

ASSESSMENT OF KNOWLEDGE REGARDING DIABETES MELLITUS COMPLICATIONS AMONG MEDICAL STUDENTS AT KING SAUD UNIVERSITY

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ABSTRACT

Background: Both prevalence and incidence of Diabetes Mellitus are rising. The number of people with diabetes went from 108 million in 1980 to 422 million in 2014. It is estimated that 552 million people will have diabetes by 2030, a prevalence of 10%. In Saudi Arabia, there were 3.8 million individuals with diabetes in 2014 and this number is projected to increase to 2.5 million by 2030. It is very clearly that diabetes represents a major clinical and public health problem in Saudi Arabia. **Objectives:** To assess the level of awareness among medical student about complication of Diabetes Mellitus. **Methods:** A cross-

sectional study conducted at King Saud University Medical College. A self-administered questionnaire was given to medical students containing questions about proven complication of diabetes. The questionnaire is to be given to all medical students from all years (first to fifth year). The sampling technique will be convenience sampling. **Results:** 82.9% of the students were appropriately knowledgeable about the complications of diabetes, 69.4% of pre-clinical chose the right answer in at least ten questions and 88.8% of clinical students chose the right answer in at least ten questions. **Conclusion:** Overall, medical students of King Saud University did well knowing about the complications of diabetes. Clinical year Students outperformed Preclinical years students as we can see from the results. There's a need for further curriculum modifications as pre-clinical years students weren't highly aware about DM complications.

KEYWORDS: Diabetes mellitus, Medical students, Complications.

INTRODUCTION

Both prevalence and incidence of Diabetes Mellitus are rising. The number of people with diabetes went from 108 million in 1980 to 422 million in 2014.^[1] It is estimated that 552 million people will have diabetes by 2030, a prevalence of 10 %.^[2,3] In Saudi Arabia, there were 3.8 million individuals with diabetes in 2014 and this number is projected to increase to 2.5 million by 2030. It is very clearly that diabetes represents a major clinical and public health problem in Saudi Arabia. People with diabetes have an increased risk of developing a number of serious health problems. Consistently high blood glucose levels can lead to serious diseases affecting the heart and blood vessels, eyes, kidneys, nerves and teeth.^[4,10] In addition, people with diabetes also have a higher risk of developing infections. Because of its high prevalence and incidence in Saudi Arabia, it is very essential that Saudi medical students should be aware of and have enough knowledge about the complications of Diabetes Mellitus. The purpose of this study is to assess how many medical students at King Saud University know about the complications of Diabetes Mellitus and how much their knowledge is evolving with their progress from pre-clinical to clinical years of medical study. In addition, the study aims at finding out which diabetes mellitus complications are recognized by King University Saud medical students and which ones are most frequently and least frequently recognized. The study is a cross sectional study in which the subjects (both pre-clinical and clinical- year medical students) will be asked to recognize all the complications of diabetes mellitus they know from a list of medical conditions.

METHODS

The design of the current study is both a Qualitative and Quantitative. This design will help us answer the research question and validate its hypotheses. The research design will guide us to find out the percentage of pre-clinical and clinical students that are able to identify the complications of Diabetes Mellitus, and confirm or deny that neuropathy is the most frequent reported complication. The study is conducted by senior medical students. The sampling technique will be a Convenience Sampling and the sample size will be 245.8624 students by using the Sample size formula equation $Z_{\alpha/2} \cdot P \cdot (1-P) \cdot D^2$ and is going to be approximated to 250 students to reduce error. Our inclusion criterion is all medical students who study at King Saud University Medical College (from first year to fifth) and our exclusion criteria: students who don't study at the college of medicine. The study questionnaire is self-administered. Sent through email which contains a link to the questionnaire to all the medical students through the student council in the college of medicine and to all the group leaders so they can relay it

to the students it's going to be electronic based questionnaire. The questions in the questionnaire are going to be multiple choice questions in which students are asked to select one alternative from a given list of alternatives and it consist of questions about the complication of diabetes. We are going to ask them about proven complications of diabetes and see if they know about those complications or not. The questions are in English and consist of 17 questions. The approximate time to finish the questionnaire is about three minutes. A consent statement will be written in the questionnaire. Participants confidentiality will be assured. A pilot study will be done prior to the full-scale study to assess the study methods, find out any potential errors, test logistics of data collection, examine how much suitable and clear the questionnaire and its instructions, and to estimate timing for data collection. Data analysis plan includes both descriptive and analytical statistics and they are going to be done through SPSS application. No funds needed. This study is designed for the first time during the CMD 305 curriculum time from 2011. It was approved by the IRB.

Za2=1.962, P=0.8, D2= 0.05

RESULTS

Number of medical students who participated in our questionnaire is 269 students (SD=.461 variance=0.213) out of 250 (the sample was N=250). 82 of them were Preclinical (first and second year medical students) and 187 of them were Clinical (third, fourth and fifth year). The analysis was done using the program SPSS. The significance of the questions was calculated through Chi-square test by cross tabbing between the medical year (Preclinical or Clinical) and the answers of each question. The first question in the questionnaire was if they were Preclinical or Clinical students, 82(30.5%) chose they were Preclinical and 187(69.5%) chose that they were Clinical. In the second question of the questionnaire (table 1 and graph 1) was "Concerning Diabetes complications in blood vessels" and the options were, It affect both small vessels and large vessels, It only affect small vessels, It only affect large vessels or It does not affect blood vessels and the right answer was the first choice. 210(78.1%) students chose the option "It affect both small vessels and large vessels" and 50(18.6) students chose "It only affect small vessels" options and 4(1.5%) students chose "It only affect large vessels" option and 5(1.9%) students chose "It does not affect blood vessels" option, 59(72%) students of Preclinical years and 151(80.7%) students of Clinical years chose "It affect both small vessels and large vessels", 17(20.7%) students of Preclinical years and 33(13.6%) students of clinical years chose "it only affect small vessels", 2(2.4%) preclinical years students and 2(1.1%) clinical years students chose "it only affect large vessels" and

4(4.9%) Preclinical year's students and one (0.5%) students form clinical years chose "It does not affect blood vessels". Chi-square tests show that the degree of freedom is 3 and the significance is $P=0.61$. The SD was 0.583 and the variance 0.340.

Table 1:

Concerning Diabetes complications in blood vessels	It affect both small vessels and large vessels	It only affect small vessels	It only affect large vessels	It does not affect blood vessels
Preclinical	72%	20.7%	2.4%	4.9%
Clinical	80%	17.6%	1.1%	0.5%
Total of the whole students	78.1%	18.6%	1.5%	1.9%

Is the Diabetes a cause for Nephropathy (disease of the kidney)?	Yes	No	I don't know
Preclinical	84.1%	3.7%	12.2%
Clinical	98.9%	0%	1.1%
Total of the whole students	94%	1.1%	4.5%

In the third question in the questionnaire was "Is Diabetes a cause for myocardial infarction?" and the options were "yes", "no" or "I don't know" and the right answer was the first choice. The SD was 0.709 and the variance was 0.503. 213(79.2%) medical students chose the option "yes", 19(7.1%) of them chose the option "no" and 37(13%) of them chose "I don't know". 55(67.1%) students from Preclinical years and 158(84.5%) from Clinical years chose "yes" and 6(7.3%) students from Preclinical years and 13(7%) from clinical years chose "No" and 21(25.6%) students from Preclinical years and 16(8.6%) students form Clinical years chose "I don't know". Chi-square test show that the degree of freedom is 2 and the significance value is $P=0.001$.

The forth question in the questionnaire was "Is the Diabetes a cause for Dermopathy (skin diseases)?" and the options were "yes", "no" or "I don't know" and the right answer was the first choice. The SD=0.845 Variance=0.715. 155(57.6%) medical students chose "yes" and 48 students chose "No" and 66(24.5%) students chose the option "I don't know". 46(56.1%) Preclinical students and 109(58.3%) clinical students chose "yes" and 13(15.9%) Preclinical and 35(18.7%) clinical students chose "no" and 23(28%) Preclinical and 43(23%) Clinical students chose "I don't know". Chi-square tests show that the degree of freedom is 2 and the significance value is $P=0.637$.

The fifth question (table 2) in the questionnaire was “Is the Diabetes a cause for Nephropathy (disease of the kidney)?” and the options were “yes”, “no” or “I don’t know”. The SD=0.424 and the variance is 0.180. 254(94.4%) medical students chose “yes” and 3(1.1%) chose “No” and 12(4.5%) chose “I don’t know”. 69(84.1% of Preclinical) and 185(98.9% of clinical students) chose “yes” and only 3 Preclinical students chose “No” and 10 Preclinical and 2 clinical students chose “I don’t know”. The Chi-Square show that the degree of freedom is 2 and the significance value is $P=0.000$.

The sixth question in the questionnaire was Can the Diabetes cause gangrene in the body? And the options were yes, no or I don’t know. The SD=0.182 and the variance was 0.33. 266(98.9%) medical students chose yes and only one (0.4%) chose no and 2(0.7%) students chose I don’t know. 81(98.8% of pre-clinical students) and 185(98.9% of medical students) chose yes, only one student from clinical years chose no and one from clinical years and one from preclinical years chose I don’t know. The chi-square test show that the degree of freedom is 2 and the significance value is $P=0.671$.

The seventh question in the questionnaire was is the Diabetes a cause for retinopathy (damage to the retina)? And the options were yes, no or I don’t know. The SD=0.369 and the variance was 0.136. 258(95.9%) of medical students chose yes and 2 of them chose no and 9 of them chose I don’t know. 71 (86.6%) preclinical and 187(100% of clinical years) clinical chose yes, 2 from Preclinical chose no and 9 from Preclinical years chose I don’t know. the chi-square test show that the degree of freedom is 2 and the significance value is $P=0.000$ very significant.

The eighth question in the questionnaire was is the Diabetes a cause for blindness? And the options were yes, no or I don’t know. The SD=0.478 and the variance was 0.228. 248(92.2%) of medical students chose yes and 6 students chose no and 15 students chose I don’t know. 63 (76.8% of preclinical) pre-clinical and 185(98.9% of clinical students) chose yes and only 6(7.3%) preclinical students chose No and 13(15.9%) preclinical and 2(1.1%) clinical students chose I don’t know. The Chi-square test show that the degree of freedom is 2 and the significance value is $P=0.000$ very significant.

The ninth question in the questionnaire was is the Diabetes a cause for glaucoma in the eye? And the options were yes, no or I don’t know. The SD=0.887 and the variance was 0.787. 155(57.6%) medical students chose yes and 39 of them chose no and 75(27.9%) chose I don’t

know. 36(43.9% of preclinical students) and 119(63.6% of Clinical students) chose yes and 13(15.9%) preclinical and 26(13.9%) Clinical students chose no and 33(40.2% of Preclinical students) and 42(22.5% of Clinical students) chose I don't know. The chi-square test shows that the $df = 2$ the significance value is $P = 0.005$ very significant.

The tenth question in the questionnaire was is the Diabetes a cause for Neuropathy? And the options were yes, no or I don't know. The $SD = 0.469$ and the variance was 0.220. 251(93.3%) of medical students chose yes and 3(1.1%) chose no and 15(5.6%) chose I don't know. 65(79.3% of preclinical students) and 186(99.5% of Clinical students) chose Yes and 3(3.7%) practical students chose no and 14(17.1%) Preclinical and one (0.5%) clinical students chose I don't know. The Chi-square shows that the degree of freedom is 2 and the significance value is $P = 0.000$ very significant.

The eleventh question in the questionnaire was is the Diabetes a cause for Gastroparesis (delayed gastric emptying)? And the options were yes, no or I don't know. The $SD = 0.924$ and the variance was 0.854. 95 (35.3%) of medical students chose yes and 32(11.9%) of them chose no and 142(52.8%) of them chose I don't know. Only 9 (11%) preclinical and 86(46%) clinical students chose yes and 14(17.1%) Preclinical and 18(9.6%) Clinical chose no and 59(72%) of Preclinical and 83(44.4%) Clinical students chose I don't know. The Chi-square shows that the degree of freedom is 2 and the significance value is $P = 0.000$ very significant.

The twelve questions in the questionnaire was Is the Diabetes a cause for metabolic acidosis? And the options were yes, no or I don't know. The $SD = 0.840$ and the variance was 0.706. 201(74.7%) of the students chose yes and 7 of them chose no and 61(22.7%) chose I don't know. 50(61%) of preclinical and 151(80%) clinical chose yes, 4(4.9%) preclinical and 3(1.6%) clinical chose no and 28(34.1%) preclinical and 33(17.6%) clinical chose I don't know. The Chi-square shows that the degree of freedom is 2 and the significance value is $P = 0.002$.

The thirteenth question in the questionnaire was Is the immune response impaired in individuals with diabetes mellitus? And the options were yes, no or I don't know. The $SD = 0.531$ and the variance was 0.282. 243(90%) of medical students chose yes and 7(2.6%) of them chose no 19(7.1%) chose I don't know. 70(85.4%) of preclinical and 173(92.5%) of Clinical students chose yes and 3(3.7%) of preclinical and 4(2.1%) clinical chose no and 9(11%) of preclinical and 10(5.3%) of clinical students chose I don't' know. The Chi-square test shows that the degree of freedom is 2 and the significance value is $p = 0.184$.

The fourteenth question in the questionnaire was is the Diabetes a cause for coma? And the options were yes, no or I don't know. The SD=0.650 and the variance was 0.423. 231(85.9%) of the students chose yes and 7(2.6%) of them chose no and 31(11.5%) of them chose I don't know. 73(89%) of Preclinical students and 158(84.5%) clinical students chose yes, 2(2.4%) of preclinical and 5(2.7%) clinical chose no and 7(8.5%) Preclinical and 24(12.8%) of clinical chose I don't know. The chi-square tests show that the degree of freedom is 2 and the significance value is $P=0.588$.

The fifteenth question in the questionnaire was Do People with Diabetes have an increased risk of dehydration? And the options were yes, no or I don't know. The SD=0.741 and the variance was 0.549. 218(81%) medical students chose yes, 8(3%) chose no and 43(16%) students chose I don't know. 68(82.9%) of Preclinical and 150(80.2%) clinical chose yes, 2(2.4%) of Preclinical and 6(3.2%) Clinical chose no and 12(14.6%) of Preclinical and 31(16.6%) of clinical years chose I don't know. The Chi-square test show that the degrees of freedom is 2 and the significance is $P=0.861$.

The sixteenth (Graph 2) question in the questionnaire was What do you think is the most reported cases of Diabetic complication? And the options were Neuropathy, Nephropathy, Retinopathy, Gastrointestinal diseases and Vascular Diseases. The SD=1.510 and the variance was 2.279. 73(27.1%(preclinical=12(14.6%)clinical=61(32.6%)) chose neuropathy and 44(16.4% of all of them (preclinical=23(28%)clinical=21(11.2%)) chose Nephropathy and 79(29.4% of them(preclinical=14(17.1%)Clinical=65(34.8%)) chose retinopathy and 2 preclinical and 1 clinical chose Gastrointestinal diseases and 70(26% (preclinical= 31(37.8%) clinical= 39(20.9%)) chose Vascular Diseases.

82.9% of the students know about the complications of diabetes, 69.4% of preclinical chose the right answer in at least ten questions and 88.8% of clinical students chose the right answer in at least ten questions (the cumulative percent of people who done right in ten to fourteen questions, so 82.9% of 269 chose the right answer in at least ten questions excluding the first and the last questions)

DISCUSSION

The objective of this study is to assess the knowledge of KSU medical students about the complications of Diabetes mellitus. The result of the evaluation of the Students knowledge about such complications was above average (compared to previous studies about the same

concern). In this study, we are comparing two populations, Clinical years Students (grade 3, 4, 5) and preclinical year students (grade 1, 2) to see if students are enhancing their knowledge throughout the years. Its expected and noted that Students of advanced years will score better than the ones in early levels. Out of 15 questions used to assess how well the students are aware about the complication of DM, only 1 was answered more by preclinical year's students, this answers our second objective which is "to compare the level of knowledge between pre-clinical and clinical-year students".

More than 80% of the students knew that Cardiovascular diseases such as Myocardial Infarction is one of the complications of DM, compared to a study done in a university in Ajman, United Arab Emirates^[13] in which more than half of the students answered incorrectly (60%). A very important complication as such, if missed could result in an increased morbidity and mortality in any community.

Another study to compare with is a study done in Ziauddin University Karachi^[11] that aimed to assess the knowledge of its preclinical and clinical years students about the complications of DM (almost identical to our study) found that 72% of the clinical-years students and 51% of the Preclinical years students succeeded to identify that Neuropathy, Retinopathy, Nephropathy, Heart diseases are all complications of Diabetes Mellitus, comparing this to our study, we found that 79% of clinical years students and 57% of pre-clinical years were able to identify the mentioned complications.

Awareness of early complications plays pivotal role in preventing said complication, most of the students (clinical and preclinical) were aware about such early complication (Neuropathy).

In this Study, overall Students knowledge about complications of Diabetes Mellitus showed better standard among the clinical years compared to early (preclinical); due to the interaction with the patients in the hospital. To compare this with a previous study showing frequency of identifying different complications of DM among health care providers. It was observed that only 1/3 of them including house officers, were able to identify different complications, suggesting that there is lack of understanding of the disease among the young graduates that require continuity of education and training.

In one study, students were more likely to provide appropriate management of chest pain than diabetes.^[14] This shows that there's weakness in the curriculum that needs improvement, and one of our study's aim and objective is to assess the need for further curriculum changes and additions.

In a study done in Al-Baha University,^[15] 100% of interviewed medical students identified nephropathy as a known complication of DM compared to our study (94%)

In our study, the knowledge of students about the complications of DM was more in clinical than in preclinical groups, overall knowledge is average. Medical students are the future treating physicians and with Diabetes being highly a prevalent medical problem. It's advised that KSU Medical College's curriculum should implement more lectures and clinical sessions about Diabetes Mellitus in order to raise the level of the students. Especially more bed side teaching and patient-based clinical sessions. To help in creating highly trained physicians who are able to deal with this highly prevalent disease.

Recommendations

We recommend the college of medicine to increase its teaching about the complications of diabetes especially in preclinical years so to give students of pre-clinical years more knowledge about diabetes mellitus and its complications and to raise the future doctors competency in managing such common conditions and avoid doctors lack of self-confidence that may occur as a result.^[13]

CONCLUSION

As we can see from the results of the questionnaire, overall, medical students of King Saud University did well knowing about the complications of diabetes. Clinical year's students outperformed Preclinical years students as we can see from the results.

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