

Review article

## An Inter-Professional Curriculum for Delivering Quality Healthcare to Diabetic Patients

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### Abstract:

Inter-professional practice in health profession has existed for millennia. The issue of professional fragmentation is an old ancient issue. IPE and collaborative practice can positively contribute to some of the world's most urgent health challenges. IPE is a very important way for preparing future health professionals to provide patient care in a collaborative team environment with hands together. The major advantage of IPE is that once health care professionals begin to work together in a collaborative manner, patient care will improve significantly. Inter-professional teams enhance the quality of patient care, lower costs, decrease patients' length of stay, and reduce medical errors. Diabetes mellitus is a syndrome of abnormal carbohydrate, fat and protein metabolism that results in acute and chronic complications due to the absolute or relative lack of insulin. There are three general categories of diabetes: type 1, which results from an absolute insulin deficiency; type 2, which is the result of insulin resistance and an insulin secretory defect; and gestational, a condition of abnormal glucose tolerance during pregnancy. Diabetes develops in people of all ages and its prevalence has increased dramatically over the past several decades. In dentistry, diagnosis is made on the basis of a host of systemic and oral signs and symptoms, including gingivitis and periodontitis, recurrent oral fungal infections and impaired wound healing. Safely managing the patient with diabetes requires effective communication among multiple health care providers.

**Keywords:** Interprofessional Education, Diabetes, Diabetic Education

## Introduction:

Inter-professional practice in health profession has existed for millennia. The issue of professional fragmentation is an old ancient issue. Herodotus described this of Egyptians (c446 BC, 1954), as ‘The practice of medicine they split up into separate parts, each doctor is responsible for treating only one disease, there are in consequence innumerable doctors.....’ The concept of inter-professional education (IPE) was developed to prepare all health professions students for deliberately working together with the common goal of building a safer and better patient-centered and community oriented health care system. IPE has been defined as ‘‘occasions when two or more health/social care professions learn with, from and about each other to improve collaboration and the quality of care’’.<sup>1</sup>

IPE and collaborative practice can positively contribute to some of the world’s most urgent health challenges. IPE is a very important way for preparing future health professionals to provide patient care in a collaborative team environment with hands together. The major advantage of IPE is that once healthcare professionals begin to work together in a collaborative manner, patient care will improve significantly. Inter professional teams enhance the quality of patient care, lower costs, decrease patients’ length of stay, and reduce medical errors. Diabetes mellitus is a syndrome of abnormal carbohydrate, fat and protein metabolism that results in acute and chronic complications due to the absolute or relative lack of insulin. There are three general categories of diabetes: type 1, which results from an absolute insulin deficiency; type 2, which is the result of insulin resistance and an insulin secretory defect; and gestational, a condition of abnormal glucose

tolerance during pregnancy. Diabetes develops in people of all ages and its prevalence has increased dramatically over the past several decades. In dentistry, diagnosis is made on the basis of a host of systemic and oral signs and symptoms, including gingivitis and periodontitis, recurrent oral fungal infections and impaired wound healing. Safely managing the patient with diabetes requires effective communication among multiple health care providers.<sup>2</sup>

Diabetes mellitus is a highly prevalent worldwide disorder with a rising prevalence particularly of type 2 diabetes mellitus. Diabetes, with its acute complications, has become a major health hazard in India. World Health Organization (WHO) projections show that more than 32 million Indians have diabetes, and half of them are not aware of it. This number is expected to swell to 80 million by the year 2030.<sup>3</sup> There is a huge variation in the quality of care provided by health sector. Lack of national guidelines and treatment protocols for health services is making monitoring and quality assessment difficult. Thus, diabetes epidemic in India is a consequential loss to national productivity and exchequer at social level.<sup>4</sup>

The prevalent ineffective management for diabetes in India could be attributed to many factors, viz., compartmentalization of health profession, barrier between patients and provider of health services and lack of a holistic approach. In India the current undergraduate medical curriculum does not have multidisciplinary, collaborative approach for quality health care of diabetic patients. Considering the multifactorial nature of diabetes, an integrated multidisciplinary approach through implementation of IPE curriculum could have a positive impact on diabetes management. Quality care for diabetes

patients could be improved by developing an IPE curriculum for healthcare students from different disciplines, viz., Medical, Dental, Pharmacy Physiotherapy, Nursing, and Nutrition. This curriculum is proposed for the final year students of the above disciplines as they are already well versed with the basic sciences. This curriculum could be incorporated in the existing core curriculum of Diabetes.

#### **Theoretical basis and practical relevance:**

IPE draws on education, psychology and sociology theories for its rationale and delivery. There is overlap among these theories; thus factors that are 'interdisciplinary' serve to complement inter-professionalism. Hean *et al.* provide a useful guide to learning theories applicable to IPE and highlight the inclusion of socio-cultural theory that recognizes the social aspect of learning, thereby helping to differentiate between uni-professional and inter-professional learning.<sup>5</sup> Social constructivism emphasizes that we learn through interactions with others and the environment in which we work. Thus, inter-professionally, learners should engage actively with the roles, beliefs, values and cultures of other professionals.

IPE differs from most traditional continuing education in that knowledge is largely socially created through interactions with others and involves unique collaborative skills and attitudes. IPE programs are inherently complex, so no single theoretical framework can be used to guide the development and implementation of such programs.<sup>6</sup>

Best practice models of IPE in terms of Inter-professional collaboration represent a didactic program, a community-based experience and an interprofessional simulation experience. The didactic program emphasizes interprofessional team building

skills, knowledge of professions, patient centered care, service learning, the impact of culture on healthcare delivery and an interprofessional clinical component. One common theme leading to a successful experience among these three interprofessional models included helping students to understand their own professional identity while gaining an understanding of other professional's roles on the health care team. Commitment from departments and colleges, diverse calendar agreements, curricular mapping, mentor and faculty training, a sense of community, adequate physical space, technology, and community relationships were all identified as critical resources for a successful program. Recommendations for best practices for IPE include the need for administrative support, interprofessional programmatic infrastructure, committed faculty, and the recognition of student participation as key components to success for an IPE centered program.<sup>7</sup>

Curricula for IPE may be stand-alone ones or add-ons to existing curricula. Add on curricula may be IPE modules delivered at regular intervals during the course, the so-called implant model. Another model is to integrate IPE modules with the existing core curriculum. When there are large groups of students on different campuses an e-learning approach has been advocated.<sup>8</sup>

The IPE curriculum proposed here on quality health care for Diabetes could be integrated with the pre-existing core curriculum of Diabetes. Due to severe time constraint of students and faculty, separate IPE modules would not be feasible. A stand-alone separate curriculum would require changes in the existing schedules of the college and health care professionals, which may not be feasible and could adversely affect patient care. The proposed integrated

IPE curriculum is more suitable and effective to get desired competencies in health care professionals. The joint training and shared learning of the students, which is the essence of IPE, has major benefits. It would inculcate collaboration, respecting the differences between teams, improve inter disciplinary communication, build up inter-professional networks, reduce communications breakdowns, improve morale and efficiency, help students to recognize the overlapping professional functions, or those activities which fall between professional roles thereby contributing towards better and improved quality care of diabetic patients. IPE when implemented will help inter-disciplinary students learn collaborative team building and working to achieve a common goal, viz., quality health care for diabetic patients which is missing at present. Collaboration of multidiscipline faculties in the development of integrated IPE curriculum and its implementation will develop ownership of curriculum as well as will reduce the morbidity and mortality in diabetics.

**Curriculum intent – Goals/Objectives/Outcomes:**

This proposed IPE curriculum has been developed keeping in mind the final year undergraduates of different disciplines, Medical, Dental, Pharmacy, Physiotherapy, Nursing, and Nutrition as they are already subjected to basic sciences in their curriculum.

The goal of this IPE curriculum is to provide quality health care to diabetes patients at any medical college by a collaborative approach of multiple disciplines. The objectives of the proposed IPE curriculum are grouped as short term and long term outcome objectives, as mentioned below.

**Short term outcome objectives:**

**Medical students** should be able to:

1. Make a correct clinical diagnosis of diabetes.
2. Prescribe evidence based investigations in diabetic patients and able to Interpret results.
3. Assess the level of diabetes and oral disease severity and suggest the most appropriate, cost effective, tailor-made treatment for diabetes.
4. Counsel patients about lifestyle modifications, treatment adherence, side effects and the need for follow up visits.

**Dental students** should be able to:

1. Provide clear instructions for hypoglycemia and hyperglycemia sign and symptoms
2. Make a correct clinical diagnosis of diabetics related oral diseases
3. Assess the level of Diabetes and oral disease severity
4. Provide clear instructions for hypoglycemia and hyperglycemia sign and symptoms
5. Counsel patients about lifestyle modifications, treatment followup, side effects and the need for follow up visits.

**Nursing students** should be able to:

1. Provide clear instructions for hypoglycemia and hyperglycemia sign and symptoms
2. Explain in detail to diabetics about the practical ways in which appropriate lifestyle modifications can be made

3. Assist patients in treatment follow up and recognizing the side effects of medications
4. Clarify any doubts that the patients may have regarding their condition.

**Physiotherapy** students should be able to:

1. Plan the most suitable physiotherapeutic approach to Diabetics.
2. Counsel patients for the importance of regular physiotherapy exercises in view of body weight, basal metabolic rate, body-mass index
3. Suggest suitable exercises that can be performed without supervision at home.

**Pharmacy students** should be able to:

1. Take responsibility for medication therapy management, insulin initiation, smoking cessation counseling and patient education on medications and glucose monitors.
2. Identify the most suitable drug for diabetics and inform the doctor of any contraindicated drug that has been inadvertently prescribed.
3. Provide clear instructions to the patient about the prescribed drug regimen
4. Counsel the patient about the importance of treatment follow-up and possible side effects.

**Nutrition students** should be able to:

1. Provide clear instructions for hypoglycemia and hyperglycemia sign and symptoms, Glycemic control, calories related diet, exercise, diet schedule and their relation.

2. Counsel the patient about the importance of treatment follow up.

Last but not the least, students of each the above discipline should be able to work as a team member effectively with the other disciplines and other health care providers for quality care of diabetes patients. The learning outcomes should meet the need of all professions involved.

**Long term outcome objectives:**

The above multi-discipline students should be able to work together as a team to provide optimum quality care for diabetic patients.

**Learning strategies and schedule:**

Components that are crucial to sustain IPE from educator and curriculum perspective are personnel resources, financial resources, administrative and faculty time. Along with above-mentioned components the key elements that are very important to sustain IPE from educator and curriculum perspective are responsibility, accountability, coordination, communication, cooperation, assertiveness, autonomy, mutual trust and respect. A successful interprofessional curriculum will ensure that students can experience, share, and practice these traits with each other. The table on specific learning objectives, teaching methods, assessment is detailed in Annexure A.

Implementing inter-professional education is not easy. Various stakeholders are involved and a systematic and clear strategy is required for successful and sustainable implementation. The required stimulus for IPE is strong visionary organizational leadership with transformative leadership style and having collaboration with all professional disciplines and proactive approach to problems and concerns.<sup>9</sup> Bland has identified leadership, cooperative climate, participation by

organization members, politics, human resource development, and evaluation for successful implementation of curriculum.<sup>10</sup>

The proposed IPE curriculum for quality health care of diabetic patients would be integrated into the core curriculum of Diabetes. The final year medical students undergo 2 month postings in batches of 10 in the department of medicine. Each day, three hours are spent in the department of Medicine either in the out-patient department (OPD), wards, and Community postings. It is proposed to use a total of six hours per week, for 8 weeks for the proposed IPE curriculum of 48 hours. 12 hours will be scheduled for didactic program and remaining 36 hours for community-based experience and an interprofessional simulation experience.

It is proposed that during the IPE sessions, students of dental, nursing, physiotherapy, nutrition and pharmacy disciplines would join the medical students. Each batch will consist of 10 students from each discipline. The facilitators and students would provide oral and written feedback to each other in every session. This module would be continued for each batch.

#### **Assessment & Evaluation:**

A blueprint would be prepared collaboratively by multidisciplinary faculty before commencing the test to ensure vast coverage of the content as per 'Must know', 'Desirable to know' and 'nice to know' areas. Assessment tools would include Multiple choice questions, short answer questions, objective structured viva, reflections, 360 degree feedback, faculty feedback, peer assessment, simulated patients, observed structured clinical examination (OSCE).<sup>11</sup>

Formative assessment would be part of each session by way of written and oral feedback by the

faculty as well as students. Pre-test and post-test will be administered by Multiple choice questions (MCQ). Pre-validation of the questions will be done by content expert and health profession experts. Separate tests would be conducted for each of the disciplines. OSCE will be used for the assessing the practical skills of the students of all the above disciplines. It would be made mandatory for all students to pass theory and practical assessments. Change in attitude of participants will be assessed by conducting the Readiness for Inter-professional Learning Scale containing 19-item questionnaire with subscales namely, teamwork and collaboration, professional identity and roles and responsibilities.<sup>12</sup> Other scales Interdisciplinary Education Perception Scale (IEPS) to assess change in attitude and Inter-professional Collaborator Assessment Rubric (ICAR) to assess a learner's inter-professional collaborator competencies would be used as per logistic support available.

#### **Program evaluation(PE):**

PE is helpful for program improvement. It is also useful for accountability and knowledge generation. Evaluation may be conducted to determine whether the outcomes are met which is called summative evaluation.<sup>13</sup>

Kirkpatrick's four level evaluation model based on System theory is extensively employed to evaluate the effectiveness of educational programs.<sup>14</sup> The evaluation of IPE curriculum can focus on the outcomes as enumerated in the Kirkpatrick model, viz., participants' reaction, learning, change in behavior and results.<sup>15</sup> The outcomes will be measured with the help of quantitative and qualitative data analysis. Qualitative data is as important as quantitative data when evaluating programs. Measuring the impact of the program on the learners

at these four levels will reveal the effectiveness of the IPE curriculum program.

**Reaction:** Written feedbacks of the participants on a likert scale for quantitative evaluation and open ended questions for qualitative.

**Learning:** Check the learning of the participants before and after the IPE program by use of Pre-Test and Post-test questionnaire methods. Also measure the resulting increase in students' knowledge or capability (achievement of learning) as defined by the specific learning objectives of the program.

**Behavior:** In the IPE curriculum change in behavior is the outcome expected and can be observed. The learners should be able to provide quality care to diabetics in real life situation all the times. Rewards, forming clubs or forming groups for best practices etc., could help in achieving desirable change in behavior.

**Results:** Results will depict what is the return on investment (time, money, infrastructure and human expertise) in the form of organizational goals.

The program evaluation questions formulated as per the objectives could be as under:

- Whether students have gained better knowledge about diabetes after implementation of the module.
- How much did multidisciplinary students rank as team players during this module?
- Have they achieved the desired level of competency?
- Is there any desirable change in their attitude towards this curriculum.
- Whether the students who intervened by this module were able to cater quality health care to diabetics.
- What is the outcome level of diabetes care after implementation of the curriculum?

It is assumed that students from multidiscipline who undergo this module will be able to provide quality health care for diabetics. The premises made could be checked during the evaluation process from the Scores of Questionnaires, Feedback responses of students and faculty and satisfaction of patients marked on likert scale.

The evaluation will be conducted by the all multidisciplinary faculty who are involved in the module. Focus group discussions can be used for multidisciplinary faculty, interns and a thematic analysis would be used to understand the level of impact of the module. Quantitative data analysis would help to understand mean and standard deviation for the descriptive statistics as well as to find difference of scores of multidisciplinary students pre and post module implementation.

Evaluation report can be discussed with the entire multidisciplinary faculty. The strategy for effective communication of the program evaluation findings would be use of newsletters, brochures, electronic responses, presentations for the Program participants. Workshops, internal reports, performance indicators and presentations could be used for the Project team. For the Management and the funding bodies (if any) it could be Recommendations, briefings, presentations, Seminars, summary reports, and data summary sheets that bring out the cost efficiency of the program. Formal reports that are brief and key findings with a focus on the outcomes could be used to communicate to the Health Department and Ministry.

Producing press releases and articles for local professional publications, such as newsletters and journals, making presentations at meetings on the results of our program at the local health department, university, listing our evaluation report or other

evaluation-related publications in relevant databases and scheduling meetings with similar programs to share our experience and results will be considered.<sup>16</sup>

#### Annexure -1

##### Learning Objectives, Teaching methods, Assessment

###### **Module 1- Overview of Diabetes Mellitus**

- To equip physician to diagnose a case of Diabetes
- To learn about the classification of diabetes with particular reference to diabetes in youth
- To help a physician decide on the initial evaluation of the patient with respect to metabolic control, presence of complications and other co-morbidities.

**Teaching methods:** Interactive didactic lecture, group discussion

**Assessment:** MCQs, Short answer questions, structured viva

###### **Module 2 – Presentation and Initial Evaluation of Type 2 Diabetes**

- To define diabetes
- To learn about some of the important milestones in diabetes and its management
- To understand the magnitude of the problem of diabetes and role of the general physician in tackling it.
- To understand the basics of normal intermediary metabolism and the hormonal control of the same
- To learn about the pathogenesis and pathophysiology of type 2 diabetes and appreciate its diverse metabolic consequences.

**Teaching methods:** Interactive didactic lecture, video presentation for pathogenesis and physiology

**Assessment:** Seminars, MCQs, Short answer questions, structured viva

###### **Module 3 – Non-Pharmacological Management of Type 2 Diabetes**

- To learn the basic principles of diet and exercise modifications to be recommended in type 2 diabetes.
- To learn about the importance and basic principles of patient education in diabetes
- To help trainees identify people at risk for type 2 diabetes and screen them for the same
- To learn the best ways to prevent diabetes in individuals at high risk of diabetes.

**Teaching methods:** Interactive didactic lecture, Role play, case scenario

**Assessment:** Seminars: MCQs, Short answer questions, structured viva, OSCE/OSPE

###### **Module 4- Approach to Pharmacotherapy of Type 2 Diabetes**

- To define the treatment objectives in diabetes
- To develop a basic understanding of the different oral anti-diabetes medications available, and their merits and demerits.

**Teaching methods:** Interactive didactic lecture, case scenario, group presentation

**Assessment:** MCQ/SAQ

###### **Module 5- Treatment algorithms**

- To learn about the pharmacology of different insulin preparations
- To learn the indications for insulin therapy and the choice of regimen
- To discuss the various treatment algorithms for type 2 diabetes

**Teaching methods:** Interactive didactic lecture, video presentation, demonstration, hands on experience

**Assessment:** OSCE/OSPE, OSCE/MCQ/SAQ

###### **Module 6 – Acute Complication Of Type 2 Diabetes**

- To learn how to identify, treat and prevent hyperglycemic crises.
- To learn how to identify, treat and prevent hypoglycemia.
- To learn about some of the landmark clinical trial in diabetes and how they influence current practice.

**Teaching methods:** Interactive didactic lecture, role play, case scenario, group discussion

**Assessment:** Simulated Case scenarios, OSCE/MCQ/SAQ



**Module 7: Chronic complications of Type 2 Diabetes**

- To describe the pathogenesis of micro vascular diabetes complications
- To learn how to practically manage and more importantly, to prevent these complications

**Teaching methods:** Interactive didactic lecture, Buzz group, video presentation

**Assessment:** OSCE/ OSPE/MCQ/SAQ

**Module 8: Chronic complications of Type 2 Diabetes**

- To learn about the patho-physiology, clinical features, management and prevention of macro vascular complication of diabetes.
- To develop an appreciation of the concept of “global risk reduction “including the management of dyslipidemia, hypertension and obesity.

**Teaching methods:** Interactive didactic lecture, Buzz group, group discussion, seminar

**Assessment:** Simulated Case scenarios, OSCE/MCQ/SAQ

**Module 9: Other complications of Type 2 Diabetes**

- To learn about the other infection commonly found in diabetes patients, their treatment and prevention.
- To describe the etiopathogenesis, clinical feature and management of diabetic foot
- To learn how to advise patients regarding its prevention.
- To learn about the common skin lesions that can occur a result of diabetes, its complication or its treatment.

**Teaching methods:** Interactive didactic lecture, role play, case scenario

**Assessment:** OSCE/MCQ/SAQ

**Module 10: Special Topics In Care of Patients with Type 2 Diabetes**

- To learn about the peri-operative management of a diabetes patient undergoing surgery
- To learn how to manage critically an noncritical ill diabetes patients in the hospital
- To learn how to manage diabetes in an elderly patient
- To learn about the syndrome of nonalcoholic fatty liver disease and its management.
- To learn about the common dental and rheumatologic problem in diabetes patient
- To learn how to manage other special situations in diabetes like travel, sick days and occupational problems

**Teaching methods:** Interactive didactic lecture, case scenario, panel discussions

**Assessment:** OSCE/MCQ/SAQ

**Module 11: Diabetes in pregnancy**

- To learn to identify, evaluate and treat diabetes in pregnancy
- To learn about the identification and management of other uncommon type of diabetes such as type 1 diabetes, drug induced diabetes and diabetes due to endocrinopathies.

**Teaching methods:** Interactive didactic lecture, case scenario

**Assessment:** /OSPE/OSCE

**Module 12: Documentation of diabetes**

- To understand the importance of timely completion, storage and retrieval of patient information in “In-Clinic Diabetes Management Software “ for patient follow up, feedback, analysis, medical studies and research.

**Teaching methods:** Interactive didactic lecture, video demonstration and hands on experience

**Assessment:** OSPE/ OSCE/ Simulation case scenario

Reflection/ Peer Feedback/360 degree assessment will be incorporated once in two week

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