is the development of multi-professional teams in which members value the professionalism and roles of the others, and the work of patient care is delivered by the healthcare professional who is best able to do it. In theory, such teams should assist in the responding to the reforms called for in primary care by meeting three ends: enhancing patient care, improving patient and practitioners' satisfaction and reducing costs (WHO, 2000). In practice, there have been many reasons why efforts to produce functioning multi-professional teams have not been as successful as anticipated (Institute of Medicine, 2001) including practice environments that finds disciplines (or professions) defending their individual authority rather than cooperating in teams (Larson, 1999).

Multi-professional education (MPE) might, at least partially, address these concerns. MPE, as an educational strategy, incorporates a group of students from various professions who "learn together... with interaction as a primary goal, to collaborate in providing promotive, preventive, curative rehabilitative and other health-related

services" (WHO, 1988). The perceived benefits of MPE are well described globally (WHO, 1988) and specifically in the US (Casto, 1994) and in Europe (Areskog, 1988, 1994, 1995; Foldevi *et al.*, 1996; Parr *et al.*, 2000). There is evidence that MPE improves awareness of other professional roles (Carpenter, 1995; Mires *et al.*, 1999) and that this role awareness is sustainable (Mires *et al.*, 2001).

This paper describes and discusses the findings of a half-day diabetes teaching program, developed by a multi-professional group of educators and offered to participants from nursing, pharmacy and medicine.

Program rationale

The focus on diabetes was consistent with the Canadian Diabetes Association Clinical Practice Guidelines, which suggested multi-professional care would benefit patients (Meltzer *et al.*, 1998). The management of diabetes has changed over the last 10 years based on the evidence that better glycemic control improves clinical outcomes (Diabetes Control and Complications Trial Research Group, 1993; UKPDS, 1998); the escalating health costs caused by long-term complication of diabetes (O'Brien *et al.*, 2003) and improved pharmacological management (Inzucchi, 2002).

The provision of comprehensive care to patients with diabetes is clinically challenging, and often exceeds the resources of many primary care physicians (Helseth *et al.*, 1999). Multi-professional team approaches to diabetic care have been found to be an effective model for care management (Broaden & Leaviss, 2000). A cornerstone of success is the coupling of teams who can provide support, education and promotion of self-care (Health Canada, 2002), with the patients' ability to manage their diabetes (Norris *et al.*, 2001).

The teaching program

A team involving pharmacists, nurses, dietitians, psychologists and physicians designed and delivered a teaching program with the goal of assessing the potential of MPE in diabetes care. The program had the following objectives:

Clinical

- Participants would have a small increase in knowledge in the diagnosis and management of type 2 diabetes.

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- Participants would recognize the importance of self-care for diabetic patients.
- Participants would appreciate the incongruence between the expectations of healthcare professions (as outlined by practice guidelines) and the barriers to meeting those goals for diabetics who are trying to integrate their self-care into a 'normal' life.

Educational

- The team would examine the effect of uni-professional versus multi-professional small groups on learning outcomes.

The clinical and educational objectives were considered equally important.

Method

The study was submitted to and received ethical approval from the University of Calgary and the University of Alberta.

Sample

Participants were final-year baccalaureate nursing students, final-year pharmacy students and first-and second-year family practice residents. Upon sign-in to the workshop, participants from each profession were randomly assigned to uni- versus multi-professional groups using a sequential randomization procedure. This randomization was accomplished through a

pre-developed sign-up sheet, which indicated group assignment based on order of arrival.

Within each profession group (nurses and physicians), participants were sequentially randomized into multi- versus uni-professional group types and then further sequentially randomized into individual groups.

Procedure

Prior to the delivery of the educational program, participants completed a 50-item questionnaire pre-test. The questionnaire included items that assessed: knowledge about the diagnosis and management of type 2 diabetes, attitudes regarding self-care and other care issues, and perceived role responsibilities. These questionnaires were completed anonymously; however, participants each selected a personal identification number to allow for matching of the pre and post surveys.

Education Program

The half-day program was delivered in two sessions (Figure 1). Each session followed the same format. Within each session all participants were exposed to three didactic presentations of 4–6 minutes each. The first presentation set was delivered by an endocrinologist and a clinical psychologist who provided information based on scientific research, published evidence and clinical practice guidelines. A community pharmacist and a family physician cross-trained as a

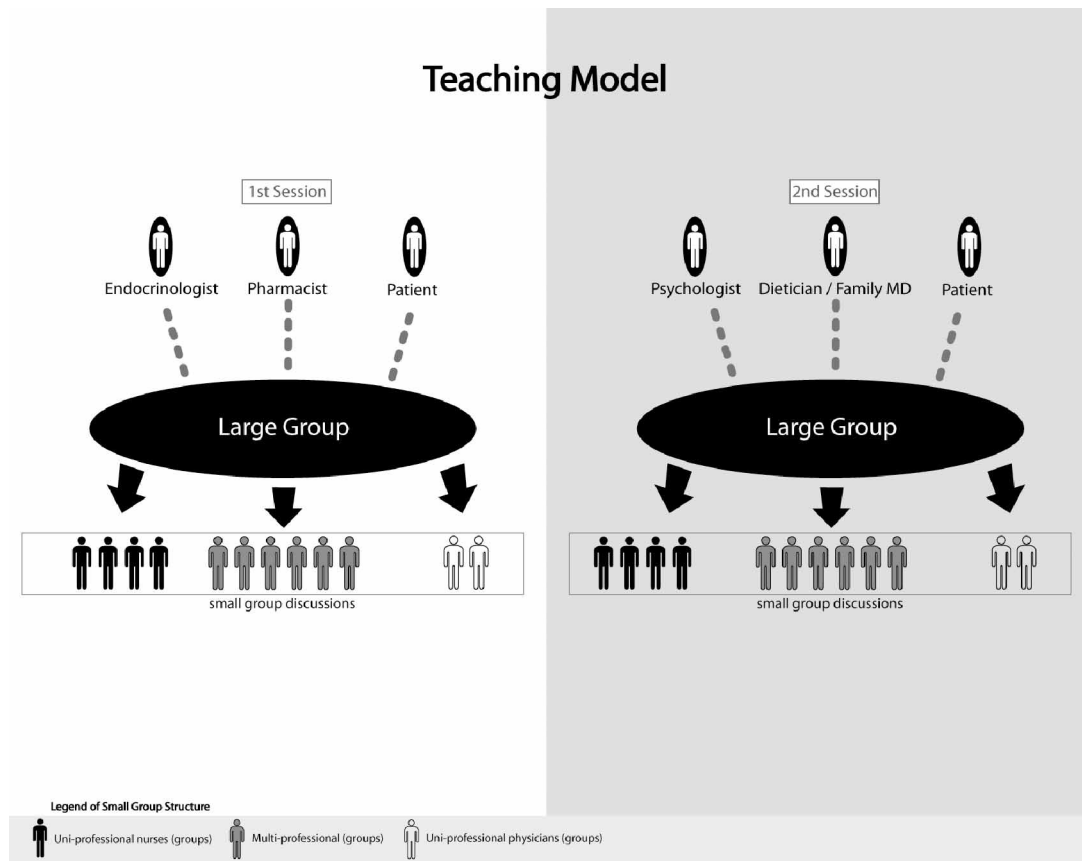


Figure 1.

dietitian presented the second set, which addressed compliance with therapy and lifestyle changes from a care provider's perspective. The third set provided information presented from a patient's perspective. We recruited an individual with longstanding type 2 diabetes who candidly spoke of the realities of living with diabetes and the relationships with healthcare professionals and their expectations. He began his first presentation by asking "Do you ever feel guilty when you go and have a beer? I always feel guilty, and [consequently] I don't take my blood sugar that day". All presenters stressed the complexity and chronicity of diabetes care, the necessity of self-management and the barriers to long-term adherence to 'therapy'.

Following each large-group session, individuals participated in a 45-minute small-group discussion session in either uni- or multi-professional groups. The first small-group session addressed the question 'Is it possible for you to believe that you could live a diabetic's life?'. The second small-group session discussed 'How could you be a true partner with a diabetic patient while maintaining your professionalism and professional accountability?'. On conclusion of the second session, participants completed a post-test questionnaire that was identical to the one completed at pre-test with the addition of five questions assessing reactions to the program.

The health professional small-group facilitators attended an orientation session immediately prior to the commencement of the program. They were instructed to work as facilitators and not content experts. In all small groups a cooperative and positive atmosphere was established and participant interaction was maximized. In all groups, and within the context of the small-group question, discussion of nurse/physician role similarities and differences was encouraged. The small-group facilitators completed a questionnaire on process and content issues following each small-group discussion.

Evaluation Measures

- *Knowledge Assessment:* (available from the authors, and adapted from Gerstein *et al.*, 1999). The knowledge assessment scale initially consisted of 15 items: six true-false questions, three yes/no questions, and six multiple-choice questions. All items were scored one for a correct response and zero for an incorrect or incomplete response. Items focused on knowledge about the diagnosis and management of type 2 diabetes. The knowledge assessment scale yielded a low level of internal consistency (Cronbach's $\alpha = 0.46$) at pre-test across all 15 items. In order to improve the properties of the scale, items with low item-total correlation were removed until an adequate level of internal consistency was achieved. The final knowledge assessment consisted of five true-false questions, three yes/no questions, and three multiple-choice questions. The internal consistency was 0.68 and 0.78 at pre- and post-test respectively.
- *Attitudes Regarding Self-Care and Other Care Issues:* Twenty-three attitude items were categorized into six dimensions: (1) self-care concepts, (2) multidisciplinary teams, (3) blaming patients for their condition, (4) professional role, (5) working within the current system and, (6) clinical

science. These dimensions were arrived at through a Q-sort exercise involving seven care providers representing four disciplines: nursing (2), medicine (3), social work (1) and dietetics (1). The 23 items are listed under 'Item no.' in Tables 1 and 2. Participants responded on a five-point rating scale ranging from 'strongly disagree' (1) to 'strongly agree' (5). The internal consistency within each dimension was very low ($\alpha < 0.50$) preventing the creation of sub-scales.

- *Perceptions of Role Responsibilities:* Perceived role responsibilities were assessed for 12 aspects of diabetic care, based on a template developed by Mires *et al.* (2001). For each aspect of diabetic care, participants responded on a five-point rating scale ranging from 'nurses have sole responsibility' (1), through 'shared responsibility among nurses and physicians' (3), to 'physicians having sole responsibility' (5) (See Table 2). Given the non-linear nature of the response choices, internal consistency was not assessed.

Reaction to Education Program

The post-test's measure consisted of two items:

- (1) How would you rate the overall quality of this half-day diabetes and self-care educational program?
- (2) How valuable did you find your own discussion group? Participants responded on a five-point rating scale ranging from 'very poor' (1) to 'excellent' (5).

Additionally, participants were asked, in free text format, to list the three best things and three worst things about this workshop.

Quantitative Analysis

Questionnaire data were analysed using SPSS (version 10.0). Since only four pharmacy students participated, they were removed from the analyses.

- *Knowledge Assessment:* Scores on the knowledge assessment were subjected to a 2 (uni- versus multi-professional group) by 2 (nurse versus physician) by 2 (pre-post) repeated measures ANOVA.
- *Attitudes Regarding Self-Care and Other Care Issues:* All attitude items were analyzed together using a 2 (uni- versus multi-professional group) by 2 (nurse versus physician) by 2 (pre-post) repeated measures MANOVA.
- *Perceived Role Responsibilities:* Given the non-linear nature of the scaling, non-parametric analyses were conducted on each item. Within-subjects effects (pre-post) were analysed using the Wilcoxon signed ranks test. Between subjects effects (uni- versus multi-professional groups) were analysed using Pearson chi-square tests.

Results

A total of 121 individuals participated in the program. Of these, 88 (73%) were female, 23 (19%) were male, and 10 (8%) did not indicate gender. The average age of participant was 26 years ($SD = 4.32$). Sixty-one of the participants were nursing students, 56 were family practice residents and four were pharmacy students.

Table 1. Attitudes and attitude change

Item no.	Dimension	Change In Attitudes				
		Significant attitude differences between nurses and physicians at pre-test	Overall change in attitude effect sizes (η^a)	Significant change by profession interactions	Significant change by group type interactions	Significant change by group type by profession interactions
<i>Self-care:</i>						
12	Educating patients about complications will improve their compliance.		-0.33***			
15	Individuals with diabetes should make the important decisions regarding daily diabetes care.		0.19*			
16	Patients with diabetes have the right to decide how aggressively they will work to control their plasma glucose.		0.23*			
18	Individuals are capable of determining what is important in their lives and health professionals such as nurses/doctors are able to help them realize their personal goals.	Nurses are more positive*	0.31**			
22	Self-care involves managing complex lives, not just diseases.		0.32***			
<i>Multidisciplinary teams:</i>						
9	Physicians need the help of other healthcare professionals to provide sufficient self-care information to those with diabetes.		0.31**			
20	Wider access to multidisciplinary consultation, if available, would be an important step to true collaborative medical treatment.	Nurses are more positive**	0.40***			
8	It is important to use a diabetes educator's expertise in treating people with diabetes.		0.35***		Multi-prof became more positive*	Multi-prof nurses became most positive*
<i>Blaming patients for condition:</i>						
11	There is little point in trying to achieve optimal glucose control because complications of diabetes are inevitable.	Nurses are more positive*	0.09			
13	Patients with multiple complications are those who do not take care of themselves.		-0.26**		Multi-prof became more negative*	

7	NIDDM would not be a problem if people watched their weight.		-0.31***		
4	People with diabetes are not as compliant with their treatment recommendations as they should be.	Physicians are more positive**	0.34***	Nurses became more positive**	
<i>Professional role:</i>					
6	I feel competent giving dietary counseling to patients with diabetes.		-0.15*		Uni-prof Nurses became most negative*
3	I want patients to consult with me before making changes in their medications.		-0.07		Uni-prof Physicians became most negative*
10	I (post: I will) encourage Self-blood glucose monitoring for newly diagnosed patients.		-0.11		Uni-prof became more positive*
32	Do you (post: will you) routinely refer patients to other health professionals (e.g. nurse educators, dietitians, and podiatrists) when caring for patients with diabetes? (0 = No, 1 = Yes)				
			0.33***		
<i>Working within the system:</i>					
5	It is difficult for health-care professionals to influence the self-care behaviour of people with diabetes.		0.42***		
19	There is a difference between self-care in the hospital and the community.		0.17		Uni-prof Nurses became most positive*
21	Health systems features such as time pressures, workload and payment mechanisms do not encourage support of self-care.				
			0.40***		
<i>Clinical science:</i>					
1	NIDDM is a less serious disease than IDDM.		-0.41***	Nurses became more negative*	Uni-prof became more negative*
2	All newly diagnosed patients with NIDDM need to start diabetes medication.		0.12		Multi-prof Nurses became most positive*
14	Optimal blood pressure control is important in patients with diabetes.	Physicians are more positive***	0.19*		
17	Hemoglobin A1C is not useful when assessing glycemic control.	Nurses are more positive***	-0.23*	Nurses became more negative*	

Notes: ^aeta is equivalent to a correlation coefficient (it is approximately half the size of a 'd' statistic); * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 2. Assigning responsibility

Item no.	Dimension	Significant differences in role perceptions between nurses and residents at pre-test	Significant differences in role perceptions between nurses and residents at post-test	Significant changes perceptions of role overall	Significant changes in physician perception of role responsibility as a function of group type	Significant changes in nurse perception of role responsibility as a function of group type
39	Diagnosis of NIDDM	Nurses see greater role for nurses*				Uni-prof Nurses move from shared to physician focus*
40	Helping patient cope with clinical problems	Nurses see greater role for nurses*				
41	Communication of laboratory results	Nurses see greater role for nurses**	Nurses see greater role for nurses***			
42	Prescribing medications			Participants move from physician to shared focus*	Uni-prof physicians move from physician to shared focus*	Uni-prof Nurses move from physician to shared focus*
43	Advising re: drug side effect problems	Nurses see greater role for nurses***	Nurses see greater role for nurses***			
44	Explaining non-pharmacological management of DM					
45	Educating re: need to self-monitor for complications		Nurses see greater role for nurses*			
46	Education on the use of the glucose meter			Participants move from nurse to shared focus*	Uni-prof physicians move from nurse to shared focus*	
47	Providing patient and family-centered DM care			Participants move from nurse to shared focus*		Uni-prof nurses move from nurse to shared focus*
48	Influencing self-care behaviour of patients	Nurses see greater role for nurses*				
49	Providing dietary advice/counseling					
50	Reviewing patients self-blood glucose monitoring techniques					Multi-prof nurses move from nurse to shared focus*

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The randomization procedure resulted in:

- two uni-professional physician groups with a total of 27 participants, (one pharmacist was accidentally assigned to a physician uni-professional group. This group was made up of 12 physicians and a single pharmacist. This group was coded as uni-professional);
- four uni-professional nurse groups with a total of 28 participants;
- six multi-professional groups with total of 66 participants (23 physicians, 31 nurses, eight pharmacists, and four unknown).

Knowledge

There were no significant within-subject effects, suggesting that knowledge levels remained unchanged overall as well as within subgroups. There was a significant between-subjects effect for professional group. Averaged across pre- and post-test scores, physicians ($M = 8.75$) scored higher on the knowledge test than nurses ($M = 5.85$, $F(1, 104) = 72.82$, $p < 0.001$).

Attitudes

Results of the analyses are summarized in Table 1. At baseline, there were significant differences between physicians and nurses on six of the 23 attitude variables in the domains of multidisciplinary teams, blaming, healthcare, self-care and clinical science. There were no differences noted in professional role or system variables.

Post-test we saw unequivocal evidence of change. Across all participants, there was change between pre-test and post-test measures in all domains assessed by the attitude questionnaire. We examined this change in attitude in more depth, by assessing reported attitudinal change in relation to

- (a) profession (nurses, physicians);
- (b) group type (uni-professional, multi-professional);
- (c) both profession and group type.

Within uni-professional groups, significant changes occurred for:

- all groups within the domains of professional roles and clinical science;
- nurses in the domains of professional roles and working within the system;
- physicians in the domain of professional roles.

Within multi-professional groups, significant changes occurred for:

- all groups in the domains of clinical science and blaming patients;
- nurses in the domains of clinical science and multidisciplinary teams.

Perceptions

A softening of rigid role boundaries over the course of the program was reflected in the responses to the responsibility questionnaire. At pre-test, there were significant differences between physicians and nurses on five of the 12 variables. At post-test, significant differences between physicians and nurses were noted on three of the 12 variables. (See Table 2).

Across all participants there were significant changes in attitudes toward roles in three out of 12 questions. Specifically, there was a shift from a physician-dominated role to more of a shared role for prescribing medications and there was a shift from nurse-dominated roles to shared roles for education on the use of the glucose meter and the provision of patient and family-centered care.

A summary of the findings concerning role responsibility for physicians and nurses within uni-professional and multi-professional groups is also presented in Table 2. Of the six significant findings, five moved towards greater shared responsibility. Interestingly, five of the six changes occurred for those participating in uni-professional groups. There also appeared to be greater changes among nurses than physicians.

Reaction to Education Program

The response rate for the workshop evaluation was 93% ($n = 113$). Some 52% of respondents described the quality of the workshop as 'good' or 'excellent' and 63% rated the value of their discussion group as 'good' or 'excellent'. Further they reported that the three best things were:

- (1) hearing the patient's perspective (49%);
- (2) participating in small-group discussions (34%);
- (3) hearing the different perspectives (27%).

The three worst things reported were:

- (1) not enough information (31%);
- (2) only one discipline in small-group work (18%);
- (3) too short (17%).

There was broad agreement with the observation that 'interdisciplinary teaching and learning was helpful'.

Discussion

In our experiment, brief exposure to novel educational methods did not produce significant changes in knowledge, but did produce significant changes in attitude and role definition.

In retrospect, given the teaching format, we should not have expected nor did we find knowledge improvement. We know that passive or short educational interventions (i.e. one day or less) generally effect no change (Davis *et al.*, 1995). We also know that multi-faced educational activities matter, and a time for reflection is needed (Davis, 1998; Mazmanian *et al.*, 2002). Although our program was multifaceted, it was very brief and there was no time for reflection. For some attendees, the paucity of knowledge gain was a disappointment—in the evaluation 31% of participants said that they did not get enough information. The difference between physician and nurse knowledge levels as assessed by our survey instrument is hardly surprising, given different curricula and objectives of health professional training. From a program-planning perspective, we were less concerned about the knowledge goal (the easiest goal to achieve through more traditional means) and more concerned to structure a vibrant learning activity that would 'stick' with both teachers and learners.

With regard to role definition, we saw changes from uni-professional responsibility to shared responsibilities. We do not know if this change has been sustained for our learners,

but there is literature describing role shift and attitudinal sustainability after MPE experiences (Mires *et al.*, 2001). The fact that our program met the criteria for the ‘contact hypothesis’ (see Carpenter, 1995) adds to the evidence the MPE can work under favourable conditions.

Nurses in uni-professional groups demonstrated the greatest role definition shift. We cannot identify an explanation for this. Optimally, a study that was both longitudinal and qualitative would be required to begin to critically examine such role shift dynamics. The need for such well-conducted studies has been the subject of a recent appeal (Freeth *et al.*, 2002). We speculate that perhaps in our uni-professional groups there was a greater comfort in exploring role issues. Our research design was such that the large-group discussion set the stage for all small-group activities. Perhaps this mixture of large-group then uni-professional/multi-professional small-group discussion was optimal for creating a climate in which role definition shifts were possible.

Strategies to nurture shifts in health professional roles and attitudes are central to healthcare reform. In response to the challenges of reform, three recent Canadian reports acknowledge shortages of healthcare providers (Mazankowski, 2001; Kirby & LeBreton, 2002; Romanow, 2002) and recommend a workforce planning process that both addresses the roles of the various health providers and develops long-term strategies that build a more stable supply of healthcare professionals. Although it remains challenging to see beyond current structures and processes, it is clear that there will be changes and these changes will involve an assessment of role responsibilities. Our study provides a useful example of an educational strategy that can support health professional role and attitudinal shift.

Harden *et al.*, (1997) offer a three-dimensional model to help answer the question of the appropriate use of MPE. Within this model are nested 11 steps, which can be viewed as conceptual waypoints along a continuum of health professional interaction. Using this framework, our large-group sessions incorporated activities at levels of the multi-professional, interprofessional and transprofessional. The context of the clinical practice of medicine and nursing was prominent, and our patient contributed substantially to this ‘real world filter’. In fact, the learners’ evaluation of the workshop indicated that the best thing was ‘hearing the patient’s perspective’. Yet although we can describe our project using the above model, there appears to be no consensus from the literature as to optimal models of MPE. Hall & Weaver’s (2001) review of interdisciplinary education and teamwork highlights many of the educational questions in need of answers, and work by Barr (2001) and Freeth *et al.* (2002) provides a current stepping-off point for a contextual understanding of MPE and its evaluation.

There is a need for caution when grounding new research on literature in the MPE domain. A Cochrane review (Zwarenstein *et al.*, 2003, p. 2) on interprofessional education concludes: “despite finding a large body of literature on the evaluation of IPE (Inter-Professional Education), these studies lacked the methodological rigor needed to begin to convincingly understand the impact of IPE on professional practice and/or health care outcomes”.

This project has several limitations. Our research design was complex. We recognized from the outset that the scope

for our half-day teaching program was ambitious. Although we aimed for rigorous evaluation, our evaluation efforts were out of proportion to the half-day duration of the educational program. We do not know what impacts have been made, if any, over the longer term for our learners. In the assignment of the small-group facilitators, we did not control for the disciplinary background of the facilitator. Additionally, it is possible there was some ‘blunting’ with the differences we have described in the uni- and multi-professional small groups as there were limited opportunities for interaction between individuals of both groups during the large-group discussion and during the two brief nutrition/comfort breaks. Although our data reveals notable differences between the uni- and multi-professional small groups in role-shift and attitudinal outcomes, our data do not reveal why these differences occurred.

Our study has provided one model of how to structure an MPE activity that ‘works’. Although our knowledge expansion objective was not achieved, both the self-care and MPE learning context were explored with results that point the way for additional work. Further exploration and rigorous analysis of the utility of MPE in diverse settings is warranted.

Practice Points

- Participants and educators demonstrated interest in MPE.
- Role shifts and attitudinal changes resulted from the educational intervention.
- The dynamics of learning in a uni-professional versus multi-professional context warrant more exploration.
- The contribution of the patient, as a teacher, was prominent.
- The educational model used in this program could be a template for other programs exploring MPE.

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