Prevalence of type 2 diabetes mellitus among non teaching staff of a medical college in North Karnataka: a cross sectional study

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Background: Diabetes threatens to assume pandemic level by 2030 and there is no available statistics of type2 diabetes mellitus on non-teaching staff. The risk factors like bad habits, family history, waist hip ratio (≥ 0.9 in males and ≥0.85 in females), BMI (≥28) and IDRS (>60) all attributed to the high prevalence of pre-diabetic as well as diabetes. Aims: To know the prevalence of Type 2 Diabetes Mellitus among non-teaching staff and to determine the risk factors associated with it. Methods: A facility based cross – sectional study was conducted among all the non-teaching staff of Jawaharlal Nehru Medical College, Belagavi from February to October 2014. A total 500 (394 males and 106 female) participants between age group 20-59 years were selected for the study. After taking written informed consent, information regarding socioeconomic and risk factors were collected though pre – tested questionnaire. Physical examination were done to calculate BMI, Waist – Hip ratio and IDRS (Indian diabetes risk score). The random blood sugar was estimated to identify the diabetes and pre-diabetics. Results: The overall prevalence of diabetics and pre- diabetics was 5 per cent and 17 per cent respectively. The prevalence of diabetes was highest in age group 50-59 years. The risk factor like bad habit, waist hip ratio (≥0.9 in males and ≥0.85 in females), BMI (≥28) and IDRS (>60) attributed to high prevalence of pre diabetics and diabetics. Conclusions: The prevalence of diabetes was more among non-teaching staff so; both preventive and curative services should be provided to them. Keywords: Type 2 diabetes, Prevalence, Non-teaching staff, Random blood sugar

INTRODUCTION

It has been projected that Type 2 Diabetes, (T2DM) will be around 438 million globally by 2030 which threatens assume to a pandemic and India will be the diabetes capital of the world.1 The awareness in non-teaching staff about risk of diabetes is low in compared to teaching staff in the medical college. Dietary changes, physical inactivity, prolonged working hour, unhealthy life style are more among them. Also, they are in more stress in compared to the teaching staff. There is also no available statistics regarding the burden of type 2 diabetes among the non-teaching staff of a medical college and hence they were selected for the study.

METHODS

A facility based cross sectional study was conducted among all the non-teaching staff of Jawaharlal Nehru Medical college, Belagavi from February to October - 2014. Total 500 (394 males and 106 female) non-teaching staff between age group 20-59 years as per list of employees received from the institutional office were selected for the study. The study subjects who were not
available for checkup even after two follow up were excluded in the study.

Information regarding socioeconomic status and risk factors were collected through pre-tested questionnaire. Study participants were asked regarding regular physical activity, family history of diabetes, regarding personnel history. Weight was measured with minimum clothing to the nearest to 0.1 kg using a standard adult portable weighing machine. Height was measured without footwear using a standard calibrated stadiometer with 0.1cm accuracy. BMI of subjects were calculated and classified based on Asian standards.\(^2\) Waist hip ratio of subjects were calculated and classified according to WHO criteria.\(^3\) Socioeconomic status were assessed using modified B.G Prasad\(^4\) classification (April 2013).\(^5\) Indian diabetes risk score (IDRS) was calculated using all four parameters (age, waist circumference, physical activity and family history of diabetes) and subjects were categorized into three group based on it, low risk (IDRS <30), medium risk (IDRS 30-50), high risk (IDRS >60).\(^6\) Random blood sugar of subjects was estimated for pre-diabetics and diabetics, according to American diabetes association criteria.\(^6\)

**Statistical analysis**

Data entry and analysis was done by using SPSS Software (SPSS 20.0 Version). Chi- square ($\chi^2$) and Fishers exact test were used for association of diabetes with various risk factors at the 5 per cent level of significance.

**RESULTS**

In the study, majority of non-teaching staffs were male (78.8 per cent) compared to female (21.2 per cent). Most of participant’s age was in between 30–39 years and majority of them were married. The study population comprised predominantly of hindu and belongs to general categories and consumed mixed diet. According to socioeconomic status of participants, majority of them belonged to class III and class IV. Most of staff had attained secondary level of education (Table 1).

According to personal habits, 47 per cent (235) had bad habits and most of them chewed tobacco followed by alcohol and smoking (Table 2).

According to Asian BMI classification, among study population, 173 (34.6 per cent) was overweight and 40 (8 per cent) were obese (Table 3).

In the study population, overall prevalence of pre diabetics and diabetics was 17.0 per cent and 5.0 per cent. Both the prevalence of pre diabetes and diabetes was more in males (18.8 per cent) and 25 (6.3 per cent) compared to females. Prevalence of diabetes was more (13.7 per cent) in elderly age group (50–59 years) and pre diabetes was more (27.5 per cent) age group 40-49 years.

Table 4 described the association of diabetes prevalence with biosocial characteristics and risk factors.

| Categories                | Frequency | Percentage |
|---------------------------|-----------|------------|
| Age group in years        |           |            |
| 20-29                     | 117       | 23.3       |
| 30-39                     | 157       | 31.4       |
| 40-49                     | 131       | 26.2       |
| 50-59                     | 95        | 19         |

**Table 1: Distribution of respondent according to socio-demographic profile and IDRS.**

Table 2: Distribution of study subjects by type of personal habits: (n=235).

| Habits                  | No of subjects | %  |
|-------------------------|----------------|----|
| Tobacco Consumption     | 96             | 19.2|
| Smoking                 | 19             | 3.8 |
| Alcohol                 | 74             | 14.8|
| Alcohol+ Smoking        | 9              | 1.8 |
| Alcohol+ Tobacco        | 37             | 7.4 |
| No habits               | 265            | 53  |

Table 3: Distribution of study subjects by BMI: (Asian standards).

| BMI                     | Frequency | %  |
|-------------------------|-----------|----|
| <17.5 (underweight)     | 24        | 4.8 |
| 17.5-22.99 (normal weight)| 263        | 52.6|
| 23.0-27.99 (overweight) | 173       | 34.6|
| ≥28 (obesity)           | 40        | 8   |
| Total                   | 500       | 100 |

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| Biosocial characteristics | Normal (%) | Pre diabetes | diabetes | Statistical value |
|--------------------------|------------|--------------|----------|-------------------|
| **Age in years**         |            |              |          |                   |
| 20-29                    | 106(90.6)  | 11(9.4)      | 0        |                   |
| 30-39                    | 137(87.3)  | 16(10.2)     | 4(2.5)   | Fisher exact test=48.540 df=6 P= <0.001 |
| 40-49                    | 87(66.4)   | 36(27.5)     | 8(6.1)   |                   |
| 50-59                    | 60(63.2)   | 22(23.2)     | 13(13.7) |                   |
| **Genders**              |            |              |          |                   |
| Male                     | 295(74.9)  | 74(18.8)     | 25(6.3)  | Yates corrected χ² = 12.526 df=2 P=0.002 |
| Female                   | 95(89.6)   | 11(10.4)     | 0        |                   |
| **Religion**             |            |              |          |                   |
| Hindu                    | 360(76.9)  | 83(17.7)     | 25(5.3)  | Fisher exact test=4.409 df=2 P=0.007 |
| Muslim and other         | 30(93.8)   | 2(6.2)       | 0        |                   |
| **Categories**           |            |              |          |                   |
| SC/ST                    | 52(75.4)   | 12(17.4)     | 5(7.2)   | χ²=2.781 df=4 P=0.595 |
| OBC                      | 126(81.8)  | 21(13.6)     | 7(4.5)   |                   |
| General                  | 212(76.5)  | 52(18.8)     | 13(4.7)  |                   |
| **Education**            |            |              |          |                   |
| Illiterate               | 57(81.4)   | 13(18.6)     | 0        | Fisher exact test=8.061 df=6 P=0.283 |
| Primary                  | 64(83.1)   | 9(11.7)      | 4(5.2)   |                   |
| Secondary                | 166(76.1)  | 37(17)       | 15(6.9)  |                   |
| Graduate                 | 103(76.3)  | 26(19.3)     | 6(4.4)   |                   |
| **SEC**                  |            |              |          |                   |
| I                        | 10(52.6)   | 4(21.1)      | 5(26.3)  | Fisher exact test=14.949 df=6 P=<0.001 |
| II and III               | 197(77.6)  | 46(18.1)     | 11(4.3)  |                   |
| IV                       | 158(81.9)  | 27(14)       | 8(4.1)   |                   |
| V                        | 25(73.5)   | 8(23.5)      | 1(2.9)   |                   |
| **Risk factors**         |            |              |          |                   |
| Type of diet             |            |              |          |                   |
| Vegetarian               | 103(71)    | 35(24.1)     | 7(4.8)   | χ²=7.403 df=2 P=0.025 |
| Mixed                    | 28(80.8)   | 5(14.1)      | 18(5.1)  |                   |
| Smoking                  |            |              |          |                   |
| No                       | 376(78.2)  | 83(17.3)     | 22(4.6)  | χ²=5.132 df=2 P=0.077 |
| yes                      | 14(73.7)   | 2(10.5)      | 3(15.8)  |                   |
| Tobacco chewing          |            |              |          |                   |
| No                       | 325(80.4)  | 65(16.1)     | 14(3.5)  | χ²=12.552 df=2 P=0.002 |
| yes                      | 65(67.7)   | 20(20.8)     | 11(11.5) |                   |
| Alcohol                  |            |              |          |                   |
| No                       | 336(78.9)  | 71(16.7)     | 19(4.5)  | χ²=2.148 df=2 P=0.342 |
| Yes                      | 54(73)     | 14(18.9)     | 6(8.1)   |                   |
| Tobacco+ Alcohol         |            |              |          |                   |
| No                       | 366(79)    | 74(16)       | 23(5)    | Yates corrected χ² = 4.706 df=2 P=<0.095 |
| Yes                      | 24(64.9)   | 11(29.7)     | 2(5.4)   |                   |
| BMI                      |            |              |          |                   |
| <17.5(underweight)       | 24(100)    | 0            | 0        | Fisher exact test=56.223 df=6 P=<0.001 |
| 17.5-22.99(normal)       | 232(88.2)  | 25(9.5)      | 6(2.3)   |                   |
| 23.0-27.99(overweight)   | 115(66.5)  | 44(25.4)     | 14(8.1)  |                   |
| ≥28(Obesity)             | 19(47.5)   | 16(40)       | 5(12.5)  |                   |
| Waist hip ratio          |            |              |          |                   |
| Male                     |            |              |          |                   |
| <0.9                     | 91(89.2)   | 8(7.9)       | 3(2.9)   | Yates corrected χ² = 9.633 Df=2 P=0.008 |
| ≥0.9                     | 299(75.1)  | 77(19.3)     | 32(5.5)  |                   |
| <0.85                    | 20(100)    | 0            | 0        | Yates corrected χ² = 1.139 Df=1 P=0.286 |
| ≥0.85                    | 370(77.1)  | 85(17.7)     | 25(5.2)  |                   |
| Female                   |            |              |          |                   |
| <0.9                     | 299(75.1)  | 77(19.3)     | 32(5.5)  |                   |
| ≥0.9                     | 20(100)    | 0            | 0        |                   |
| ≤30                      | 152(92.7)  | 12(7.3)      | 0        | Yates corrected χ² = 58.289 Df=4 P=<0.001 |
| 30-50                    | 159(80.3)  | 30(15.2)     | 9(4.5)   |                   |
| ≥60                      | 79(57.2)   | 43(31.2)     | 16(11.6) |                   |

**DISCUSSION**

In the present study, the overall prevalence of pre-diabetes and diabetes was 17 percent and 5 percent. Similar result was found with the study conducted among the employees in University hospital, Thailand during 2009, where the overall prevalence of diabetes among University staffs was 6.5 percent.7 Prevalence of diabetes was more (13.7 percent) in elderly age group (50–59 years) and pre-diabetic was more (27.5 percent) in age group 40–49 which is significant (p =<0.001). The result of our study were similar to National survey of diabetes that was conducted in six major cities of India in 2000, where the prevalence of diabetes mellitus among population age more than 40 years were (15.5).8 In present study, the prevalence of diabetes among higher class (class-I) was 26.3 per cent which is similar to the study done by National urban diabetes survey in 2000.
where the prevalence of diabetes among higher income group were (21.6 percent). In present study, the prevalence of diabetes were more among individual who smoke (15.8 percent) and chew tobacco (11.5 percent), which comparatively high in our study. The prevalence among alcohol consumers was slightly less (8.1 percent) in compared to them. The similar prevalence (8.64 per cent) of diabetes was seen among alcohol drinkers in the study conducted selected institution at Bishoftu Town, Eastshoa, Ethiopia in 2012. In present study population, the prevalence of pre diabetic and diabetic among subjects who had family history of diabetic was 23 (29.1 percent) and 2 (2.5 percent). The study conducted in Rural central Kerala in 2007 done showed the prevalence among diabetic who had family history of diabetic was 24.2 per cent which is different from our study. In present study, the prevalence of diabetes among obese (BMI ≥28) participant were 12.5 per cent, which is similar with study conducted in one of the administrative Blocks of Central Kashmir in 2011, where the prevalence of diabetes was 14.37 per cent among obese. In present study 138 (27.6 percent) had high IDR 5 and 198 (39.6 percent) had medium IDR 3. The prevalence of diabetes among who had IDR 5 high (≥60) was 11.6 per cent and 31.2 per cent were pre-diabetic who had medium IDR 3 (30-50). Similar study was conducted by Pondicherry Institute of Medical Science in 2007, where the 76.47 per cent participants had high IDR 3.

CONCLUSION

The present study showed that the prevalence of pre diabetics and diabetes was more among males’ non-teaching staff in compared to females’ non-teaching staff in the medical college in age group between 50-59 years. Prevalence was more in higher socioeconomic class. The risk factors like bad habits, family history, waist hip ratio (≥ 0.9 in males and ≥0.85 in females), BMI (≥28) and IDR (≥60) all attributed to the high prevalence of pre-diabetic as well as diabetes. The present study showed the significance association of Type 2 diabetes mellitus with age, sex, family history, mixed diet, tobacco chewing, waist hip ratio (Males), BMI and with IDR 3.

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