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Diabetes Knowledge and Practice in Malaysian and the United Arab Emirates Diabetic Patients

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ABSTRACT

The aim of the study is to investigate and to compare the current levels of the knowledge, attitude and the practice of people with diabetes in Malaysia and the United Arab Emirates. A cross-sectional prospective study, 403 diabetic patients were participating in this study, 202 Malaysian and 201 from the UAE. The data showed significant differences at the levels of the Knowledge, and the Practices between Malaysian and the UAE respondents with ($P < 0.001$), while the good attitude was missing amongst the UAE respondents. This study had found that more than three quarter of Malaysian respondents (77.2%) were had a family history of diabetes compared to the UAE counterpart (64.7%). Interestingly, a high significant differences ($P < 0.001$) were found in the Knowledge, Attitude and Practice scores between Malaysian and the UAE counterpart. The mean scores presented as (Mean \pm SD) were higher in Malaysian than in the UAE study group; were knowledge scored (25.6 \pm 3.3 vs. 20.3 \pm 2.9), attitude (4.3 \pm 1.2 vs. 2.9 \pm 0.1) and practice (4.3 \pm 1.3 vs. 4.1 \pm 1.0). The UAE diabetic patients included in the study appeared to have poor knowledge, attitude and practice regarding their disease. These findings can be used to promote discussion in the profession and with stakeholders about any future diabetes care or to plan intervention strategies to promote awareness and reduce incidence of diabetes in this country. However, further work is needed to gauge the levels of the knowledge, attitude and the practice of people with diabetes in both countries.

Keywords: Diabetes Mellitus; Knowledge; Attitude; Practice; Patients with diabetes; The UAE patients; Malaysian respondents.

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INTRODUCTION

Diabetes mellitus, which is linked both directly and indirectly to behavioral, nutritional and environmental factors, has emerged as the leading cause of morbidity and mortality worldwide [1, 2]. One of the facts that have come to the forefront of researcher's studies is that the prevalence of diabetes in adults is expected to rise by about 42% in developed countries. This figure has predicted to increase up to more than four times to reach 170% in the developing nations [3].

The United Arab Emirates (UAE) had ranked the second-highest incidence (18.7% to 19.6%) of diabetes in the world in 2010 [4, 5]. It has been reported that deaths attributable to diabetes have accounted for 2-3% of all deaths in the UAE during the last fifteen years. Furthermore, it is reported that diabetes is set to affect half of the UAE population in the next 25 years unless people change their lifestyle and become more active [6,7]. Economic growth and development in the oil-exporting countries, as in the case of the UAE, over the past three decades has set the scene for the transformation of lifestyle, eating habits, and traditional societal and familial structures.

On the other hand, Malaysia with a diabetes mellitus prevalence rate of 13.8% has been listed in the 10th position of the top ten countries with high diabetes prevalence in 2009 [5]. There was more than 50% increase in the diabetes issue in Malaysia during the last decade. It has been reported that the prevalence of diabetes was 11.6% in 2006 compared to only 6.3% in 1986 [8].

The rapid raise of its prevalence in Malaysia is probably related to the increase in the size of aging population, increased urbanization, lifestyle changes, dietary changes, and improvements in diagnostic testing [9].

This concerned about the explosion in the prevalence of diabetes around the world is compounded by the difficulties involved with the control of diabetes, and a consequent increase in the healthcare cost. Furthermore, diabetes is largely self-managing, and successful models of care must focus on strategies that promoting, maintaining and improvement of the self-care behaviors. Drugs are only part of the plan for managing type II diabetes. Other interventions, such as patient education, modification of diet and promotion of exercise remain cornerstones for management of this chronic condition [10]. Unfortunately, the majority of people with diabetes (76%), in one particular study, do not take such interventions and report having never attended a diabetes educational class, courses, or any other educational program about diabetes [11]. Consequently, they fail to achieve their glycemic goals [12], due to inadequate self-care advice despite all of the advances in diabetes management in recent years. Deficit in self-care management skills such as medication administration, glucose testing, diet, sick day guidelines and foot care have been identified in more than 50% of diabetic patients [13]. Accordingly, knowledge of diabetes and the attitude of self-care management skills should be reassessed at least annually and continuing education should be provided or encouraged in people with diabetes.

The objective of this study was to investigate and to compare the current levels of the knowledge, attitude and the practice of people with diabetes in Malaysia and in the United Arab Emirates, and indeed international comparative studies of this type are rare in this part of the world.

METHODOLOGY

Study Design and Study Population:

For this study, a cross-sectional prospective survey was conducted in two different countries. In Malaysia, data was collected from patients who attend the endocrinology outpatients' clinic in Penang General Hospital (PGH). Whilst in the UAE, the data were collected from the patients who were using the Diabetes Center of (SKMC) in Abu-Dhabi - UAE, during their regular visits. The selection of participants was based on inclusion and exclusion criteria. Patients who were included in this study were; adults aged 18 years and above, diagnosed with diabetes mellitus of either type, willing to participate voluntarily in this study and outpatients who were on their regular follow-up visit during the period of the study. This study excluded; Juvenile diabetes patients and inpatients, diabetic pregnant women, the mentally retarded, unconscious, deaf, and patient not willing to participate in this study.

Data Collection:

A questionnaire was used to assess the diabetic patients' knowledge, attitude, and practice regarding their condition. The instrument used was the Diabetes Knowledge Test (DKT), which was developed and validated by the Michigan Diabetes Research and Training Center (MDRTC). This questionnaire was derived from previous studies published in NCD Malaysia [14]. Furthermore, a face-to-face interview was done by a trilingual pharmacist (the researcher).

Classification of the Knowledge, Attitude and Practice:

In this study the KAP (Knowledge, Attitude and Practice) was divided in two categories; (good KAP and poor KAP). As an understanding, the respondents who scored 17 and above, ($\geq 50\%$ of total knowledge scores) had good knowledge and less than 50% had poor knowledge (< 17 scores). In attitude total scores of 6 points (≥ 3) were considered as good attitude and less than that were considered as poor attitude. In practice total scores were 7 points (≥ 3.5) which were considered as good practice and less than that were considered as poor practice [15].

The language of the questionnaire was English. However, the questionnaire was translated into "Bahasa Malaysia", which is the national language of the country of Malaysia. Two senior faculty members, the researcher and two professional translators were involved in the modification and linguistic validation of the questionnaire, and have also translated in to Arabic language which is the distinct language in the United Arab Emirates.



Knowledge Assessment:

Evaluation of the diabetes patients' knowledge contains six general test items suitable for adults with both type I or type II diabetes. Each question either had one or more correct answer(s). Each correct answer contributed of one score. Total scores for each part ranged from 0 to 34 scores [16]. Participants were awarded one point for each question they answered correctly and zero for each wrong or unsure response. The raw scores were converted to percentages thereafter. The data from questioner was valid and reliable to measure overall diabetes related KAP with $\alpha = 0.81$.

Attitude Assessment:

This section includes questions about the patient's attitude with diabetes. The findings from these questions were evaluated to determine the patients' ability to accommodate to their condition through the practice of healthy lifestyle and healthy diet. The gathered information was then used to understand and highlight the key points to diabetes control. The spread of awareness among these patients was necessary. The attitude section contained five items and the "Attitude Assessment" test scores ranged from 0 to 6 scores.

Practice Assessment:

In this section a specific design was used to practically measure the patients' ability to change their lifestyle, maintain their body weight and take self-responsibility for diabetes control. This will effect if we take any action towards augmenting the knowledge of diabetes patients to achieve better control of the disease and improved prevention of the complications. The practice section contained five items with 7 scores. Thus, the possible test scores ranged from 0 to 7 scores.

Statistical Methods/ Data Analysis:

Data were calculated, tabulated and merged by using the Statistical Package for Social Science software (SPSS) version 12. Comparative statistics were calculated by using Chi-square analysis for categorical variables, Independent t-test; this multiple statistics approach gave highly significant differences between groups and confirmed the relationship between the individual factors at the level of clinical significance, defined as ($P < 0.05$).

RESULTS

Demographic Characteristics:

The demographic characteristics of the two study groups are presented in Table 1. Both groups had a slightly higher proportion of female than male. In term of the mean age, Malaysian diabetic respondents were older (60.1 ± 10 years) than the UAE respondents (49.3 ± 15 years). The respondents in both groups had a high prevalence of type II diabetes, for type I

diabetes the prevalence among the UAE (18.4%) patients was higher than Malaysian (5%) patients. The prevalence of diabetes differed with the ethnicity. The results of diabetes prevalence among races in this study indicate that Chinese had the highest incidence of diabetes (52%) compared to the other races in Malaysia (Table 1).

Table 1: Demographic Characteristics of Malaysians (n=202) and the UAE (n=201) Respondents

Variable		Malaysia Frequency (%)	UAE Frequency (%)
Age	18-50	30 (14.9%)	92 (45.8%)
	51-83	172 (85%)	109 (54.2%)
Gender	Female	104 (51.5%)	109 (54.2%)
	Male	98 (48.5%)	92 (45.8%)
Race	Malay	45 (22.3%)	0
	Chinese	105 (52%)	0
	Indian	52 (25.7%)	9 (4.5%)
	Arab	0	192 (95.5%)
Diabetes type	Type I	10 (5%)	37 (18.4%)
	Type II	192 (95%)	164 (81.6%)

Social Characteristics:

The results of this study found some differences in the educational levels between the respondents in Malaysia and the UAE. Less than one quarter of the pooled sample from Malaysia (37; 18.3%) reported that they have either college/university or postgraduate degree vs. (45; 22.4%) from the UAE with college/university and postgraduate degree. In terms of occupation, seventy nine of the Malaysian respondents (39.1%) were pensioners, which is higher than the percentage of pensioners reported for the patient under study from the UAE (41; 20.4%). In terms of marital status, most of the Malaysian respondents were married (89.6%), which is slightly higher than the UAE married respondents (85.1%), see (Table 2).

The findings of this study showed there was a difference in terms of diabetes family history between both groups. More than three quarter of Malaysian respondents (77.2%) had a family history of diabetes (first-degree relatives) compared to the UAE respondents (64.7%). Malaysian diabetic patients included in the study had a lower body mass index (BMI) than the UAE diabetic patients. Almost half (100; 49.5%) of the patients under study from Malaysia were classified as either overweight or obese/sever obesity. On the other hand, one hundred sixty nine (84.1%) of the patients studied from the UAE were classified under the same category. Almost three quarter (148; 73.3%) of the Malaysian diabetic patients included in the study reported that they were active smokers during the study period. Interestingly, only 9 (4.5%) of the patients under the study from the UAE reported that they were active smokers during the study period. However, the proportion of Malaysian patients included in the study adhered to a healthy lifestyle (diet and exercise) was higher than that for the UAE patients. Ninety two (45.5%) and fifty three (26.4%) of the people with diabetes included in this study reported that they adhered to a healthy lifestyle from Malaysia and the UAE, respectively. Unfortunately, still a good number of patients from both countries in this particular study; 42 (20.8%) in Malaysia and 62 (30.8%) in the UAE did not adhere to any healthy lifestyle factors. Table 3 summarizes

the proportion and percentage of the risk factors among the 202 patients with diabetes from Malaysian and the 201 patients with diabetes from the UAE included in this study (Table 3).

Table 2: Social Characteristics of Malaysians (n=202) and the UAE (n=201) Respondents

Variable		Malaysia Frequency (%)	UAE Frequency (%)
Higher educational level attended	Not educated	18 (8.9%)	45 (22.4%)
	Primary education	56 (27.7%)	44 (21.9%)
	High school	91 (45%)	67 (33.3%)
	College/University	35 (17.3%)	41 (20.4%)
	Postgraduate	2 (1%)	4 (2%)
Occupation	Employee	18 (8.9%)	55 (27.4%)
	Housewife/ Unemployed	72 (35.6%)	84 (41.8%)
	Professional	18 (8.9%)	0 (0%)
	Non-professional	10 (5%)	0 (0%)
Marital status	Pensioner	79 (39.1%)	41 (20.4%)
	Other	5 (2.5%)	21 (10.4%)
	Married	181 (89.6%)	171 (85.1%)
Marital status	Single	16 (7.9%)	26 (12.9%)
	Widow/Divorced	5 (2.5%)	4 (2%)

Table 3: Risk Factors of the Malaysians (n=202) and the UAE (n=201) Respondents

Variable		Malaysia Frequency (%)	UAE Frequency (%)
Family history	Yes	156 (77.2%)	130 (64.7%)
	No	46 (22.8%)	71 (35.3%)
Body Mass Index	Under weight	3 (1.5%)	2 (1%)
	Normal	99 (49%)	30 (14.9%)
	Over weight	46 (22.9%)	59 (29.4%)
	Obese	37 (18.2%)	110 (54.7%)
	Severe obesity	17 (8.4%)	0 (0%)
Smoking status	Smoker	148 (73.3%)	9 (4.5%)
	Non-smoker	21 (10.4%)	179 (89.1%)
	Ex-Smoker	33 (16.3%)	13 (6.5%)
Lifestyle	Diet & Exercise	92 (45.5%)	53 (26.4%)
	Diet or Exercise	68 (33.7%)	86 (42.8%)
	No Diet, No Exercise	42 (20.8%)	62 (30.8%)

Comparison of the Knowledge, Attitude, and Practice Scores between Malaysian and the UAE Respondents:

A very high significant differences ($P < 0.001$) were found in the Knowledge, attitude and practice scores between Malaysian ($n=202$) and the UAE ($n=201$) pooled samples, using independent t-test. The mean scores presented as (Mean \pm SD) were higher in Malaysian than the UAE study group; knowledge (25.6 \pm 3.3 vs. 20.26 \pm 2.9), attitude (4.3 \pm 1.2 vs. 2.90 \pm 0.1) and practice (4.25 \pm 1.3 vs. 4.1 \pm 1.0). There was a very high significant difference ($P < 0.001$) in knowledge, attitude and practice scores between the two study groups which was obvious in

the good knowledge, poor attitude and good and poor practice, while the comparison of the good attitude between the two groups was not applicable.

A total of one hundred eighty seven patients included in the study from Malaysia were able to score 17 and above ($\geq 50\%$ of total knowledge scores =34) compared with only fourteen patients from the UAE were able to score 17 and above in the knowledge score system. However, the average score in both groups was 25/34 over the study period.

In attitude, ≥ 3 scores out of total scores of 6 points were considered as good attitude and less than that were considered as poor attitude. One hundred forty nine of the patients from Malaysia were able to score an average of 4.86/6. On the other hand, the average score of the two hundred one patients from the UAE was only 1.6/6.

In practice, ≥ 3 scores out of total scores of 7 points were considered as good practice and less than that were considered as poor practice. In the present study, one hundred fifty nine of the sample pooled in Malaysia was able to score an average of 4.81/7 compared with only 69 of the patients under study from the UAE who were able to score an average of 4.63/7 during the study period. The average of the KAP categories of Malaysian (n=202) and the UAE (n=201) respondents included in this study are summarized in (Table 4).

Table 4: Means of the KAP Categories of Malaysian (n=202) and the UAE (n=201) Respondents

Variable		Malaysia	UAE	P value
		No. (Mean \pm SD)	No. (Mean \pm SD)	
Knowledge	Good	187 (25.8 \pm 3.3)	14 (25 \pm 0.3)	<0.001*
	Poor	15 (14.20 \pm 2.7)	187 (13.9 \pm 2.1)	0.04*
Attitude	Good	149 (4.85 \pm 0.8)	0	NA**
	Poor	53 (2.71 \pm 0.5)	201 (1.6 \pm 1.0)	<0.001*
Practice	Good	159 (4.81 \pm 0.8)	69 (4.63 \pm 0.8)	<0.001*
	Poor	43 (2.16 \pm 0.6)	132 (2.91 \pm 0.1)	<0.001*

DISCUSSION

Comparative data in this study were divided into three categories: demographic characteristics, social characteristics and risk factors.

Demographic characteristics:

Data showed that both groups had a slightly higher proportion of female than male, (51.5% vs. 48.5% in Malaysian and 54.2% vs. 45.8% in the UAE).

In term of the mean age, Malaysian diabetic respondents were older (60.1 \pm 10 years) than the UAE respondents (49.3 \pm 15 years). The finding in this study found that the risk of getting diabetes increased with the age, which was consistent to the previous studies [8, 9, 17, and 18]. There was a difference in the onset of diabetes in both countries, where 87.6%

Malaysian diabetic respondents had diabetes at the age of 40 years and above, while 48.8% the UAE diabetic respondents had diabetes at the age below 40 years old. The respondents in both groups had a high prevalence of type II diabetes, with Malaysian diabetic patients showing a higher prevalence of type II diabetes (95%) than the UAE diabetic patients (81.6%). For type I diabetes the prevalence among the UAE patients was higher than Malaysian patients (18.4% vs. 5%). The results of the Malaysian part of this study were similar to the results of the NHMS II and NHMS III [8], and to the [19]. However, the ratio of type I diabetes mellitus to type II in the UAE respondents was higher than the ratio of some previous studies. In many studies done in the UAE, the percentage of diabetics with type I was ranged between (9–19.7%), and the percentage with type II was (80–91%) [20-22].

This high prevalence of type II diabetes among the UAE diabetes population may be due to the increase in the rate of obesity among the children in the UAE [17, 23].

In this study the prevalence of diabetes was differed with the ethnicity. The major race of the participants in Malaysian group were Chinese (52%) followed by Indian (25.7%) and Malay (22.3%). In the UAE most of the respondents were Arab Emirati (95.5%) and only (4.5%) were Indian (Non-Arab). The results of diabetes prevalence among races in this study indicate that Indians had the highest incidence of diabetes compared to the other races; for example, in Penang (9.8%) of the total population of the state are Indian. In addition, Malays had the lowest prevalence of diabetes (22.3%), compared to the total population of (41.4%) of Penang state [24]. These results are similar to the findings of another study conducted in Malaysia [9] which shows that Indian patients had higher odds of having diabetes compared to Chinese patients. The result presented here is similar to the results of one particular study presented elsewhere [25]. More recently, it has been demonstrated that Asian Indians who migrated to various parts of the world have a high prevalence of diabetes [26].

In the UAE, previous studies have indicated that the percentage of Emirati diabetic patients is higher than that of expatriate diabetic patients (24-25% vs. 13-19%, respectively) [17], (57.9% vs. 42.1%) [22] and (83.9% vs. 16.1%) [18], which has lower percentage than the finding of this study. This discrepancy may be due to the population of diabetics who visits the Diabetic Center in SKMC, which offers treatment free of charge for the local Emirati's and for the government employees, but not for the general expatriate residents.

Social Characteristics:

This study found some differences in the educational levels between the respondents in Malaysia and the UAE. In Malaysia, diabetic respondents who had a high school education (45%), followed by patients with a primary education (27.7%), the college degree holders (17.3%), and those without formal education (9%), and lastly, post-graduate degree holders were only (1%).

Differences were also found in the educational levels between respondents in both groups. In the UAE group, the percentages of diabetic patients who had high school education

(33.3%), followed by those without any formal education (22.4%), primary school education (21.9%), college degree holders (20.4%) and finally, post-graduate respondents (2%). However, the percentage of patients with a high school education was higher in Malaysia than in the UAE, and the percentage of respondents with no formal education was higher in the UAE than in Malaysian group.

The percentages of Malaysian respondents at particular educational levels in this study were different from those reported in other previous studies [27, 28], which reported that (67-77%) of the diabetics had informal education or a primary education and that (23-31%) of patients had a high education level. Similarly, for the UAE, most previous studies indicate that illiterate diabetic patients make up a larger percentage of the diabetic population than educated diabetic patients [20, 29, and 30]. These discrepancies may be due to a general increase in the educational level among people in the UAE in recent years as a result of progress in educational opportunities that have only been widely available since the 1970s [20]. In terms of occupation, less than half (39.1%) of the Malaysian respondents were pensioners, which was higher than the percentage of pensioners reported for the general UAE population (20.4%). National Health and Morbidity Survey (NHMS II) [25] reported similar results for the percentage of pensioners among diabetic patients; the percentage of diabetic pensioners reported here is probably due to the increased prevalence of diabetes among older age groups. The results of this study for the UAE diabetics were different from previous studies that reported a higher percentage (52.7%) of working diabetic patients [31]. The current study found that the majority of patients in the UAE were housewives or unemployed (41.8%); the percentage is higher than that of Malaysian diabetic patients (35.6%). In addition, employees (27.4%) were more common in the UAE diabetic population than in the Malaysian diabetic population (8.9%); this difference may be due to a difference in the time of diabetes onset, which started at working age in the UAE population, but which was later in the Malaysian population. Moreover, in the UAE sample, there were no professional and non-professional career that were diabetics, whereas in Malaysia, 8.9% (18/202) of the patients were professional workers and 5% (10/202) were non-professional workers.

In terms of marital status, most of the Malaysian respondents were married (89.6%), which is slightly higher than the UAE married respondents (85.1%). The percentage of Malaysian diabetics who were single (7.9%) was slightly lower than that for the UAE respondents (12.9%). These results were similar to many previous studies done in both countries [18, 25, 27, 31, and 32]. The most important reasons for these differences in marital status are the differences in the cultures of the two countries regarding marriage.

Risk Factors:

The findings showed there was a difference in terms of diabetes family history between both groups. A higher percentage of Malaysian respondents (77.2%) had a family history of diabetes (first-degree relatives) compared to the UAE respondents (64.7%); both percentages were very high. The percentages of respondents with a family history of diabetes in both groups in this study were higher than those which reported in previous studies. In Malaysia, the

percentage of patients with a family history in previous studies ranged between 14% - 54% [33, 34], whereas in the UAE, previous studies found the percentage of diabetic patients with the family history was between 23.1% - 54.3% [18, 20, and 30].

Malaysian diabetic patients had a lower body mass index (BMI) than the UAE diabetic patients. In addition, more than half of the total respondents in the UAE group (54.7%) were obese, whereas only 18.2% of patients in the Malaysian group were obese. However, among Malaysian diabetic patients, 8.4% were severely obese, whereas there was no patient who was severely obese in the UAE group. A higher percentage of Malaysians had a normal body weight than the UAE patients (49% vs. 14.9%).

A study published in the United States of America found that almost six out of ten diabetic patients are overweight or obese [35]. Many previous studies in Malaysia and the UAE have reported that the prevalence of overweight and obesity among diabetic patients is high, but this prevalence is usually higher among patients in the UAE study sample than in Malaysian study sample. The Second National Health Morbidity Survey in 1996 reported that 18.8% of the diabetic patients were either obese or overweight [25]. This percentage was higher in the Kelantan study, at 38.4% [36].

Two previous studies in the UAE have indicated that approximately three-quarters of all the UAE diabetic patients included in these studies were classified as either overweight or obese [17, 37]. A higher percentage of the Malaysian diabetics were active smokers (148; 73.3%) than non-smokers. The percentage of Malaysian patients who were smokers was much higher than that of the UAE patients (148; 73.3% vs. 9; 4.5%). Overall Malaysia, 35.9% of males and 5.1% of females (aged 20-74 years) were current smokers in 2004 [38].

In other previous study in Malaysia, about 30% of diabetic patients had a history of smoking either currently or previously [27]. However, in the UAE, the percentage of active smokers was higher than that reported in previous studies, 12.8% – 24.7% [31, 36]. The proportion of Malaysian patients (45.5%) who adhered to a healthy lifestyle was higher than that for the UAE patients (26.4%), despite the fact that in the UAE, 86 (42.8%) of the patients were either on a healthy diet or on a regular exercise program, which was a higher percentage than for the Malaysian patients (33.7%). Only 42 (20.8%) of the total patients in Malaysia did not adhere to any healthy lifestyle factor, whereas 62 (30.8%) of the total patients had poor lifestyle in the UAE.

In two published studies about diabetes control in Malaysian private and public hospitals, (37.4%-54.8%) of diabetic patients admitted to hospitals adhered to a diabetic diet regularly, and (32% - 38.9%) exercised regularly [39]. In a previous study in 2008, half of the diabetic patients (51%) reported subscribing to a diet for diabetes management [4]. In previous study another 65% of diabetic patients were not following an eating plan as recommended by dietitians [31].

Significant differences were found in the Knowledge, attitude and practice scores between Malaysian and the UAE samples. The mean scores (Mean \pm SD) were higher in Malaysian study group than the UAE patients [knowledge (25.6 \pm 3.34 vs. 20.26 \pm 2.96); attitude (4.29 \pm 1.2 vs.2.90 \pm 0.1); and practice (4.25 \pm 1.3 vs. 4.1 \pm 1.0)]. A statistically significant difference between the two study groups was obvious in good knowledge. In good attitude it was not applicable. There was a highly significant differences (P <0.001) in good and poor practice between Malaysian and the UAE respondents. In many previous studies done in Malaysia to detect diabetic patients' KAP, the levels of KAP were high [14], as they were in this study. A comparative study on the knowledge of diabetic patients in the two communities (the UAE and the USA); had presented a lower level of diabetes knowledge in the UAE sample than the USA sample. That previous study was carried-out by using the same questionnaire as the UAE versus the USA [20].

CONCLUSION

The UAE diabetic patients included in the study appear to have poor knowledge, attitude and practice regarding their disease. Furthermore, a higher percentage of the UAE respondents were obese with poor healthy lifestyle compared with Malaysian counterpart. These findings can be used to promote discussion in the profession and with stakeholders about any future diabetes care or to plan intervention strategies to promote awareness and reduce incidence of diabetes in this country. However, further work is needed to gauge the levels of the knowledge, attitude and the practice of people with diabetes in both countries.

Limitations of the Study:

Language was the main barrier between the researchers and non-English speaker patients among Malaysian group. Another limitation of the study was that patients have been recruited from one government hospital or diabetes center in both country and therefore the results presented here cannot be generalized.

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