Assessment of diabetes knowledge among adolescents in selected Iranian schools in UAE

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ABSTRACT
Objectives: To assess the level of knowledge of students aged 13-19 years in selected Iranian schools in UAE about diabetes and to identify probable misconceptions with regard to this disease among the participants.

Materials and Methods: A cross sectional study was done including 200 female and male students in the age group between 13 to 19 years in selected Iranian schools. A scoring system was used by which a score of 1 or zero was given to each correct or incorrect response respectively. The total correct score was used as criteria to assess the total knowledge of students that was categorized into three parts (good, average and low). The knowledge was also categorized into 5 domains (general knowledge, epidemiology, risk factors/complication, investigation/screening and lifestyle/treatment). Because of variation in number of items included in each domain, percentage of correct responses for these domains were compared.

Results: The percentage of correct knowledge scores for the general knowledge, epidemiology of diabetes, risk factors/complication, investigation/screening and lifestyle/treatment domains are 60.5%, 47.8%, 52.5%, 51.5% & 56.4% respectively. Poor knowledge scores is identified among 18% of the participants (n=34). Poor knowledge scores are most commonly observed in males compared to females (2% Vs 14%), and in younger age adolescents (≤15 Yrs) compared to older age (>15 Yrs). The most common misconception is that diabetes is caused by eating too much sugar and sweets.

Conclusion: High lack of knowledge in all knowledge domains. Poor knowledge is observed in 18% of the adolescents. Most common misconception is that sugar intake cause diabetes.

Keywords: knowledge, misconception, diabetes mellitus, adolescents, Iranian schools

INTRODUCTION
Diabetes mellitus (DM) are a group of chronic metabolic disorders that is characterized by hyperglycemia. Distinct types of DM are induced by a complex interaction of environmental as well as genetic factors. According to etiology, factors contributing to hyperglycemia include reduced or absence of insulin secretion from pancreatic cells (ISLETS OF LANGERHANS), reduced glucose uptake and utilization by tissues, the imbalance of these two hormones leads to a state of hyperglycemia. This metabolic under regulation associated with DM causes secondary signs and symptoms in multiple organ systems that cause a heavy burden on the individual with diabetes and complicates the treatment directed towards the care system. DM is the main cause of adult blindness, end-stage renal disease (ESRD), and lower extremity amputations worldwide. It also increases risk of cardiovascular diseases.

Diabetes has become an important public health problem which has reached epidemic proportions worldwide. This issue needs to be dealt with to avoid rising prevalence of this disease, and prevention seems a reasonable method. Preventive measures such as lifestyle adjustments including weight control and adequate exercise can decrease the incidence of diabetes by more than half in patients with impaired glucose tolerance (IGT)². Hypoglycemic drugs such as Metformin and Acarbose has been shown in randomized study trials to prevent type 2 diabetes in high-risk subjects with
impaired glucose tolerance\(^2\). Newer drugs are under trials in large scale studies. It is hoped that one of these drugs could make diabetes prevention more promising in the near future\(^2\).

Prevalence of DM has raised exponentially in the past twenty year or so worldwide, from an approximate 30 million cases in 1985 to 285 million cases in 2010. Even though prevalence of both type 1 and type 2 Diabetes mellitus is on the rise worldwide, prevalence of type 2 DM is rising at a higher rate, assuming due to increasing obesity, reduced activity levels because of national industrialization\(^1\). United Arab Emirates is among the 10 countries with the highest prevalence of DM; Nauru, United Arab Emirates, Saudi Arabia, Mauritius, Bahrain, Reunion, Kuwait, Oman, Tonga, and Malaysia—in descending prevalence\(^1\).

Sedentary lifestyle, dietary factors, possible environmental determinants and genetic predispositions have contributed to the increased number of diabetes cases seen in children and adolescents in recent years\(^3\).

According to the International Diabetes Federation, in the UAE, 19.5% of the population and 25% of the national population is living with diabetes and 40% of residents over the age of 60 have diabetes\(^4\).

This disease will cost the country an estimate of Dh10 billion by year 2020\(^5\). By year 2030 the number of diabetes cases in UAE will rise to 684,000\(^6\).

Our study focuses on the knowledge of adolescents (13-19 years old) with regard to diabetes. Adolescents are one of the most potentially effective age groups to target for early awareness of diabetes and its complications. By increasing awareness of adolescents about diabetes a group of knowledgeable and responsible future adults is prepared who can be beneficial to the national health programs by increasing awareness of others, passing their knowledge to later generations and therefore diminishing the burden of diabetes in both socio-economic and medical aspects on the nation.

With the raising prevalence of diabetes in children and adolescents\(^7\) it is required that both the students and the school staff especially the teachers be educated through health programs and campaigns. This can help in decreasing the mortality rate of acute and severe complications of type I diabetes in children and adolescents as well as the prevention and control of type II diabetes among young populations.

**Objectives:** To assess the level of knowledge of students aged 13-19 years in selected Iranian schools in UAE about diabetes and to identify probable misconceptions with regard to this disease among the participants.

**MATERIALS AND METHODS**

A cross sectional study was done including 200 female and male students (100 from each gender) in the age group between 13 to 19 years in selected Iranian schools. Data collection was done between September and December 2012. The sample size was determined conveniently and non-probability sampling method was used to recruit participants. Self-administered questionnaire that had been validated by two experts was used as a tool. The GMU Ethics Committee approved the study. Permission from schools and informed consent from official guardians were obtained. The students were informed about the study objectives, voluntary participation, and anonymity of the study and those who agreed where enrolled in the study. All students were offered Diabetes Education Brochure on the day of data collection. Data was entered on excel sheet and SPSS software version20 was used for analysis. Results were presented in tables, figures, and \(X^2\) test was used to test significance of association between variables. For analysis a scoring system was used by which a score of 1 or zero was given to each correct or incorrect response respectively. The total correct score was used as a criteria to assess
the total knowledge of student that was categorized into three groups (good, average and low). The knowledge was also categorized into 5 domains (general knowledge, epidemiology, risk factors/ complication, investigation/screening and lifestyle/treatment). Because of variation in number of items included in each domain, percentages of correct responses for these domains were compared.

RESULTS
Demographic data: The students are mostly at the age of 18 years (27.5%), holding Iranian nationality.

![Figure 1: Distribution of participants by age](image)

<table>
<thead>
<tr>
<th>GENDER</th>
<th>FREQUENCY</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>FEMALE</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

![Figure 2: Distribution of participants by nationality](image)

![Figure 3: The Percentage of correct responses in different knowledge domains](image)

**Table 1: Distribution of participants by gender**

**Correct Answers**

- General: 60.5%
- Epidemiology: 47.8%
- INV/Screen: 52.5%
- RF/Complication: 51.5%
- Lifestyle/Rx: 56.4%

**Domains of knowledge about Diabetes**

INV. = Investigation  
RF = Risk Factors

Figure 3.

Figure 3: The Percentage of correct responses in different knowledge domains
Table 3: Attitude of participants towards the possibility of learning more about DM

<table>
<thead>
<tr>
<th>ATTITUDE</th>
<th>FREQUENCY</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>99</td>
<td>49.5</td>
</tr>
<tr>
<td>Negative/Neutral</td>
<td>101</td>
<td>50.5</td>
</tr>
</tbody>
</table>

Figure 4 shows the level of knowledge scores of the students. Poor knowledge is noticed in 18% (n=36) of participants.

Figure 4: Level of knowledge scores among participants on DM.

Table 4: Level of knowledge score of the participants by gender.

<table>
<thead>
<tr>
<th>LEVEL OF KNOWLEDGE</th>
<th>POOR KNOWLEDGE</th>
<th>AVERAGE KNOWLEDGE</th>
<th>GOOD KNOWLEDGE</th>
<th>P value CHI-SQUARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(max. score = 25)</td>
<td>0-8</td>
<td>9-17</td>
<td>18-25</td>
<td></td>
</tr>
<tr>
<td>FEMALE</td>
<td>14%</td>
<td>67%</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>MALE</td>
<td>22%</td>
<td>57%</td>
<td>21%</td>
<td>0.2(NS)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18%</td>
<td>62%</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

Mean = 12.95 ; Max=25. Total Correct Answers =51.8%.NS: Not Significant

Table 5: Level of knowledge in different age groups

<table>
<thead>
<tr>
<th>AGE In Years</th>
<th>POOR KNOWLEDGE 0-8</th>
<th>AVERAGE KNOWLEDGE 9-17</th>
<th>GOOD KNOWLEDGE 18-25</th>
<th>P value CHI-SQUARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>13(n=8)</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>14(n=20)</td>
<td>25%</td>
<td>65%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>15(n=23)</td>
<td>30.4%</td>
<td>56.5%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>16(n=28)</td>
<td>14.3%</td>
<td>71.4%</td>
<td>14.3%</td>
<td></td>
</tr>
<tr>
<td>17(n=32)</td>
<td>12.5%</td>
<td>71.9%</td>
<td>15.6%</td>
<td>0.08</td>
</tr>
<tr>
<td>18(n=55)</td>
<td>16.4%</td>
<td>56.4%</td>
<td>27.3%</td>
<td></td>
</tr>
<tr>
<td>19(n=34)</td>
<td>8.8%</td>
<td>58.8%</td>
<td>32.4%</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>18%</td>
<td>62%</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

Higher frequencies of poor knowledge scores are noticed in younger age students (≤ 15 Ys) compared to older ones (> 15 Ys). There is no significant association between age and level of knowledge scores.
Lack of knowledge was noticed among all knowledge domains especially related to epidemiology of the disease which include questions related to the probability of the disease among adolescents, the type of diabetes most common among adolescents and how common the disease is in the UAE.

Participants’ attitude:
There is no significant association between gender and level of knowledge. Higher frequency of poor knowledge score is noticed among males compared with females.

DISCUSSION
It is important to know about the awareness level of adolescents with regard to diabetes, as knowledge is a critical component of behavior change. Research studies have shown that education in populations about diabetes resulted in a significant increase in knowledge about the disease. Once awareness is created, people are more likely to participate in prevention and control activities.

There were several studies conducted about awareness of diabetes in different age groups and communities. The results obtained are somewhat similar to this project. These studies have been done among different age groups, including adolescents, adults and elderly.

Table 6: Level of knowledge in different nationalities

<table>
<thead>
<tr>
<th>NATIONALITY</th>
<th>POOR KNOWLEDGE</th>
<th>AVERAGE KNOWLEDGE</th>
<th>GOOD KNOWLEDGE</th>
<th>CHI-SQUARE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-8</td>
<td>9-17</td>
<td>18-25</td>
<td></td>
</tr>
<tr>
<td>Iran (n=186)</td>
<td>16.7%</td>
<td>63.4%</td>
<td>19.9%</td>
<td></td>
</tr>
<tr>
<td>Afghanistan (n=8)</td>
<td>28.6%</td>
<td>71.4%</td>
<td>0%</td>
<td>NA</td>
</tr>
<tr>
<td>UAE (n=6)</td>
<td>33.3%</td>
<td>16.7%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>17.6%</td>
<td>62.3%</td>
<td>20.1%</td>
<td></td>
</tr>
</tbody>
</table>

NA: Not applicable

X² test is not applicable between nationality and level of knowledge on DM. The frequency of participants from UAE and Afghanistan is so small to allow any interpretation.

Table 7: Misconceptions with regard to diabetes among participants

<table>
<thead>
<tr>
<th>MISCONCEPTION (n=200)</th>
<th>Yes Number (%)</th>
<th>No Number (%)</th>
<th>I don’t know Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM is caused by eating too much sugar and sweets</td>
<td>137(68.5%)</td>
<td>20.5%)41</td>
<td>22(11%)</td>
</tr>
<tr>
<td>Obesity alone causes DM</td>
<td>59(29.5%)</td>
<td>113(56.5%)</td>
<td>28(14%)</td>
</tr>
<tr>
<td>Diabetics should never eat sweets</td>
<td>57(28.5%)</td>
<td>91(45.5%)</td>
<td>51(25.5%)</td>
</tr>
<tr>
<td>DM has no treatment and will lead to death</td>
<td>57(28.5%)</td>
<td>118(59%)</td>
<td>25(12.5%)</td>
</tr>
</tbody>
</table>

The most common misconception is related to the role of sweets in the etiology of diabetes.
One study was conducted in Tamaka village a rural area in India in regards to awareness of diabetes mellitus in adults and elderly. Half of the questioned participants had some awareness about diabetes and its symptoms. But more than half (75%) of them did not know about its complications. The common misconception about diet in diabetes was to entirely avoid sweets, rice and fruits and to consume more ragi, millet and wheat chapattis. The study concluded that relevant knowledge about diabetes is poor in rural population. Hence community level awareness programs have to be organized. Healthcare providers must be aware of community perceptions and practices\(^1\).

Another study was conducted in the out Patient Department of Ghurki Trust Teaching Hospital, Pakistan evaluating awareness of diabetes. This study concluded that awareness of diabetes mellitus in the sample under study was significantly low. More than 80% were unaware of etiology of diabetes and only 10% were aware about the types of diabetes\(^1\).

A study was conducted on May of 2009 in Uyo, Nigeria among adolescents. This was a cross-sectional descriptive study. A structured questionnaire on the various aspects of diabetes – such as cause, symptoms, and complications – was administered to 200 students followed by a health awareness talk on diabetes. In this study only 40% of the subjects correctly identified absence of insulin as the etiologic factor for diabetes\(^1\).

The lack of knowledge with regard to diabetes complication observed in this study among 48.5% of student, is in agreement with another study done by Mahajerin and colleagues\(^1\) which showed that less than half of the student were able to identify diabetes-related complications and risk factors from a predetermined checklist. A study from Oman showed that although 47% of the students could not identify any of those complications, however, their knowledge about managing diabetes was high as 86% of the students knew that diabetics need a special diet\(^18,19\).

Misconception about the role of sugar intake in the etiology of diabetes was also reported in a study from Canada that included different focus group of adolescent which showed that in 11 out of 19 focus groups the misconception that sugar causes diabetes was stated\(^1\).

**CONCLUSION**

- High Lack of knowledge in all knowledge domains. Poor knowledge is observed in 18% of the adolescents
- Most common misconception that sugar intake cause diabetes

**RECOMMENDATIONS**

- Educational sessions covering basic facts about DM can be incorporated within the curricula of adolescent
- Nationwide research studies on the subject
- Special concentration on increasing awareness of the younger age adolescents since healthy preventive behavior can be initiated early in life.

**LIMITATIONS**

- Convenience sampling method
- Sample was not randomly selected
- Sample size does not represent the total population in terms of age group and nationality
- Results cannot be applied to general population of Iranian or other nationalities adolescents
- Study suffered from maturation bias

**ACKNOWLEDGEMENT**

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REFERENCES


