

# The effect of interprofessional education on interprofessional performance and diabetes care knowledge of health care teams at the level one of health service providing

Nikoo Yamani, Marzieh Asgarimoqadam, Fariba Haghani, Abbas Qari Alavijeh<sup>1</sup>

Department of Medical Education, Medical Education Research Center, Isfahan University of Medical Sciences, Isfahan, <sup>1</sup>Shahrekord University of Medical Sciences, Shahrekord, Iran

## Abstract

**Background:** The increase in life expectancy and changes in lifestyle have led to prevalence of non-communicable diseases including diabetes whose treatment and care requires effective teamwork. This study was conducted to examine the effect of inter-professional education on performance and diabetes care knowledge of health care teams.

**Materials and Methods:** This quasi-experimental study was performed as an inter-professional education on 6 healthcare teams (34 people) based on Kolb's Learning Cycle and consisted of a set of training activities to improve individual, group, and inter-professional capabilities of members of the health care team. The pre- and post-tests included Team Climate Inventory (TCI) and a knowledge assessment tool performed before the workshop and 3 months later.

**Results:** Mean scores for knowledge of health care team before intervention and 3 months later were  $7.06 \pm 1.04$  and  $7.97 \pm 0.97$  out of 10, respectively, that showed a significant difference ( $P < 0.0001$ ). Mean score of the pre-test and post-test for inter-professional performance comprised  $47.03 \pm 6.7$  and  $49.44 \pm 5.54$  out of 70, respectively, which did not show any significant difference. However, these mean scores had a significant difference for the domains of knowledge and exercising objectives of the teamwork ( $10.62 \pm 1.37$  and  $11.41 \pm 1.76$  out of 15, respectively) ( $P = 0.013$ ).

**Conclusion:** It seems that inter-professional education can improve the quality of health care to some extent through influencing knowledge and collaborative performance of health care teams. It also can make the health-related messages provided to the covered population more consistent in addition to enhancing self-confidence of the personnel.

**Key Words:** Diabetes mellitus, healthcare team, inter-professional education, teamwork

### Address for correspondence:

Dr. Fariba Haghani, Department of Medical Education, Medical Education Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.  
E-mail: fariba.haghani@gmail.com

**Received:** 27.7.2012, **Accepted:** 07.08.2012

| Access this article online  |                                  |
|---|----------------------------------|
| Quick Response Code:  | Website:<br>www.advbiores.net    |
|  | DOI:<br>10.4103/2277-9175.137861 |

## INTRODUCTION

The 1978 Islamic revolution led to numerous changes in Iranians' life including health care services. The execution of healthcare network was remarkably

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**How to cite this article:** Yamani N, Asgarimoqadam M, Haghani F, Alavijeh AQ. The effect of interprofessional education on interprofessional performance and diabetes care knowledge of health care teams at the level one of health service providing. Adv Biomed Res 2014;3:153.

successful in increasing life expectancy, controlling infectious diseases, promoting health indices, and controlling population growth. By control of infectious diseases, non-communicable and chronic diseases like diabetes, cardiovascular diseases, and cancers became the priority of the health care system policies. In this regard, the executive team of health sector reform established the new system of family physician with the same 4 fundamental principles of PHC (Primary Health Care) in late 2002. The health care team of this system includes Behvarzs and those with AS and BS in Paramedicine who provide health treatment services to the defined population with responsibility of family physician.<sup>[1,2]</sup> Diabetes is one of the non-communicable and chronic diseases among the priorities of healthcare system. Diabetes mellitus is a metabolic disorder, in which metabolism of carbohydrates, fats, and proteins is disrupted due to deficiency or lack of insulin that causes various chronic complications. Prevalence of diabetes in Iran is 2-3%, which increases to 6-8% for people over 30 years old.<sup>[3]</sup> Prevention and treatment of diabetes require a community-based care within family medicine under supervision of healthcare teams. Moreover, all instructions for prevalent diseases are written by physicians without concentrating on the teamwork and are implemented by other health workers.<sup>[4]</sup> In most practices, team members seldom meet each other, so patient care is done with minimal consultation and without making appropriate connection with patients.<sup>[5]</sup> Some team members are not qualified, and some others do not have necessary equipment. Lack of skills results in reduction of self-confidence and lack of attention in team. Therefore, the first strategy to promote standards of personnel is to train them. The purpose of an effective teamwork must first be promotion of care quality. Once team members perceive their effectiveness in healthcare providing, they feel they belong to a real team.<sup>[4]</sup>

One effective approach in training members of a team and promotion of teamwork is interprofessional education. Interprofessional education was first discussed following initial report of WHO in 1988 in response to the national-regional needs for collaborative learning. The interprofessional education is a collaborative, egalitarian, group-based, experiential, reflective, and applied education. A This interprofessional education takes advantage of approaches like Adult Learning Theory and Kolb's Learning Cycle; therefore, learners can better adapt themselves to the interprofessional education. Actually, the interprofessional education is designed for a group; however, its aim is to qualify individual participants.<sup>[6]</sup> The interprofessional education in countries more developed than Iran entails more

details, which is undoubtedly due to the changing process and facing with its surrounding issues.<sup>[1]</sup>

Achieving Cardiovascular Health Institute in Canada believes that continuing interprofessional education must be applied to change behavior of healthcare workers and public since this method helps workers and people to learn how to cooperate better. Actually, this is the only way to create a constant message of health.<sup>[7]</sup> Mistakes in selection and implementation of treatment plan for patients in America cause 44000 to 98000 deaths per year and an annual cost of 17-29 billion dollars. Most of these deaths are due to disorders in healthcare systems, which should be made safer in order to prevent such mistakes. In this respect, extensive collaboration of different professions is recommended to improve healthcare quality.<sup>[6]</sup>

Furthermore, satisfaction of healthcare needs of those people living in deprived areas is among the priorities of healthcare systems. Rural deprived areas are often poor, sparsely populated and are out of reach that encounter with limited sources and shortage of personnel who do multi tasks due to the above deficits.<sup>[8]</sup> Meanwhile, there are few educational opportunities for those working in these areas. Indeed, an available and high-quality continuing training must be interprofessional that can satisfy personnel and protect healthcare system in rural areas.<sup>[9]</sup>

Most countries try to improve their social and health care system emphasizing on changing the system from hospital-based into community-based in order to react to demographic changes and pattern of diseases. The American Institute of Medicine in a report called "Crossing the Quality Gap" suggested integrity of healthcare systems foundations in order to increase care quality, safety, patient-orientedness, efficiency, and accountability and, to do so, all people working in health professions must learn how to work together in interprofessional teams. Therefore, the curriculum of interprofessional education should be designed in such a way that make changes in knowledge, skills, and behavior of the personnel who care for patients as patients' status would be recovered.<sup>[10]</sup>

The interprofessional education and collaborative learning in medical education in Iran have been studied in terms of background, nature, structure, and their reinforcing and inhibiting factors. Most identified elements in the area of interprofessionalism have been focused on various studies; however, the existing literature has no model for the processes of developing interprofessionalism. The interprofessional education in leading countries entails more details, which is undoubtedly due to the changing process

and facing with its surrounding issues.<sup>[1]</sup> In this respect, the interprofessional education is expected to be applied as an effective tool in continuing professional education of healthcare teams although studies show no certain interventions in this regard. It is worth noting that healthcare system in Iran has been founded on the basis of 4 principles of PHC, in which physicians, Behvarzs, and paramedics provide health-related services. Once the non-communicable diseases became the priority, healthcare system was not responsive any longer, so the family medicine was defined within the previous system and the same principles and the above-mentioned professions were defined within healthcare teams providing level one services to the population under cover. A brief study on healthcare teams of health treatment systems in Kiyar, Iran showed that the healthcare was not practiced consistently and purposefully to change the attitude, behavior, and lifestyle of the patients. Prevention and treatment of a chronic disease like diabetes requires actions leading to changes in behavior and lifestyle of patients, and the healthcare team training must be done toward establishing a constant health message and changing behavior of team members and consequently, changing behavior and lifestyle of the patients. This matter is even more important in rural deprived areas, which have limited access to healthcare facilities. The objective of the present study was to examine the effect of interprofessional education on interprofessional performance of health care team members and their knowledge on diabetic patient care by holding an interprofessional education course on diabetic patient care for healthcare personnel of Kiyar, Iran.

## MATERIALS AND METHODS

This quasi-experimental study with a pre-test and a post-test was conducted on a group in Kiyar, Chahar Mahal and Bakhtiari Province, Iran, in June-July, 2011. Sampling was done by census, and 34 members of healthcare teams in Kiyar were selected, of whom 12 are physicians, 12 are Behvarzes, and 10 are associates. The inclusion criterion was currently working in the positions of Behvarzes and associates in preventing and fighting against diseases, and family physicians in Kiyar's health treatment centers. Moreover, the Behvarzes and associates whose duties were not related to the practices of the prevention section and the staff had been working there less than 6 months were excluded from the study. The intervention was an interprofessional education course held as a 3-day workshop on the basis of Adult Learning Theory and Kolb's Learning Cycle with cooperation of all selected individuals. At the beginning of the workshop, the participants answered a pre-test containing

10 multiple-choice questions about diabetes. Then, the method of workshop and the related questionnaires were discussed briefly. After that, the participants completed a questionnaire adopted from TCI (team climate inventory).<sup>[11]</sup> The same questionnaire was used as a post-test, 3 months after the workshop.

The measurement instruments used in the workshop to assess the participants' knowledge about diabetic care and their interprofessional performance and teamwork were a test containing 10 multiple-choice questions about diabetic patient care and a questionnaire adopted from TCI. The TCI questionnaire is a research instrument to assess team performance. It has been found to have an appropriate validity and reliability and used in various environments and cultures including healthcare and social systems.<sup>[12]</sup> This questionnaire is well applicable in different fields and is very useful for assessments in interprofessional education.<sup>[11]</sup> The questionnaire is divided into 4 areas of knowing and practicing the objectives of teamwork (3 questions), safe cooperation (5 questions), critical view (3 questions), and supporting creativity (3 questions). The questionnaire contains 14 questions and meets adequate validity and reliability based on previous studies.<sup>[11]</sup> Scores of the questions were calculated using the 5-level Likert scale. The 5 levels consisted of "very much, much, medium, little, and very little," of which, "very much" was assigned 5 points and "very little" was assigned 1 point, and total point of the questionnaire was 70.

The multiple-choice test for evaluating knowledge contained 10 questions about diabetic patient care, of which each question was assigned 1 point, and total point of the test was 10.

On the first day of the workshop, the interprofessional education, the way of running the workshop, and the effort of those responsible for the workshop to establish a supportive and peaceful atmosphere were explained for the participants. After that, 6 teams, each with 5 or 6 members, were formed the same as healthcare teams of Kiyar's health centers. The workshop was continued with talking wall technique in the teams so that the participants of each field could be familiar with roles and duties of other fields. Meanwhile, rules of the workshop included the clockwise move to make equal opportunity for each participant to express his/her opinions, respecting ideas of others, and not deriding the work or educational status of others. The rest of the workshop up to the end of the third day, diabetes was discussed considering Adult Learning Theory and Kolb's Learning Cycles. In this respect, the prepared scenarios about diabetic patients with subjects on screening, gestational diabetes,

diabetic foot complication and its treatment, and use of learning activities was represented to the teams. Activities of the teams were conducted by facilitators of the workshop considering suggestions of Bligh and Parsell.<sup>[13]</sup> After every teamwork, the result was presented in team’s grand meeting using transparent overhead projector sheets so that the relevant specialist could provide the feedback to the members of the teams. Internists, gynecologists, and nutritionists presented the supplementary subjects in lectures. An informal formative -qualitative assessment was done during the workshop by oral survey in order to improve next sessions and a formal summative -quantitative assessment 3 months after the workshop using the mentioned questionnaires.<sup>[6]</sup>

The data collected before and after intervention were analyzed through SPSS software using T-test and ANOVA.

**RESULTS**

In this study, 34 people including 12 general physicians, 10 healthcare associates, and 12 Behvarzs were selected. The participants were 23-51 years old with mean age of  $34.29 \pm 7.93$  years. Among the participants, 26 were female and the rest were male. Years of service of the participants were 1-28 with mean of  $9.03 \pm 9.07$  years. Mean score of the health care team for diabetes knowledge before intervention and 3 months later was  $7.06 \pm 1.04$  and  $7.97 \pm 0.97$  (out of 10), respectively, that showed a significant increase and difference ( $P < 0.0001$ ).

Mean score of the pre-test and post-test for interprofessional performance comprised  $47.03 \pm 6.7$  and  $49.44 \pm 5.54$  (out of 70), respectively, which did not show any significant difference (0.099). Mean score of the health care team for interprofessional performance around knowledge and practicing objectives of the teamwork before intervention and 3 months later was  $10.62 \pm 1.37$  and  $11.41 \pm 1.76$  (out of 15), respectively, that showed a significant statistical difference ( $P = 0.013$ ).

Mean score of the pre-test and post-test obtained from TCI questionnaire and assessment of diabetic patient care knowledge in all areas are shown in Table 1.

The interprofessional performance of the 6 teams (6 healthcare teams) was compared to each other, and the results are shown in Table 2.

The results in Table 2 show that the interprofessional performance of teams 1, 2, and 4 has improved compared to other groups.

**DISCUSSIONS**

In this quasi-experimental study, an intervention was carried out in the form of a 3-day workshop on diabetes interprofessional education on the basis of Adult Learning Theory and Kolb’s Learning Cycles for healthcare teams in Kiyar. In this program, the effect of interprofessional education on diabetic patient care knowledge and interprofessional performance of the participants was assessed using pre-test and post-test. The workshop emphasized on two issues. The first was to improve the participants’ knowledge about diabetic patient care so that the subject and content of the workshop were chosen in such a way that each participant was provided with a proper subject for the inter-professional training<sup>[14]</sup> and a training related to his/her occupation. The second issue was to improve the inter-professional

**Table 1: Mean score of the pre-test and post-test obtained from TCI questionnaire and assessment of diabetic patient care knowledge**

| Test type                          | Area   | SD*±mean Pre-test score | SD±mean Post-test score | Significance level |
|------------------------------------|--|-------------------------|-------------------------|--------------------|
| TCI inter-professional performance | Knowing and practicing teamwork objectives (out of 15) | 10.62±1.37              | 11.41±1.76              | P=0.013            |
|                                    | Safe cooperation (out of 25)                           | 16.73±2.88              | 17.47±2.2               | P=0.26             |
|                                    | Critical view (out of 15)                              | 10.22±1.56              | 10.28±1.53              | P=0.87             |
|                                    | Supporting creativity (out of 15)                      | 9.59±1.81               | 10.28±1.46              | P=0.09             |
|                                    | Total score (out of 70)                                | 47.03±6.7               | 49.44±5.54              | P=0.099            |
| Diabetic patient care knowledge    | Total score (out of 10)                                | 7.06±1.04               | 7.97±0.97               | P<0.0001           |

\*Standard deviation, TCI: Team climate inventory, SD: Standard deviation

**Table 2: Comparison of the scores obtained from interprofessional performance of the 6 healthcare teams (TCI)**

| Team  | Team  |       |       |       |       |      | Total |
|---|-------|-------|-------|-------|-------|------|-------|
| Team climate score  | 1     | 2     | 3     | 4     | 5     | 6    | mean  |
| Mean score of the pre-test for interprofessional performance of healthcare teams (out of 70)  | 48.46 | 47.67 | 49.17 | 42    | 43.28 | 48.2 | 47.03 |
| Mean score of the post-test for interprofessional performance of healthcare teams (out of 70) | 51    | 51.5  | 48.83 | 46.75 | 46    | 48.4 | 49.44 |

TCI: Team climate inventory

training in the field of diabetic patient care since caring for a chronic disease like diabetes should be done by a healthcare team and according to WHO, the best diabetic patient care is achieved by a team that is better learned within an interprofessional education.<sup>[6]</sup> Design and implementation of diabetes interprofessional education improved knowledge of the healthcare teams and also knowing and practicing the objectives of teamwork before and after the intervention showed a significant difference. Although there was no significant difference in other areas of the performance, the scores in all areas increased and the interprofessional performance of the teams increased as well. Moreover, the summative formative assessment during the workshop revealed the satisfaction of most learners with the new training experience. Therefore, it is expected that as the knowledge of healthcare teams in the field of diabetic patient care, the interprofessional performance of teams, and knowing and practicing the objectives are improved, skills and self-confidence of the individuals of the teams increase so that their desire for caring increases and consequently, the quality of diabetic patient care is enhanced.

The insignificant results may refer to the following statements: The execution of interprofessional education requires considerable time and resources and also a suitable place; a large class is the most convenient place for interprofessional education; the teams must be given the opportunity (a few sessions) to begin the collaborative work whilst they are provided with an appropriate feedback, objective, and status of other teams; the relevant instructors must be perfectly informed that teaching in an interprofessional education environment is a collaborative task and they must be group facilitators.<sup>[14]</sup> Despite the implementation of the interprofessional education and informing the instructors, the training was not performed as it should have been due to the little experienced instructors. The major discussion among the learners on the first day of the workshop after using talking wall technique was financial problems. Determining financial aspects of the learners' performance is one of the requirements of interprofessional education;<sup>[14]</sup> however, the executors of the program did not have access to these aspects. Positive results of interprofessional education are the positive responses to learning experience, new knowledge, and skills for teamwork in order to collaborate in patient care. The positive results of the workshop were also the improvement of team climate and an increase in knowledge and practicing teamwork objectives that regarding the interpretation of TCI data, the positive score in each area of the questionnaire is the pre-requisite for improvement of care quality. Although this relationship is not direct

and changes in each area do not lead to measurable changes in final results of healthcare, its effect is mostly applied through other individual and organizational aspects.<sup>[15]</sup> The unjustified side effects of interprofessional education are that negative perceptions and emotions around interprofessional education and other professions may get worse.<sup>[6]</sup> The negative perceptions and emotions about other professions were not discussed by the learners during the workshop or even in grand meetings after the talking wall technique, however, they were written on back of the worksheet of small teams humorously or sarcastically. Given that the score of the team climate of most teams increased considerably, it seemed that the negative perceptions about other professions decreased as well. In the workshop, resistance of the learners against the interprofessional education was of stage one (passive cooperation and, quiet surrender), which not only did not increase during the workshop, but also changed to an active collaboration in some cases.<sup>[6]</sup>

One of the limitations of this study was lack of a control group. Selecting a control group for interprofessional education is problematic and impossible since the learner in comparison must be provided the clinical training specific to his/her profession during the period of the interprofessional education course while preparing such condition was impossible regarding limited time, place, and references.<sup>[10]</sup>

## CONCLUSION

Based on the results, the interprofessional education for healthcare team members increased their score in the area of knowledge and practicing teamwork objectives and it seems that such workshops can improve the interprofessional performance of teams. Furthermore, it can increase healthcare team's knowledge about diabetic patient care. The interprofessional education was a new experience for all participants and as the workshop teams were the same healthcare teams of urban and rural health treatment centers in Kiyar, they had an opportunity to talk about diabetic patient care within a healthcare team away from daily working preoccupation that made the learners satisfied. In this respect, it seems that interprofessional education can improve the quality of health care to an extent through influencing knowledge and collaborative performance of health care teams and make the health-related messages provided to the covered population more consistent besides enhancing self-confidence of the personnel. Further studies are recommended to examine the effect of interprofessional education on interprofessional performance and patient care knowledge of medical and paramedical students.

Moreover, it is recommended to examine the effect of interprofessional education on interprofessional performance and patient care knowledge of healthcare teams within retraining courses.

## ACKNOWLEDGMENT

Hereby, the researchers appreciate Isfahan University of Medical Sciences for its financial support and also all the authorities and collaborators of Shahrekord University of Medical Sciences for their sincere cooperation.

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**Source of Support:** This research was financially supported by vice chancellor for research of Isfahan University of Medical Sciences, **Conflict of Interest:** None declared.