



RISK FACTORS OF DIABETES MELLITUS IN INDIAN STUDENTS STUDYING IN USMF NICOLAE TESTEMITANU

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ABSTRACT

Diabetes Mellitus is one of the most serious global health issues of the twenty-first century. The disease is of multi-factorial origin and hence can be attributed to many modifiable and non-modifiable risk factors. The study was performed by collecting and organizing data from the Indian student population of USMF with the prime goal of identifying the most influential and prevalent risk factors present in the study population. Data was analyzed from 115 participants, infographics were used to decipher and conclude the observations. The quantitative and qualitative analyses of the risk factors were done and the Indian Diabetes Risk Score was calculated for each patient.

AIM OF THE STUDY

The purpose of the study was to evaluate the risk factors of diabetes mellitus type 2 in the Indian students studying in USMF “Nicolae Testemitanu” for the prevention of future development of the disease.

INTRODUCTION

In 2021, it is estimated that 537 million people have diabetes and this number is projected to reach 643 million by 2030 and 783 million by 2045[1]. India is regarded as the world’s diabetic capital. The country’s diabetic population is expected to reach 80 million by 2030. Diabetes is a multifactorial chronic entity with systemic affection and complications related to the same. The degree of morbidity and mortality brought about by diabetes mellitus cannot be neglected. The increasing prevalence of diabetes and its complications in India is a cause for concern. Most of the Indian students studying in USMF “Nicolae Testemitanu” is from the federal state of Kerala. The unique aspect of Kerala is that the health indicators are comparable to those of developed countries [2]. T2DM, on the other hand, is now highly visible across all segments of society in Kerala, implying the existence of an Asia paradox in the state. According to the India State-level disease burden report, a tenth of the total disease burden in India was caused by a cluster of an unhealthy diet, being overweight or obese, having high blood pressure, sugar, and cholesterol, all of which contributed to ischemic heart disease, stroke, and diabetes which combined to account for a quarter of total disease burden in India in 2016 [3,4]. Other important

influential risk factors for diabetes mellitus development include high fast food consumption, sweetened beverages, and low fresh fruit and vegetable intake.

MATERIALS AND METHODS

The thesis was performed at the Department of Endocrinology, USMF “Nicolae Testemitanu” during 2020-2022. Along with literature review, it was also necessary to collect information from Indian students as it was the topic of interest in this scientific study. In order to objectively assess and evaluate the various risk factors, firstly various lifestyle factors were sought that was much prevalent among the Indian students. Later on, for an objective assessment, In the period of 2021, a questionnaire was introduced and circulated respecting the rule of privacy of every participant. In January 2022, a modified questionnaire was constructed to correct previous errors and also to emphasize and increase the specificity of certain points (risk factors).

The questionnaire was constructed using the platform of Google forms. The questionnaire included 3 sections- ‘General characteristics’, ‘Family History’ and ‘Dietary history’. The questionnaire included a total of 37 questions and was in the single and multiple-choice format.

A total of 115 students were interrogated and 115 responses were obtained. Infographics could easily be deciphered from pie charts, bar graphs, and plots obtained from the responses.

RESULTS

115 responses were obtained in total. The most prevalent age group was 22 years, followed by 23 years. Other less

prevalent age groups were 24, 25, 20, 21, and 19 years (Figure 1).

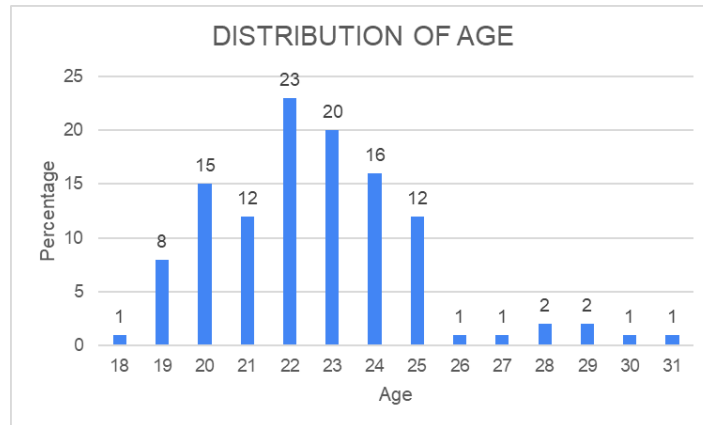


Figure 1 – Age Distribution of the Indian students of USMF

The majority of the students who participated were females (67%) as compared to males (31.3%). Some did not prefer to reveal their gender (Figure 2).

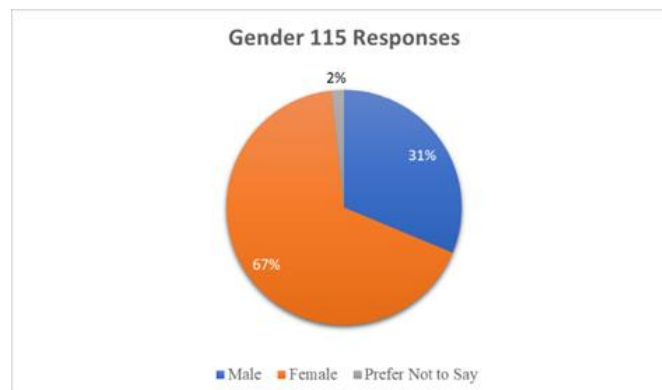


Figure 2- Gender Distribution of the Indian students of USMF

The family history of diabetes was another factor that needed to be considered extensively. From data collected, most participants belonged to the category “ No diabetes in parents” – 59 participants (51.3%). Among parents of the participants, diabetic history was sought. Only the father was diabetic in 29

(25.22%) participants. Only the mother is diabetic in 14 (12.17%) participants. Both parents were diabetic in 10 participants-(8.7%), a first-degree relative (sibling) is diabetic among 2.6 % of participants. (Figure 3)

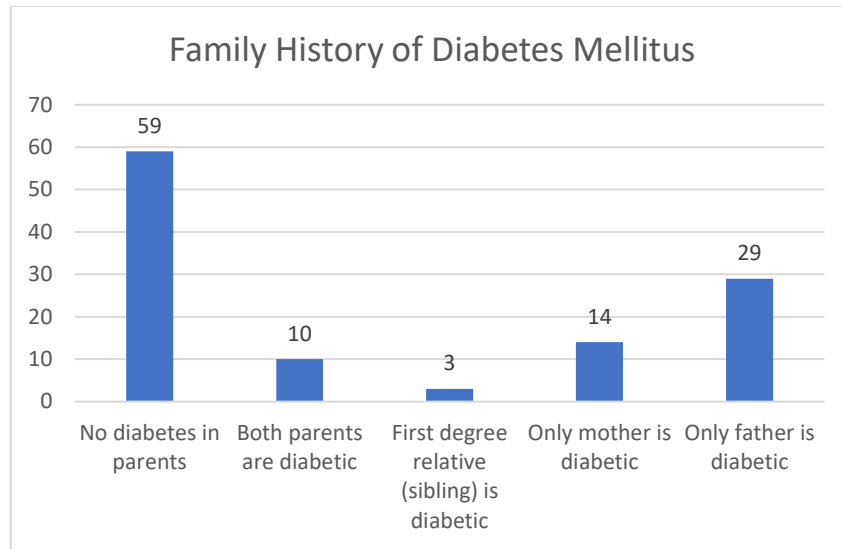


Figure 3 Distribution of Family History of Diabetes in the Indian students of USMF

Family history of obesity was sought. 85 participants (73.91%) did not have obesity in parents. Only mother was obese in 16 participants (13.91%). Both parents were obese on

5 participants (4.34%) and a sibling was obese in 5 participants (4.34%). Only the father was obese in 4 participants (3.5%) (Figure 4)

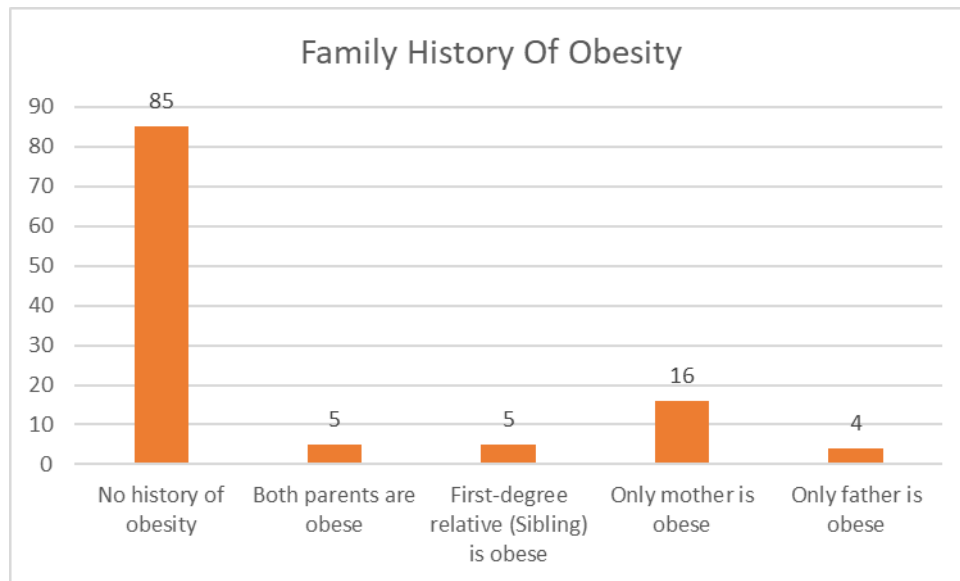


Fig 4: Family history of obesity

A family history of hypertension was considered. Most participants expressed there was no hypertension in both parents- 64 participants (55.65%). Only the father was hypertensive in 29 participants (25.22%). Only the mother was hypertensive in 11 participants (9.57%). Both parents are hypertensive in 7 participants (6.08%). First-degree relative or sibling was hypertensive in 4 participants (3.48%) (Figure 5). In addition, family history of coronary artery disease was sought. No CAD history among parents was present in most participants - 104 participants (90.4%). Only father has CAD in 7 participants (6.1%) and only mother had CAD among 3

participants (2.6%). Both parents had CAD in only 1 participant (0.9%).(Figure 6)

The height and weight of the Indian Students were obtained from the responses to the questionnaire and the BMI was calculated and was categorized into the Grades of BMI/ WHO Classification of Weight status. 57% of the patients had a normal BMI, 10% were underweight, 30% were overweight, and the rest 3% obese. Of the 3% of the obese patients, 50% had Class II Obesity and the rest 50% had Class III Obesity as described in Figure 5.

Additionally, a higher degree of fat deposition in the hypogastric and waist region was involved with higher degrees

of peripheral insulin resistance and in the long-term diabetic development. Hence this value was incorporated into the questionnaire. Most belonged to the 1st category -Waist <80cm(female) <90cm (male)- 53.9%. However there was also

significant representation in the 2nd category- waist > 80-89 cm (female) and > 90-99cm (male)- 40.9%. 5.2% participants belonged to the category: Waist >90cm (female), > 100cm (male) (Figure 8).

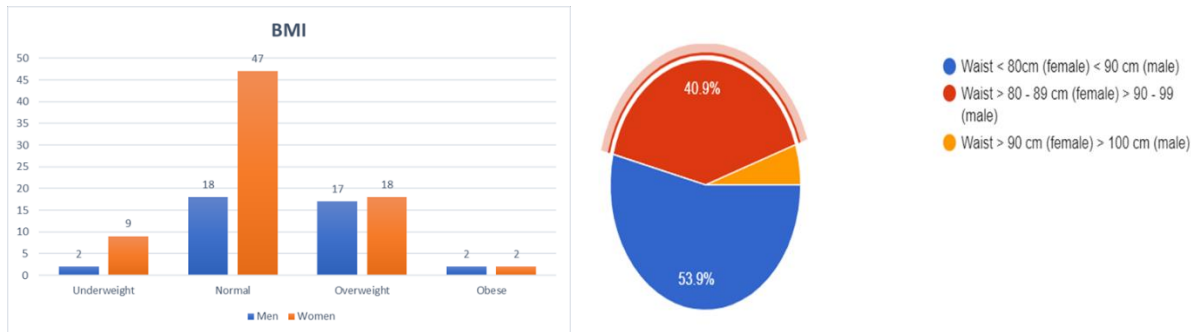
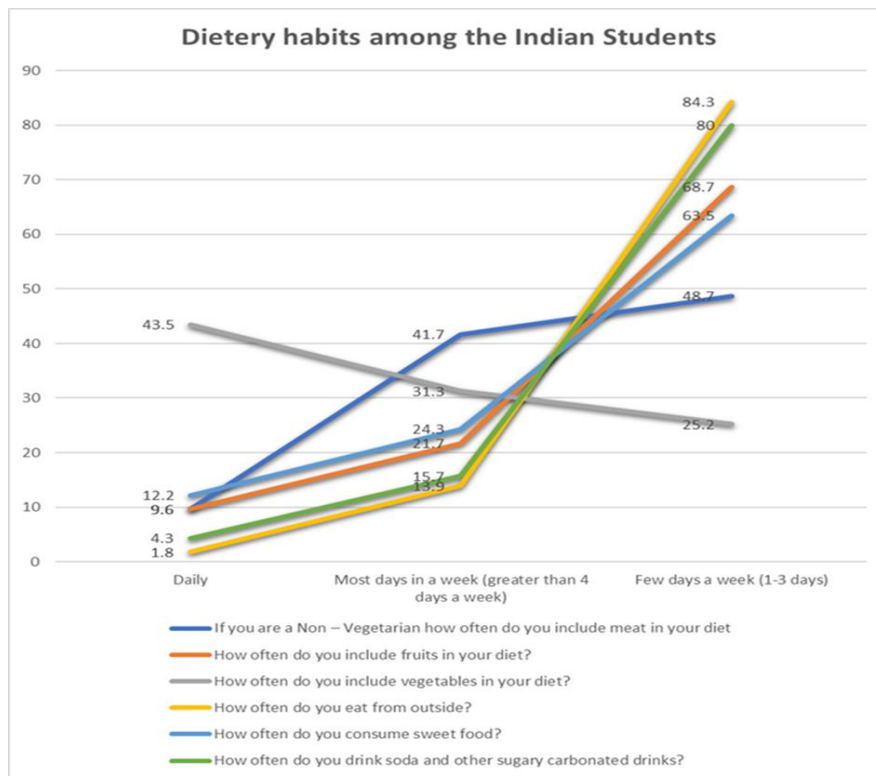


Figure 5. Distribution of BMI in the Indian Students of USMF.

Another main finding was that 54% of participants expressed that they did not have a daily physical activity of more than 30 minutes or which means only 46% of participants had a regular physical activity of more than 30 minutes. The alarming factor was that 33% of participants had no exercise and/or conferred to a sedentary lifestyle. 36.5% of participants had regular mild exercise or mild physical activity at home or work. 24.3% had regular moderate exercise or moderate physical activity at home or work. Only 6.1 % had regular vigorous exercise or strenuous activities at home or work.

Data from the dietary history showed that 96.5% of the students are non-vegetarians. 41.7% of the students include meat in their diet a few days a week, 48.7% consume meat for greater than 4 days a week, and 9.6% of the students consume

meat daily. 77.2% of the students included fresh fruits in their diet but only 9% of the students consume fruits daily. 68% of the students consume fruits less than 3 days a week. The most consumed fruits were Apples, Bananas, and Oranges. 97.4% of the students include vegetables in their diet and 43.5% were found to consume vegetables daily. 31.3% consume vegetables for more than 4 days a week and 25.2% of the students consume vegetables only few days a week (Figure 10). Students were asked how frequently and what kind of food they liked to order/ eat from restaurants. 44.3% (51 students) of the Indian students preferred Indian foods (Biryani and other Indian Delicacies), 39.1% (45 students) preferred Fast Food (Pizza, Burgers, Fried Chicken etc.), 15.7% (18 students) preferred the Arabic Food (Kebab, Shawarmas) (Figure 6).





Other lifestyle factors that needed to be addressed were Alcohol usage and smoking. In history for smoking, 87% of the students answered that they do not smoke. Among the persons who smoked 75% of them did not smoke for the past 30 days, 1.7% took less than a cigarette a day, 5% took 1 cigarette a day, 8.3% took 2-5 cigarettes a day, 6.7% took 6-10 cigarettes a day, 3.3% took 11-20 cigarettes a day.

In the section for the history on alcohol consumption, 64.3% of the students do not consume alcohol. Infographics revealed 23.5% drink beer, 20.9% wine, 11.3% consume hard liquor like vodka, 3.5% of the students consume drinks with alcohol percentage less than 5.

Types Of Alcohol	Number Of students
No	74 (64.3%)
Wine	24 (20.9%)
Beer	27 (23.5%)
Hard Liquor	13(11.3%)
Alcohol less than 5%	4 (3.5%)

CONCLUSION

From this study which was conducted among the Indian students of USMF-“NicolaeTestemitanu” for evaluating the diabetic risk factors, Sedentarism was the most prevalent risk factor found. 54% of participants expressed that they did not have a daily physical activity of more than 30 minutes or which means only 46% of participants had a regular physical activity of more than 30 minutes. From the dietary standpoint, it was evident that most students followed a non-vegetarian diet. When considering what kind of foods they consumed from restaurants or by food delivery; 44.3% (51 students) of the Indian students preferred Indian foods (Biryani and other Indian Delicacies), 39.1% (45 students) preferred Fast Food (Pizza, Burgers, Fried Chicken etc.), 15.7% (18 students) preferred the Arabic Food (Kebab, Shawarmas). Many students opted to eat out/ order food atleast for a few days every week. In addition to this, the number of students that consumed fresh fruits daily was only 9%. Most students expressed consumption of sweetened beverages (sugary sodas and other caffeinated beverages) at least for a few days a week. Another important potential influential factor we need to look to is family history. Family history is one of the established main risk factors of diabetes mellitus. However, in this study, from the data collected for family history of diabetes, most participants belonged to the category “No diabetes in parents” – 59 participants (51.3%). 88 participants (77.2%) did not have obesity in parents. Most participants expressed there was no hypertension in both parents- 66 participants (57.4%). So more than half of the participants in the study were on the safer side of the spectrum.

The Indian Diabetes Risk Score [5] was calculated and it was observed that, 32 students (7 male students and 25 female students) belonged to the low-risk category (score <30), 81 students (23 male students and 58 female students) belonged to the medium-risk category (score 30-50) and 2 students (1 male student and 1 female student) belonged to the high-risk category (score>60). From the study, it was evident that for future prevention of diabetes mellitus, the students must abstain from an unhealthy lifestyle which includes fast food, sugared beverages consumption, and sedentary behaviour. Physical exercise should be mandated. Launching awareness programs about the risk factors and diabetes mellitus would be highly useful in the future prevention of Type 2 Diabetes Mellitus.

REFERENCES

1. International Diabetes Federation. In: *IDF Diabetes Atlas. 9th ed. Brussels, Belgium: International Diabetes Federation; 2019.*
2. India state level disease burden report. [Last accessed on 2021 Jun 08]. Available from: vikaspedia.in/health/health-directory/india-state-level-disease-burden-report-released.
3. Tripathy JP. Burden and risk factors of diabetes and hyperglycemia in India: Findings from the Global Burden of Disease Study 2016. In: *Diabetes Metab Syndr Obes. 2018; 11:381–7.*
4. Brown A. Growth and success in Kerala. In: *Yale Rev Int Stud. 2013;4(1):85–95.*
5. Mohan V., Deepa R., Deepa M., Somannavar S., Datta M. A simplified Indian Diabetes Risk Score for screening for undiagnosed diabetic subjects. *J Assoc Physicians India. 2005;53:759–763.*