



## Case Control Study Regarding Substance Abuse On Maturity Onset Diabetes

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### Abstract

**Introduction:** Type 2 diabetes patients have twice more odds of mortality due to cardiovascular disease and micro-vascular complications distressing the eyes, kidneys and nerves especially if left untreated. According to GATS -2, India, 2016-2017<sup>3</sup>, 10.7% of adults in India are tobacco smokers in any form and also by NFHS-5 18.8% men and 1.3% were drinking alcohol. The objective of the study is to analyze association between Maturity onset diabetes with Substance abuse

**Methodology:** the whole study comprised of 400 patients including 200 cases with type 2 diabetic (either elevated blood sugar level or on medication) and 200 non-diabetic patients serving as control of age group range from 30 to 80 years were selected. Socio-demographic and data concerning tobacco and alcohol intake was collected

**Results:** maximum number of cases and controls belong to age group 30-40 years. More diabetic patients smoke than controls. In both diabetic and control group male tends to be significantly smoking more than females. More Diabetic subjects were consuming alcohol than controls.

**Conclusion:** As there is significant predominance of smoking and alcohol in males than females, male patients in India should be more approached in health care centers for de-addiction programs.

**Keywords:** Diabetics; Tobacco; Alcohol; Anemia

### Introduction

The type 2 diabetes is increasing, it is estimated that the total number of diabetic persons will increase from 171 million in 2000 to 366 million by 2030.<sup>1,2</sup> The number of hypertensive adults is predicted to increase by 60% to a total of 1.56 billion people by 2025.<sup>3</sup> Hypertension marks approximately 70% of patients with diabetes and is roughly twice as common in persons with diabetes as in those without.<sup>4</sup>

Diabetes can be easily said to be a pandemic or going to be one in future.<sup>5</sup> Obesity and/or dyslipidemia

work together in the pathophysiology and complications of type 2 diabetes.<sup>6</sup>

According to a study by ICMR (2023) in 31 states of India among individuals 20 years and old, prevalence of diabetes in India was found to be 11.4% and 15.3% are prediabetic. 28.6 % population is generalized obese, 39.5% are abdominal obese and 81.2% suffering from dyslipidemia.<sup>7</sup>

Type 2 diabetes patients have 2 times more chances of mortality from cardiovascular disease and microvascular complications affecting the eyes, kidneys and nerves especially if not treated timely.<sup>8</sup>

According to GATS -2, India, 2016-2017, 10.7% of adults in India are tobacco smokers in any form, of which 19 % men and 2% are women.<sup>9</sup> According to NFHS-5, 2019-21, percentage males of age more than or equal to 15 years consuming tobacco in any form was 38% and females was 8.9% also according to NFHS-5 18.8% men and 1.3% women of age more than or equal to 15 years were consuming alcohol in India.<sup>10</sup>

NFHS-5 data highlights that 13.5% females and 15.6 % adult males of age more than or equal to 15 years have either high or very high blood sugar (>140 mg/dl) or taking medicine to control blood sugar level. Similarly, 21.3% females and 24.0% adult males of age more than or equal to 15 years have either elevated blood pressure (Systolic  $\geq$ 140 mm of Hg and/or Diastolic  $\geq$ 90 mm of Hg) or taking medicine to control blood pressure.<sup>10</sup>

The objective of the study is to analyze association between Maturity onset diabetes with Substance abuse.

**Methodology:**

The study was performed in Department of Biochemistry, in Goldfield Medical College,

Faridabad, Haryana and the project was approved by Geetanjali medical College, Geetanjali University, Udaipur, Rajasthan India. According to ADA [2006], the whole study comprised of 400 patients including 200 cases with type 2 diabetic (either elevated blood sugar level or on medication) and 200 non-diabetic patients serving as control of age group range from 30 to 80 years were selected.<sup>11</sup>

Formula used to determine the sample size  

$$N = \frac{(1.96 + 0.8413)^2 \cdot 0.50(1 - 0.50)}{(0.10)^2} = 196 \text{ (approx)}$$

Where  $Z_{\alpha/2} = 1.96$  be confidence level at 95%  
 $Z_{1-\beta} = 0.8413$  be power of test be 80%  
 Proportion (P) = 50%; Allowable error (E) = 10%

Written consents were taken from all the participants. Extremely sick and debilitated patients were not included in the study. The data was entered, cleaned and coded in Microsoft excel and was to Statistical package for social sciences (SPSS) ver. 20.0 for analysis.

**Results:**

Overall, 48% of the patients were males and 52% of the patients were females.

**Table 1: Age Wise Distribution of Cases and Controls**

| Age Group | Diabetic patients (%) | Control group (%) | Total (%)  |
|-----------|-----------------------|-------------------|------------|
| 30-40     | 60(30.0%)             | 60(30.0%)         | 120(30.0%) |
| 40-50     | 56(28.0%)             | 54(27.0%)         | 110(27.5%) |
| 50-60     | 43(21.5%)             | 33(16.5%)         | 76(19.0%)  |
| 60-70     | 21(10.5%)             | 25(12.5%)         | 46(11.5%)  |
| 70-80     | 20(10.0%)             | 28(14.0%)         | 48(12.0%)  |
| Total     | 200(100%)             | 200(100%)         | 400(100%)  |

The uppermost figure of diabetic patient as well as in the control group were in the age group of 30-40 years (30%) where minimum number of patients in the controls and cases were between 60-70 years and 70-80 years of age.

**Table 2: Distribution of Study Subjects According to Smoking Status**

| Smoking | Diabetic patients (%) | Control group (%) | Total (%)   | $\chi^2$ - value | p-value |
|---------|-----------------------|-------------------|-------------|------------------|---------|
| Yes     | 90 (45%)              | 76 (38%)          | 166 (41.5%) | 1.740            | 0.187   |
| No      | 110 (55%)             | 124 (62%)         | 234 (58.5%) |                  |         |
| Total   | 200 (100%)            | 200 (100%)        | 400 (100%)  |                  |         |

More diabetic patients smoke than controls but this finding is not significant statistically.

**Table 3: Gender Wise Distribution of Smokers among Cases and Controls**

| Smoking         | Diabetic patients |              | Total (%)  | $\chi^2$ value | P Value |
|-----------------|-------------------|--------------|------------|----------------|---------|
|                 | Male (%)          | Female (%)   |            |                |         |
| Yes             | 83 (83.84%)       | 7 (6.93%)    | 90 (45%)   | 116.39         | <0.001  |
| No              | 16 (16.16%)       | 94 (93.07%)  | 110 (55%)  |                |         |
| Total           | 99 (100%)         | 101 (100%)   | 200 (100%) |                |         |
| <b>Controls</b> |                   |              |            |                |         |
| Yes             | 75 (80.65%)       | 1 (0.93%)    | 76 (38%)   | 130.82         | <0.001  |
| No              | 18 (19.35%)       | 106 (99.07%) | 124 (62%)  |                |         |
| Total           | 93 (100%)         | 107 (100%)   | 200 (100%) |                |         |

In both diabetic and control group male tends to be significantly smoking more than females.

**Table 4: Gender Wise Distribution of Smokers among Males and Females**

| Smoking        | Male          |              | Total (%)   | $\chi^2$ value | P Value |
|----------------|---------------|--------------|-------------|----------------|---------|
|                | Diabetics (%) | Controls (%) |             |                |         |
| Yes            | 83 (83.84%)   | 75 (80.65%)  | 158 (82.3%) | 0.335          | 0.56    |
| No             | 16 (16.16%)   | 18 (19.35%)  | 34 (17.7%)  |                |         |
| Total          | 99 (100%)     | 93 (100%)    | 192 (100%)  |                |         |
| <b>Females</b> |               |              |             |                |         |
| Yes            | 7 (6.93%)     | 1 (0.93%)    | 8 (3.8%)    | 5.05           | 0.025   |
| No             | 94 (93.07%)   | 106 (99.07%) | 200 (96.2%) |                |         |
| Total          | 101 (100%)    | 107 (100%)   | 208(100%)   |                |         |

Diabetic males were found to be smoking more than control group but diabetic females were significantly smoking more than control group females.

**Table 5: Distribution of Study Subjects According to Alcohol Status**

| Alcohol | Diabetic patients (%) | Control group (%) | Total (%)   | $\chi^2$ value | P Value |
|---------|-----------------------|-------------------|-------------|----------------|---------|
| Yes     | 113 (56.5%)           | 101 (50.5%)       | 214 (53.5%) | 1.216          | 0.270   |
| No      | 87 (43.5%)            | 99 (49.5%)        | 186 (46.5%) |                |         |
| Total   | 200 (100%)            | 200 (100%)        | 400 (100%)  |                |         |

More Diabetic subjects were consuming alcohol than controls but non-significantly

**Table 6: Gender Wise Distribution of Alcohol Consumers among Cases and Controls**

| Alcohol              | Diabetic Patients |             | Total (%)   | $\chi^2$ value | p- Value |
|----------------------|-------------------|-------------|-------------|----------------|----------|
|                      | Male (%)          | Female (%)  |             |                |          |
| Yes                  | 73 (73.74%)       | 40 (39.6%)  | 113 (56.5%) | 22.332         | <0.001   |
| No                   | 26 (26.26%)       | 61 (60.4%)  | 87 (43.5%)  |                |          |
| <b>Total</b>         | 99 (100%)         | 101 (100%)  | 200 (100%)  |                |          |
| <b>Control Group</b> |                   |             |             |                |          |
| Yes                  | 68 (73.12%)       | 33 (30.84%) | 101 (50.5%) | 33.904         | <0.001   |
| No                   | 25 (26.88%)       | 74 (69.16%) | 99 (49.5%)  |                |          |
| <b>Total</b>         | 93 (100%)         | 107 (100%)  | 200 (100%)  |                |          |

Both diabetic as well as Control males and were found to be consuming alcohol significantly more than females.

**Table 7: Gender Wise Distribution of Alcohol status among Males and Females**

| Alcohol status | Male          |              | Total (%)  | $\chi^2$ value | P Value |
|----------------|---------------|--------------|------------|----------------|---------|
|                | Diabetics (%) | Controls (%) |            |                |         |
| Yes            | 73 (51.8%)    | 68 (42.2%)   | 141(100%)  | 0.009          | 0.92    |
| No             | 26 (51.0%)    | 25 (49.0%)   | 51 (100%)  |                |         |
| <b>Females</b> |               |              |            |                |         |
| Yes            | 40 (54.8%)    | 33 (45.2%)   | 73 (100%)  | 1.75           | 0.18    |
| No             | 61 (45.2%)    | 74 (54.8%)   | 135 (100%) |                |         |

Both Diabetic males and females were found to be consuming alcohol more than control group though non-significantly.

**Table 8: Association of Past/ Present History of Disease within Diabetic and Control Group smokers**

| Disease history | Smoking subjects |              |               | $\chi^2$ value | p-value |        |
|-----------------|------------------|--------------|---------------|----------------|---------|--------|
|                 |                  | Diabetic(90) | Controls (76) |                |         | Total  |
| Anemia          | Yes              | 64 (71.11%)  | 40 (52.63%)   | 104            | 27.2    | <0.001 |
|                 | No               | 26 (28.89%)  | 36 (47.37%)   | 62             |         |        |
| Hypertension    | Yes              | 37 (47.11%)  | 55 (72.37%)   | 92             | 16.3    | <0.001 |
|                 | No               | 53 (52.89%)  | 21 (27.63%)   | 74             |         |        |

**Table 9: Association of Past/ Present History of Disease within Diabetic and Control Group Alcoholics**

| Disease history | Alcoholic subjects |               |                | $\chi^2$ value | p-value |       |
|-----------------|--------------------|---------------|----------------|----------------|---------|-------|
|                 |                    | Diabetic(113) | Controls (101) |                |         | Total |
| Anemia          | Yes                | 82 (72.57%)   | 62 (61.39%)    | 144            | 3.029   | 0.082 |

|              |     |             |             |     |       |              |
|--------------|-----|-------------|-------------|-----|-------|--------------|
|              | No  | 31 (27.43%) | 39 (38.61%) | 70  |       |              |
| Hypertension | Yes | 52 (46.02%) | 65 (64.36%) | 117 | 7.238 | <b>0.007</b> |
|              | No  | 61 (53.98%) | 36 (35.64%) | 97  |       |              |

When compared with smoking diabetic and control subjects, anemia was found significantly more in diabetic group and hypertension significantly more in control group, while in alcoholic anemic subjects though it was more in diabetics but was not statistically significant but the hypertension was significantly more in control group similar to smoking subjects.

**Discussion:**

There was no significant difference among the cases and controls on the basis of smoking as depicted in table 2, but there was a significant male predominance in smoking as compared to females in both case and control group. This trend is in coherence with the data of GATS-2.<sup>9</sup> Also there was no difference among the males in the cases and the controls when the smoking status was evaluated but the difference was significant in females with diabetic females having more smokers.

There was no significant difference among the cases and controls on the basis of alcohol consumption as depicted in table 5, but there was a significant male predominance as compared to females in both case and control group. This tendency is in consistent with the data of GATS- 2 and NFHS-5.<sup>9,10</sup> Also there was no significant difference among the males and females in the cases and the controls when the alcohol consumption status was evaluated.

There was no significant difference among the study subjects on the basis of alcohol consumption i.e. the higher number of male alcohol consumers as compared to females among cases (diabetic group) is not significantly different from the higher number of male alcohol consumers as compared to females among the controls. However, when separately the alcohol status among the cases and controls with regard to gender is done the, the alcohol consuming proportion were predominantly males and this was much higher as compared to females and the difference was significant. This observation could be explained on the fact that overall more males are exposed to alcohol consumption as compared to

females which may be due to many societal or behavioral reasons or working profile, etc. This is in consistency with the WHO fact sheet data of India which reports a higher number of male consumers of alcohol as compared to females overall in the general population among adult subjects irrespective of the disease presence or absence.<sup>12</sup>

Anemia was found more in diabetics than non-diabetics in both smoking and alcohol consuming group. These findings are indirectly in coherence with a study by Coban E et al according to which among the subjects with Iron deficiency anemia there was a higher mean HbA1c level as compared to the subjects with no anemia; this finding can also be deduced that in diabetic there is a higher prevalence of anemia as compared to non-diabetic.<sup>13</sup>

On contrary hypertension was found more in controls in both smoking and alcohol consuming group. This may be due to diabetes and hypertension coexisting together in same person more often similar to study.<sup>14</sup>

**Conclusion:**

As there is significant predominance of smoking and alcohol in males than females, male patients in India should be more approached in health care centers for de-addiction programs.

Also Anemia was found more in diabetics than non-diabetics in both smoking and alcohol consuming group which means that diabetic patients should always be screened of anemia.

**References:**

1. Wild, S., Roglic, G., Green, A., Sicree, R., & King, H. (2004). Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes care*, 27(5), 1047–1053. <https://doi.org/10.2337/diacare.27.5.1047>
2. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. *Australas Med J*. 2014 Jan 31;7(1):45-8. doi:

- 10.4066/AMJ.2013.1979. PMID: 24567766; PMCID: PMC3920109
3. Petrie JR, Guzik TJ, Touyz RM. Diabetes, Hypertension, and Cardiovascular Disease: Clinical Insights and Vascular Mechanisms. *Can J Cardiol.* 2018 May;34(5):575-584. doi: 10.1016/j.cjca.2017.12.005. Epub 2017 Dec 11. PMID: 29459239; PMCID: PMC5953551.
  4. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. *Nat Rev Nephrol.* 2020 Apr;16(4):223-237. doi: 10.1038/s41581-019-0244-2. Epub 2020 Feb 5. PMID: 32024986; PMCID: PMC7998524.
  5. Zhang S, Sun D, Qian X, Li L, Wu W. Combined Effects of Obesity and Dyslipidaemia on the Prevalence of Diabetes Amongst Adults Aged  $\geq 45$  Years: Evidence from a Nationally Representative Cross-Sectional Study. *Int J Environ Res Public Health.* 2022 Jun 30;19(13):8036. doi: 10.3390/ijerph19138036. PMID: 35805693; PMCID: PMC9266151.
  6. Tabish SA. Is Diabetes Becoming the Biggest Epidemic of the Twenty-first Century? *Int J Health Sci (Qassim).* 2007 Jul;1(2):V-VIII. PMID: 21475425; PMCID: PMC3068646.
  7. Anjana et.al. Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17). *The Lancet Diabetes and endocrinology.* 2023 Jul;11(7): 474-489. doi:https://doi.org/10.1016/S2213-8587(23)00119-5
  8. Martín-Timón I, Sevillano-Collantes C, Segura-Galindo A, Del Cañizo-Gómez FJ. Type 2 diabetes and cardiovascular disease: Have all risk factors the same strength? *World J Diabetes.* 2014 Aug 15;5(4):444-70. doi: 10.4239/wjd.v5.i4.444. PMID: 25126392; PMCID: PMC4127581.
  9. India Global Adult Tobacco Survey (GATS) 2016-17. Centers for Disease Control and Prevention (CDC).
  10. COMPENDIUM OF FACT SHEETS. National Family Health Survey (NFHS-5) 2019-21. Government of India. Ministry of Health and Family Welfare.
  11. American Diabetes Association; Standards of Medical Care in Diabetes—2006. *Diabetes Care* 1 January 2006; 29 (suppl\_1): s4–s42. https://doi.org/10.2337/diacare.29.s1.06.s4
  12. World Health Organisation. WHO Factsheet on Alcohol. May 2022.
  13. Coban E, Mustafa O and Aysen T. Effect of Iron Deficiency Anemia on the Levels of Hemoglobin A1c in Nondiabetic Patients. *Acta Haematol* (2004) 112 (3): 126–128. https://doi.org/10.1159/000079722.
  14. Nagao T, Nogawa K, Sakata K, Morimoto H, Morita K, Watanabe Y, Suwazono Y. Effects of Alcohol Consumption and Smoking on the Onset of Hypertension in a Long-Term Longitudinal Study in a Male Workers' Cohort. *Int J Environ Res Public Health.* 2021 Nov 10;18(22):11781. doi: 10.3390/ijerph182211781. PMID: 34831535; PMCID: PMC8619602.