

Junior Physicians, Are They Equipped to Manage Diabetes? Situation Analysis at Kasr El-Aini Hospital, Cairo University

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ABSTRACT

Background: Diabetes is a chronic illness that requires continuing medical care and patient self management education to prevent acute complications and to reduce the risk of long-term complications. **Objective:** To assess junior physicians' competencies (knowledge, attitude and skills) as regards care of diabetic patients and to evaluate efficacy of the existing system in the form of gap analysis for Faculty of Medicine curricula and practical training courses. **Methods:** A cross sectional study was conducted on 310 junior physicians, working at Kasr El-Aini Hospital, Faculty of Medicine, Cairo University. Two hundred and fifty house officers attending the rotations of internal medicine and general surgery and sixty residents from these departments were included. Research instrument was a questionnaire that inquired about four discrete areas: demographic data, knowledge, attitude and practice (KAP) domains in the field of diabetes and its complications. A scoring system was developed for every question. These scores were then converted into percentages and a mean of the total scores was calculated for each domain. Cut-off level of 60% or more was identified as the acceptable level. The undergraduate curricula courses specifications and intended learning outcomes (ILOs) for the subjects studied in the six years of medical education (year 2008-2009) were reviewed. **Results:** In our study 53.6% of the house officers and 55% of the residents were males. Two thirds of both groups had family history of diabetes. Regarding knowledge, the mean percent score of residents was significantly higher than that of house officers (41.4 ± 6.4 and 38.1 ± 6.0 respectively, $p < 0.001$). Yet, both groups could not reach the 60% acceptable level of correct answers on any of the four areas of the knowledge domain. Our results revealed that the junior physicians had good attitude towards management of diabetes and its complications with a mean percent score of 81.2 ± 5.7 . A significant positive linear relationship was observed between knowledge and attitude scores of the junior physicians ($r = 0.093$, $p < 0.001$). The majority of them had undesirable practice abilities. Mean percent score of the residents' practices was significantly higher than that of the house officers ($p < 0.05$). Reviewing the undergraduate curricula ILOs and postgraduate log book for the house officers and comparing them with the international guidelines revealed that the six years undergraduate curricula of Faculty of Medicine covered all the topics and acquired skills about diabetes and its complications, while there was shortage in the house officers' training log book regarding management skills for diabetes. **Conclusion:** This study has explored several aspects of diabetes related KAP of junior physicians. It highlights the need for improvement in their practices for treating and educating diabetics.

Keywords: Continuous Medical Education (CME), Diabetes Mellitus, Knowledge, Attitude and Practice (KAP)

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INTRODUCTION

Diabetes is a major growing health care problem. The incidence of diabetes is rising throughout the world. The figures estimated in 1995 were 135 million escalating to 151 million in 2000. In 2025 it is anticipated that there will be 300 million diabetics all over the globe and more than 75 percent of the diabetics will be in the developing countries.⁽¹⁾

There are around 24.5 million people with diabetes in the Middle East and North Africa (MENA) and the region includes several countries with some of the highest diabetes prevalence rates in the world. In the region as a whole, the International Diabetes Federation (IDF) estimates that the number of patients with diabetes is expected to nearly double by 2025.⁽²⁾ Egypt is in the world's top 10 in terms of the highest number of people with diabetes in 2003 (3.9million) and highest projected number of people with diabetes in 2025 (7.8 million).⁽³⁾

In the past three decades, despite considerable advances in treatment modalities of diabetes, considerable gaps have been shown between patients' outcome and acceptable treatment in developed and also in developing countries. Different reasons are proposed in failure to achieve therapeutic goals such as poor adherence to treatment regimens by patients or malpractice by physicians.⁽⁴⁾ Lack of compliance to the guidelines on the part of diabetic subject, indicates deficiencies in the physicians' knowledge, implementation techniques and attitude problems.⁽⁵⁾

The American Diabetes Association, (2007) has developed Standards of Medical Care in Diabetes. These standards of care are intended to provide clinicians, patients and researchers, with the components of diabetes care, treatment goals, and tools to evaluate the quality of care. The recommendations included are diagnostic and therapeutic actions that are

known or believed to favourably affect health outcomes of patients with diabetes.⁽⁶⁾

In (2009) the IDF Middle East and North Africa developed the local National Diabetes Program (NDP) with practical and achievable outcomes to improve the prevention, treatment and care of diabetes. One of the key topics covered by this action plan was to strengthen the role of primary care in diabetes management through multidisciplinary team approach with minimum standard of care.⁽⁷⁾

Patients' knowledge of diabetes and its management depends, to a large extent, on the adequacy and effectiveness of the diabetes-related care they receive.⁽²⁾ A major prerequisite for physicians to provide up to date diabetes care and education, wherever they practice, is the fundamental level of knowledge, competence and confidence. The application of this knowledge should promote the provision of consistent evidence-based practice, and

contribute to improved health outcomes.⁽⁸⁾

Therefore, it is important that all trainee doctors acquire adequate knowledge and skills in the management of diabetes.⁽⁹⁾

Williford and colleagues in their study concluded that physicians' knowledge was not enough about diabetes care, especially in the field of importance of exercise and physical activity based on individual patient's need, and most physicians were not familiar with clinical guidelines of sports medicine. It has been observed that in addition to physicians' knowledge, physicians' attitude about treatment was important to achieve goals.⁽¹⁰⁾

It has been demonstrated that guidelines had the greatest chance of changing clinical practices, when they were applied by the clinicians for whom they were intended, disseminated through a specific educational program and implemented via patient specific reminders during consultations.⁽¹¹⁾

Since preventive programs are important

as equal or even more than favourable treatments in controlling non-communicable diseases' burden such as diabetes,⁽⁴⁾ promotion of knowledge and attitude of health care providers about diabetes seem to be critical. In this way, it seems that continuing medical education programs (CME) must be one of the worthy methods to achieve this goal.⁽¹²⁾

So this study was conducted to assess knowledge, attitude and practice of junior physicians in the field of diabetes and its complications. Also to evaluate efficacy of the existing system in the form of gap analysis for Faculty of Medicine curricula and practical training courses, aiming to improve junior physicians' competencies as regards care of diabetic patients.

MATERIALS AND METHODS

A cross sectional study was conducted in the departments of Internal Medicine and General Surgery of Kasr Al-Aini Teaching Hospitals, from May 2009 to May 2010.

The study included two subgroups of

junior physicians; house officers attending the rotations of Internal Medicine and General Surgery and residents from these departments.

A convenience sample was taken from all residents in both departments, where out of a total 110 residents only 60 agreed to be included in the study with a response rate of 54.5%. A cluster sample was taken from the lectures given to the house officers during their training year. Two lectures were randomly selected. Out of 300 house officers in their training rotation of Internal Medicine and General Surgery departments, only two hundred and fifty agreed to participate with a response rate of 83.3%.

Study tools

- 1- A structured self administrated questionnaire was prepared in referral to the following international guidelines; American Association of Clinical Endocrinologists (AACE)⁽¹³⁾, International Diabetes Federation (IDF).⁽⁷⁾ and Canadian Diabetes Association (CDA)⁽¹⁴⁾.

The questionnaire consisted of four sections. The first section included data about physicians' characteristics (name, age, sex, medical history, family history of diabetes), work status of the physicians and sources of information about diabetes whether from training courses, conferences or free readings.

The second section measured four areas of knowledge related to epidemiological features of diabetes, prevention and management, lipid disorders and chronic complications of diabetes.

Section three was allocated for assessment of physicians' attitude toward treatment of diabetes and its complications, and section four included thirteen items about practice of physicians in various clinical conditions.

2- The undergraduate curricula courses specification and intended learning outcomes (ILOs) for the subjects studied in the six years of medical education (year 2008 -2009) were reviewed. Knowledge, attitude and skills concerning diabetes

mellitus in each subject of the curricula were listed and compared to the international guidelines.

Data processing and analysis

1) Scoring criteria

- **Attitude questions (25 items):**

According to the Likert scoring ⁽¹⁵⁾ range (strongly agree, agree, neutral, disagree, strongly disagree), a numerical value was assigned to each choice in the range of responses with the strongly agree response taking score (5) and strongly disagree taking score (1) point.

- **Knowledge questions:** It was most useful to analyze data from this section in terms of correct answers taking a score (1) for multiple choice questions (MCQ) and an absolute number for questions requiring a range, to detect different physicians' responses, a total score was calculated for each subdivided section in the questionnaire as follows; epidemiology of diabetes (5 items with a maximum score of

14), prevention (3 items with a maximum score of 5), management (14 items with a maximum score of 20), complications (23 items with a maximum score of 37).

- **Practice scoring:** According to practices mentioned in practical guidelines for diabetes management⁽¹⁴⁾, 13 items were designed with a maximum score of 13 points.

The answers were scored by assigning marks. Points for all questions were summed and converted into percentages then a mean of the total scores was calculated for each domain.

2) Analysis

All collected questionnaires were revised for competences and logical consistency. Data were entered on a data sheet prepared on Excel program, and then transposed to the Statistical Package for Social Sciences (SPSS) version 16 for analysis.

Data checking was done by simple frequencies. Quantitative data were

displayed as mean \pm standard deviation, while qualitative data were displayed as percentages.

Data were further stratified to assess knowledge, attitude and practice domains. Cut-off level of 60% or more for each domain score items was identified as the acceptable level.

Comparison between the two subgroups of the study (house officers and residents) was done using Chi Square test. Mean percent scores were also calculated for each of knowledge, attitude and practice domains. Comparison between study subgroups was done using the Student's t-test.

Pearson's correlation test was done to correlate total mean knowledge, with attitude and practices scores. All statistical tests were considered significant at p -value level \leq 0.05.

Ethical considerations

1. Ethical and scientific approval was obtained on 27th March, 2009 from the Department of Public Health Council.

2. Verbal consents were obtained from all physicians before completion of the questionnaires. During the lectures for house officers, all eligible participants were informed about the contents of the questionnaire and the aim of the study, and were assured of confidentiality of their data. Voluntary return of questionnaires was considered an indication of consent.
3. Verbal consents were obtained from residents, by face to face interview, before completion of the study questionnaire, and data confidentiality was also assured.
4. Data confidentiality was maintained throughout the study conforming to requirements of the latest revision of the Helsinki Declaration of Bioethics.⁽¹⁶⁾

RESULTS

Results of the study were divided into 2 sections:

- I- Analysis of data collected in the self administered questionnaire.
- II- Reviewing the undergraduate curricula and postgraduate log book of house

officers and comparing them with international guidelines.

I- Analysis of data collected in the self administered questionnaire:

Basic characteristics

In the present study 53.6% of the house officers and 55% of the residents were males. Two thirds of both groups had family history of diabetes, and twenty five house officers (10%) compared to 5% of the residents were diabetic. It was observed that there was few postgraduate education and training courses about diabetes (Table 1). Mean duration of the house officers' and residents' clinical practice was 9.76 months \pm 1.00 and 16 months \pm 2.00, respectively.

Physicians' knowledge in the field of diabetes

In the knowledge section, mean percent score of the residents was significantly higher than that of the house officers (41.4 \pm 6.4 and 38.1 \pm 6.0 respectively, $P < 0.001$) (Table 6).

Table 1. Baseline data of the study group

| Variables | House officers (n=250) | | Residents (n=60) | |
|--|------------------------|------|------------------|------|
| | No. | (%) | No. | (%) |
| Sex | | | | |
| Female | 116 | 46.4 | 27 | 45.0 |
| Male | 134 | 53.6 | 33 | 55.0 |
| Medical history | | | | |
| Diabetes | 25 | 10.0 | 3 | 5.0 |
| Hypertension | 6 | 2.4 | 1 | 1.7 |
| Liver | 1 | 0.4 | 0 | 0.0 |
| Kidney | 5 | 2.0 | 1 | 1.7 |
| Others | 17 | 6.8 | 2 | 3.3 |
| None | 196 | 78.4 | 53 | 88.3 |
| Family history of diabetes | 168 | 67.2 | 39 | 65.0 |
| Sources of information about Diabetes | | | | |
| Training course | 84 | 33.6 | 28 | 46.7 |
| Conference | 89 | 35.6 | 29 | 48.3 |
| Degree of education | 242 | 96.8 | 59 | 98.3 |
| Free readings | 163 | 65.2 | 42 | 70.0 |
| For presentation | 127 | 50.8 | 26 | 43.3 |

Table 2. Frequency of correct answers to knowledge questions in the field of epidemiology and prevention of diabetes mellitus

| Variables | House officers (n=250) | | Residents (n=60) | |
|---|------------------------|------|------------------------|------|
| | No. of correct Answers | (%) | No. of correct answers | (%) |
| Epidemiological features of diabetes | | | | |
| Leading cause of death | 51 | 20.4 | 16 | 26.7 |
| Egypt prevalence | 73 | 29.2 | 17 | 28.3 |
| Risk factors | 20 | 8.0 | 3 | 5.0 |
| Types | 33 | 13.2 | 6 | 10.0 |
| CVD risk factors | 42 | 16.8 | 18 | 30.0 |
| Acceptable level* (>60% correct) | 68 | 27.2 | 25 | 41.7 |
| Preventive measures | | | | |
| Weight reduction | 93 | 37.2 | 19 | 31.7 |
| Physical activity | 40 | 16.0 | 9 | 15.0 |
| Acceptable level* (>60% correct) | 90 | 36.0 | 22 | 36.7 |

*P = 0.21

Although the findings showed that residents gave more correct answers on knowledge items related to epidemiological features and management of diabetes, yet both groups could not reach the 60% acceptable level (cut off point) as regards their knowledge about diabetes.

Proportion of physicians with correct answers for their knowledge in the field of diabetes and its management are shown in Table 2 and 3.

Concerning epidemiological features of diabetes, 20.4% of the house officers and 26.7% of the residents knew that diabetes was the sixth leading cause of death in the world and nearly one-third of both groups mentioned that Egypt was one of the world's top 10 countries with the highest prevalence of diabetes. Small percent of whole sample could illustrate risk factors and types of diabetes. As regards preventive measures 37.2% of the house officers and 31.7% of the residents

mentioned that over weight and obese individuals should reduce from 5% to 10% of their initial weight and about 15% of both groups knew that practicing 150 minutes physical activity on weekly base was one of the preventive tools for type-2 diabetes (Table 2).

Table 3 indicates deficient knowledge regarding management of diabetes, as only 1.6% of the house officers and 13.3 % of the residents could reach the acceptable level of correct answers as regards glycemic management (diagnostic criteria of diabetes, manifestations of hypoglycaemia and hyperglycaemia, cut off levels of fasting and 2 hrs postprandial glucose concentration and HbA1c level), pharmacological management (management drugs, when to start anti-hyperglycaemic if glycaemic targets are not achieved after life style management and how long to attain target glycated haemoglobin after introducing the hyperglycaemic agents, common therapy for marked hyperglycaemia) and nutritional therapy (recommended

Table 3. Frequency of correct answers to knowledge questions in the field of management of diabetes mellitus

| Variables | House officers (n=250) | | Residents (n=60) | |
|--|------------------------|------|------------------------|------|
| | No. of correct answers | (%) | No. of correct answers | (%) |
| Glycemic management | | | | |
| Diagnostic criteria | 32 | 12.8 | 13 | 21.7 |
| Manifestations of Hyperglycaemia | 75 | 30.0 | 36 | 60.0 |
| Manifestations of Hypoglycaemia | 101 | 40.4 | 34 | 56.7 |
| Hba1c ($\leq 6.5\%$) | 136 | 54.4 | 37 | 61.7 |
| FPG ($\leq 110\text{mg/dl}$) | 153 | 61.2 | 44 | 73.3 |
| 2HRS PP ($\leq 140\text{mg/dl}$) | 112 | 44.8 | 33 | 55.0 |
| Nutritional therapy (recommended daily intake from total caloric value) | | | | |
| CHO intake (45%-60%) | 29 | 11.6 | 10 | 16.7 |
| Fat intake (<30%) | 58 | 23.2 | 13 | 21.7 |
| Saturated fat intake (<10%) | 60 | 24.0 | 20 | 33.3 |
| Fibres intake(15-25gm/1000Kcal) | 23 | 9.2 | 11 | 18.3 |
| Pharmacological management | | | | |
| Management drugs (Metformin-Thiazolidinoides) | 69 | 27.6 | 12 | 20.0 |
| Anti-hyperglycaemic and Lifestyle (2-3 months) | 42 | 16.8 | 19 | 31.7 |
| Anti-hyperglycaemic and target HbA1c level (3 months) | 39 | 15.6 | 18 | 30.0 |
| Marked hyperglycaemia | 41 | 16.4 | 17 | 28.3 |
| *Acceptable level (>60% correct) | 4 | 1.6 | 8 | 13.3 |

* $P < 0.001$

carbohydrate (CHO), total fat, saturated fat and fibres intake) of diabetic patients, with significant difference between both groups for the acceptable knowledge score ($P < 0.001$).

Our study revealed that there was a great shortage in the study group's knowledge concerning diabetes complications and co-

morbidities (cardiovascular artery disease, hypertension, nephropathy, retinopathy, neuropathy and gestational diabetes). Only 10% of the residents and 11.2% of the house officers scored at the 60% acceptable level or above (Table 4).

Table 4: Frequency of correct answers to knowledge questions in the field of complications and co-morbidities of diabetes mellitus

| Variables | House officers (n=250) | | Residents (n=60) | |
|--|------------------------|------|------------------------|------|
| | No. of correct answers | (%) | No. of correct answers | (%) |
| Cardiovascular artery disease(CAD) | | | | |
| Prevalence of CAD (increase by 2-3 folds) | 85 | 34.0 | 24 | 40.0 |
| Screening CAD | 50 | 20.0 | 11 | 18.3 |
| Screen lipids | 88 | 35.2 | 30 | 50.0 |
| Drug of choice for hyperlipidemia (statins) | 124 | 49.6 | 27 | 45.0 |
| Hypertension | | | | |
| BP target levels (< 130/80 mmHg) | 103 | 41.2 | 26 | 43.3 |
| BP medication | 61 | 24.4 | 16 | 26.7 |
| Risk factors of micro vascular | 60 | 24.0 | 18 | 30.0 |
| Kidney Complications | | | | |
| Screening (every year) | 133 | 53.2 | 36 | 60.0 |
| Investigations | 40 | 16.0 | 17 | 28.3 |
| CKD protein intake (0.8-1g/kg/day) | 68 | 27.2 | 21 | 35.0 |
| Retinopathy | | | | |
| Screen retinopathy(every year) | 127 | 50.8 | 38 | 63.3 |
| To reduce visual loss (laser) | 74 | 29.6 | 17 | 28.8 |
| Neuropathy | | | | |
| Neuropathy cause death | 143 | 57.2 | 41 | 68.3 |
| Inspect feet for changes | 35 | 14.0 | 8 | 13.3 |
| Erectile dysfunction (ED) | | | | |
| ED prevalence (35%-45%) | 31 | 12.4 | 5 | 8.3 |
| ED drug (phosphodiesterase type 5 inhibitor) | 92 | 36.8 | 25 | 41.6 |
| Gestational diabetes | | | | |
| Risk factors | 14 | 5.6 | 13 | 21.7 |
| FPG | 86 | 34.4 | 16 | 26.7 |
| 1 hr pp | 0 | 0.0 | 0 | 0.0 |
| 2 hrs pp | 6 | 2.4 | 0 | 0.0 |
| Best medications (insulin) | 141 | 56.4 | 38 | 63.3 |
| Acceptable level* | | | | |
| (> 60% correct) | 28 | 11.2 | 6 | 10 |

* $P = 0.789$

Physicians' attitude towards management of diabetes and its complications

The mean percent score of the junior physicians (81.2 ± 5.7) indicated good attitude towards management of diabetes and its complications. The majority of both groups strongly agreed to screen pre-diabetics, confirm the importance of life style modifications and physical activity in management of diabetes, and had favourable attitude towards monitoring patients by glycemic control, tailoring insulin regimens for each patient, and for the importance of pharmacological management (Fig.1).

Nearly 70% of the junior physicians strongly agreed that diabetic patients attending the outpatient clinic should be screened for dyslipidemia and hypertension. About 60% had favourable attitude towards screening of micro-vascular complications (nephropathy, retinopathy and neuropathy) in

the outpatient clinic.

A significant positive linear relationship was observed between knowledge and attitude scores of the junior physicians ($r=0.093$, $P<0.001$) using Pearson's test of correlation (Fig. 2).

Physicians' practices as regards management of diabetic patients

It was revealed that, the majority of the junior physicians had undesirable practice abilities, and small percent of both groups scored the pre-identified acceptable level of practice (>60% correct answers) (Table 5).

Table 6 reveals significantly higher mean percent score of the residents than that of house officers in the field of clinical practice as regards, patient contact and management of diabetes including management plan, monitoring criteria, using urine stick, practice of insulin injection, management plan in hospital, and working in team ($p < 0.05$).

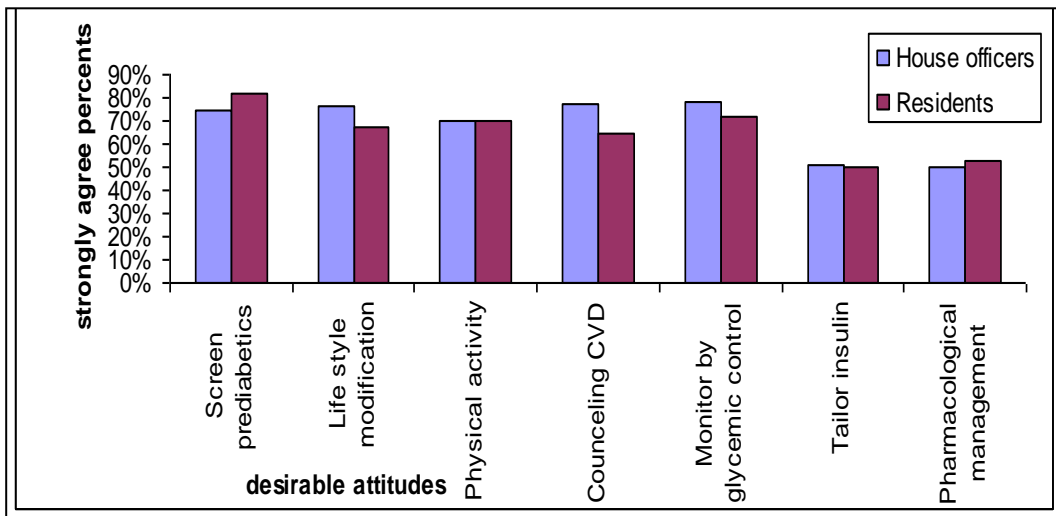


Figure 1. Attitudes of junior physicians as regards prevention and management of diabetes mellitus.

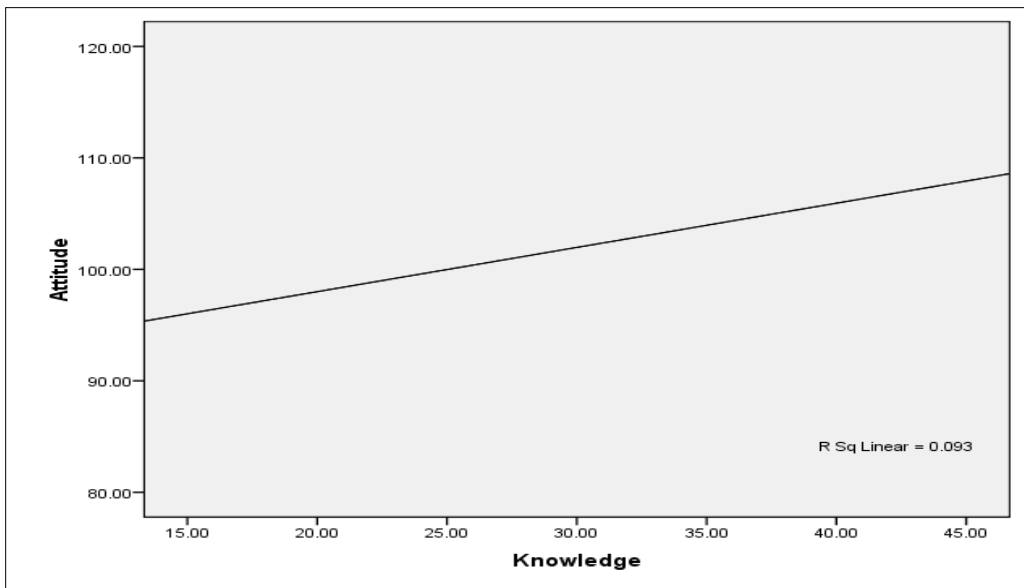


Figure 2. Correlation between total knowledge and attitude scores of the junior physicians.

Table 5: Assessment of the junior physicians' practice as regards management of diabetic patients

| Physicians' practice | House officer (n=250) | | Residents (n=60) | |
|--|------------------------|------|------------------------|------|
| | No. of correct answers | (%) | No. of correct answers | (%) |
| Patient contact | | | | |
| Expose >30 patient | 77 | 30.8 | 38 | 63.3 |
| Examine >30patient | 53 | 21.2 | 25 | 41.7 |
| Shared in treating >30patient | 25 | 10.0 | 19 | 31.7 |
| Manage Complicated patients | 25 | 10.0 | 23 | 38.3 |
| Self management education (to patients as regard) | | | | |
| Skip meal | 159 | 63.6 | 37 | 61.7 |
| Skip medication | 149 | 59.6 | 42 | 70.0 |
| Skip feet care | 157 | 62.8 | 43 | 71.7 |
| Management | | | | |
| Follow Management plan | 134 | 53.6 | 32 | 53.3 |
| Follow Monitoring criteria | 148 | 59.2 | 32 | 53.3 |
| Use urine stick | 146 | 58.4 | 45 | 75.0 |
| Practice Insulin injection | 160 | 64.0 | 46 | 76.7 |
| Management plan in hospital | 66 | 26.4 | 31 | 51.7 |
| Work in team | 48 | 19.2 | 18 | 30.0 |
| *Acceptable level (> 60% correct) | | | | |
| | 51 | 20.4 | 21 | 35.0 |

*P = 0.016

Table 6. The mean scores of junior physicians' knowledge and practice in the field of diabetes management and complications

| Variables | Mean percent scores | | P value |
|---------------------------|-----------------------------|------------------------|---------|
| | House officers Mean ± SD | Residents Mean ± SD | |
| Knowledge | | | |
| Epidemiological features | 53.0 ± 14.8 | 56.6 ± 14.3 | 0.90 |
| Prevention | 35.5 ± 27.1 | 31.6 ± 26.1 | 0.320 |
| Management | 42.1 ± 13.2 | 56.0 ± 14.2 | <0.001* |
| Complications | 30.7 ± 6.1 | 29.0 ± 6.6 | 0.06 |
| Total mean percent score | 38.1 ± 6.0 | 41.4 ± 6.4 | 0.001* |
| Practice | | | |
| Patient contact | 29.4 ± 28.3 | 43.8 ± 29.2 | 0.001* |
| Self management education | 62 ± 33.3 | 66.6 ± 32.3 | 0.24 |
| Management | 48 ± 24 | 56 ± 21.8 | 0.013* |
| Total mean percent score | 45.6 ± 17.5 | 55.2 ± 16.2 | <0.001* |

*significant p-value

II- Reviewing the undergraduate curricula and postgraduate log book of house' officers and comparing them to international guidelines:

Diabetes knowledge in the undergraduate curricula:

Results revealed that the six years undergraduate curricula of The Faculty of medicine fulfilled all topics about diabetes and its complications illustrated in the international guidelines for management of diabetes.^(7,13,14) Pathophysiology and anatomical topics were discussed in the first two years of undergraduate medical education, pharmacological management of diabetes in the third year, and in the last 3 years, knowledge about DM was delivered in a more practical manner. Public health courses included types, risk factors, prevention and control of diabetes. DM complications as gestational diabetes mellitus was included in the gynaecology courses, retinopathy at end

stage of diabetes in the ophthalmology course and diabetic foot and its complications in surgery. The internal medicine courses covered the whole subject in details where DM topics represented 3% of the topics of internal medicine (Table 7).

Diabetes management acquired skills in the undergraduate curricula:

Comparison between the undergraduate curricula ILOs, postgraduate training program (log book) and the international guidelines as regards acquired skills for management of diabetes, showed that the undergraduate curricula for the six years of medical educations fulfilled the whole professional skills documented in the international guidelines for management of diabetes, while there was shortage in the house officers training log book regarding skills of self management education for diabetics, following the management plan and monitoring criteria for diabetic patients (Table 8).

Table 7. Comparison of the undergraduate curricula (ILOs) for year (2008-2009) with the international guidelines as regards knowledge about diabetes

| Topics | 1 st year | 2 nd year | 3 rd year | 4 th year | 5 th year | 6 th year |
|--------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Definition | Present | Present | Present | Present | Present | Present |
| Pathophysiology | | | Present | Present | Present | Present |
| Types | | Present | | Present | | Present |
| Causes | | Present | | Present | | Present |
| Screening | | Present | | Present | | Present |
| Prevention | | | | Present | | Present |
| Self medical education | | | | Present | | Present |
| Glycemic control | | | | | | Present |
| Monitoring | | | | | | Present |
| Physical activity | | | | | | Present |
| Nutrition therapy | | | | | | Present |
| Insulin therapy | | | | | | Present |
| Pharmacological therapy | | | Present | | | Present |
| Hypoglycaemia | | | | | | Present |
| Hyperglycaemia | | | | | | Present |
| In hospital management | | | | | | Present |
| Obesity management | | | | Present | | Present |
| Psychological management | | | | | | Present |
| Vaccinations | | | | | | Present |
| Pancreas transplantation | | | | | | Present |
| Alternative medicine | | | | | | Present |
| CAD | | | | Present | | Present |
| Dyslipidemia | | | | Present | | Present |
| Hypertension | | | | Present | | Present |
| Heart failure | | | | Present | | Present |
| Nephropathy | | | | | | Present |
| Retinopathy | | | | Present | | Present |
| Neuropathy | | | | | | Present |
| Foot care | | | | | | Present |
| ED | | | | | | Present |
| DM in children | | | | | | Present |
| DM in pregnancy | | | | | Present | Present |
| DM in elderly | | | | | Present | Present |

Table 8. Comparison between the undergraduate curricula ILOs, postgraduate training program (log book) and the international guidelines as regards standard skills for management of diabetes

| Guidelines skills | Undergraduate skills (curricula) | House officers skills (log book) |
|---|----------------------------------|----------------------------------|
| - Exposure to patients >30 | √ | √ |
| - Examine patients >30 | √ | √ |
| - Share in treatment of patients >30 | √ | √ |
| - Educate patients as regards | | |
| Skipping meal | √ | |
| Skipping medication | √ | |
| Foot care | √ | |
| - Follow glycemic management plan | √ | |
| - Follow glycemic control monitoring criteria | √ | |
| - Use and interpret urine sticks | √ | √ |
| - Perform insulin injection | √ | √ |
| - Work in a team | √ | √ |

DISCUSSION

Diabetes care is complex and requires that many issues, beyond glycemic control, be addressed. A large body of evidence exists that supports a range of interventions to improve diabetes outcomes. Standards of care are intended to provide clinicians, patients, researchers, and other interested individuals with the components of diabetes care, treatment goals, and tools to evaluate the quality of care.⁽⁶⁾

Patient education is one of the major parts of diabetes management which has

many positive results including reduced health care costs,⁽¹⁷⁻¹⁸⁾ increasing the quality of patient care and self-efficacy; physicians education improves their knowledge level in topics related to diabetes and its complications.⁽¹⁹⁾ One of the methods proposed for updating skills and professional abilities of physicians over time are continuing medical educational (CME) programs.⁽²⁰⁾

Our results showed that despite the increasing prevalence of diabetes,

physicians' knowledge about the epidemiological features of diabetes and prevention of diabetes wasn't acceptable. This goes with a survey done in 1992 ⁽¹⁰⁾ about physicians' attitudes and practices concluding that physicians' knowledge was not enough about diabetes prevention, especially in the field of importance of exercise and physical activity based on individual patient's need, where most of physicians were not familiar with clinical guidelines.

In the current study the shortage of knowledge of the two groups about prevention of diabetes might be due to lack of undergraduate's education programs and adherence to guidelines.

It was observed that there was knowledge deficiency among physicians about management of diabetes, as regards glycemic, pharmacological management and nutritional therapy of diabetic patients. The acceptable level of correct answers among the residents was significantly

higher than the house officers. This difference in knowledge between the two groups could be explained by the finding that as more than 95% of the residents documented that they gained their knowledge about diabetes through postgraduate education (master degree) and also through on job training. On the other hand, there were no educational programs for the house officers except for some theoretical lectures that were not on a continuous basis.

Similarly a study conducted in 2009 ⁽²¹⁾ showed that the knowledge of different medical groups such as general practitioners, specialists, internal medicine residents and medical students in the management of diabetes was not enough.

In the present study there was a great shortage in the study groups' knowledge about diabetes complications and co morbidities (CAD, hypertension, nephropathy, retinopathy, neuropathy and gestational diabetes), only 10% of the

residents and 11.2% of the house officers scored the 60% acceptable level.

Consistently a study done in Iran (2010)⁽¹⁹⁾ revealed that there was knowledge deficiency among general practitioners about risk factors, follow-up, diagnosis and treatment of dyslipidemia, hypertension, neuropathy, nephropathy and impaired glucose tolerance, and there was poor knowledge regarding diagnosis and treatment of gestational diabetes mellitus.

In contrast to our results a study done in 2002 in Pakistan ⁽²²⁾ about diabetes related knowledge, attitude and practices, 70% of the family physicians knew that estimation of the blood glucose level was the best parameter for assessing the glycemic control. Nearly 90% of them identified insulin as the first line of treatment in type 1 diabetics, about 70% had the knowledge of the co-morbid condition related to diabetes and 85% claimed to use angiotensin converting enzyme inhibitors for treating

hypertension in diabetics. This leads to the presumption that family physicians do make an effort to follow the clinical guidelines for diabetes management.

In the present study there was good attitude of the study groups towards management of diabetes and its complications. A positive significant relation was observed between knowledge and attitude mean scores of the junior physicians.

Inconsistent with our findings' were results of the study done in Iran 2010 ⁽¹⁹⁾ showed that weakness of the general practitioners attitude was towards diabetic neuropathy, and major weakness in other expertise groups was towards nephropathy and neuropathy. Internal medicine group had desirable attitude towards diabetes and its complications.

It has been found that despite generally positive attitude towards the guidelines, general practitioners didn't use guidelines frequently in daily practice and some barriers

existed that prevented the translation of this positive attitude into action at the clinic level.⁽²³⁾

In the present study, the majority of the junior physicians had undesirable practice abilities. Small percent of both groups scored the pre-identified acceptable level of practice (>60% correct answers). This finding was in accordance with a study done in Pakistan (2002)⁽²²⁾ and another study about physicians' knowledge and practice patterns in diabetes.⁽²⁴⁾ In our study major weaknesses in house officers practices were in the field of clinical practice and contact with diabetic patients. This poor practice of the house officers reflects lack of postgraduate training programs.

Regarding the technique of insulin injection, 66.4% of house officers and 76.7% of residents declared that they were able to perform this technique. This might be appropriate. This shows that in addition to changing the educational structure, it must be directed towards management and care of patients.⁽²⁵⁾

be due to emphasis on these professional skills in the training log book of house officers and being a part of the residents' daily work.

Similarly a study done in 2002⁽²²⁾ revealed that only 40% of physicians knew the correct procedure of insulin injection. The study revealed that it is true that a physician who had learnt the correct technique of subcutaneous insulin injection could impart the technique quickly and accurately to the diabetics initiating insulin therapy. Also, they discovered that to acquire correct practice this depends on the individual practice and his attitude for learning and knowledge.

It has been indicated that despite having adequate knowledge and even acceptable attitude about diabetes and its complications, physicians' practice is not

Studies show that poor practice of physicians was associated with extensive health problems in the community such as increasing the incidence of medical errors,

patient dissatisfaction, lack of control of many chronic diseases, delay in diagnosis and the illegitimate use of drugs.⁽²⁶⁾

Diabetes is a lifelong disorder which is hard to treat because, firstly doctors lack time and secondly people with diabetes are deficient in resources for comprehensive care. Usually patients with symptoms demand a quick relief. If they are symptomatic, they are afraid to visit the doctor. The role of the health care provider, in the case of chronic illness is different than that of the seasonal, episodic and temporary ailments. For the successful treatment of a diabetic, the physicians have to acquire the understanding, cooperation, and involvement of other family members.⁽⁸⁾ This will demand more of the doctor's time along with a symptomatic approach. The ideal method would be a team work, where the physicians. It highlights the need for improvement in their practices for treating and educating diabetics. It is thus recommended that awareness and

education of diabetics is shared and coordinated by the physician, dietician and nurse.

Medical education and continuous medical education (CME) play an important role in enabling the health care providers to treat diabetics in the most efficient and economical manner. To achieve the targets, the change has to be made from the core. Awareness programs for the lay people and CME for the doctors will give an impetus to promote positive attitudes and encourage compassionate treatment of diabetics. Practice behaviours can be changed into more positive ones, improving the outcome of diabetes and compliance by the subjects.⁽²⁷⁾

CONCLUSION

Diabetes is a major growing health care problem. This study has explored several aspects of diabetes related KAP of junior education programs are necessary to update the physicians on screening, effective treatment of diabetes and prevention of complications.

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