

Prevalence of Diabetes Mellitus And Risk Factors Among The Employees of N.P.D.C.L.Warangal

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Abstract

Introduction: Diabetes mellitus, a lifelong disease is achieving pandemic proportions. Even in India its prevalence is on the rise making our country the diabetic capital of the world. Many studies have found that sedentary lifestyle and increased stress are risk factors for diabetes. The job of NPDCL employees is both sedentary in nature and accompanies high levels of stress. With this background the present study was conducted with the following objective.

Objective: To assess the prevalence of diabetes mellitus and risk factors among the employees of NPDCL

Methodology: A Cross-sectional study was conducted and all the employees (n=310) of NPDCL, warangal were studied. Along with collecting information about their demographic characteristics, their weight, height, blood pressure, random blood sugar was measured and recorded. Data was analyzed by SPSS 17.0 for Windows. Statistical test employed was Chi-square test for proportions.

Results: Prevalence of diabetes mellitus was found to be 16.5%. The prevalence among males 18.5%, female 5.9% which was statistically significant. Diabetes was significantly associated with age >40 years, high socio economic status, waist hip ratio, body mass index (BMI), and hypertension. The findings of the present study highlight the high disease burden among NPDCL employees.

Conclusion: It is therefore strongly suggested that all NPDCL employees especially above 40 years of age should be put on high-risk approach for the secondary prevention of diabetes.

Keywords: diabetes, NPDCL(Northern Power Distribution Company Limited) employees, prevalence, BMI, hypertension

I. Introduction

Diabetes Mellitus, long back considered a disease of minor significance to World Health, is now emerging as one of the main threats to human health in the 21st century.¹ The past two decades have seen an explosive increase in the number of people diagnosed with diabetes worldwide. The world health organization (WHO) estimated that there were 135 million diabetics in 1995 and this number would increase to 300 million by year 2025.² The prevalence of diabetes is steadily increasing worldwide particularly in developing countries. There were an estimated 84 million persons with diabetes in the developing world in 1995. The Indian subcontinent accounted for a quarter of them, this number is likely to increase three folds to 226 million by the year 2025. India currently has the world largest diabetic population with an estimated 19.4 million people. This is expected to be 57.2 million by 2025. Hyderabad is the diabetic capital of the country with every sixth person being diabetic³ prevalence 16.6%.

Diabetes is now considered a vascular disease. Diabetes affects large blood vessels (cardiac, cerebral and peripheral arteries) small vessels (kidney and retina), nerves and other organs. Micro vascular and macro vascular diseases cause considerable mortality and morbidity among diabetics. Diabetes can affect nearly every organ system in the body, it can cause blindness, lead to end stage renal disease, lower extremity amputations, and increased the risk for stroke, ischemic heart disease, peripheral vascular disease and neuropathy, This is causing great concern since the cost of treating diabetes is becoming a serious drain on health resources.⁵ In type 2 diabetes mellitus the risk of some of these complication (eg. Coronary artery disease), may start even before the onset of diabetes. Diabetes are 25 times more likely to develop blindness, 17 times more likely to develop kidney disease, 30-40 times likely to undergo a major amputation, 2-4 times chances of developing myocardial infarction and two times chance of stroke with diabetes.^{6,7,8}

Non Insulin Dependent diabetes Mellitus (NIDDM) Constitutes about 85-90% of all diabetes in developed countries but it accounts for virtually all diabetes in developing countries. NIDDM is now a common and serious global health problem, which for most countries, has evolved in association with rapid social and cultural changes, ageing populations, increasing urbanization, dietary changes, reduced physical activity, and unhealthy lifestyle and behavioural patterns of modern societies^{9,21}.

For the developed countries, the oldest age group (65 years+) has the largest number of people with diabetes and will experience the greatest increase in numbers by 2025. However for developing countries, the largest number people with diabetes is found in the 45-64 years' age group and this tendency will accentuate markedly by the year 2025 (WHO, 1999).²² Thus greater number of middle-aged persons with diabetes in developing countries has to endure the condition during the most productive period of their lives and will have many more years to develop its costly and disabling chronic complications.

In the 1970s, reports of migrant Asian Indians living in different parts of the world showed that they had a higher prevalence of diabetes than other ethnic groups living in the same countries. This was attributed to changes in environmental factors, such as increased affluence, which unmasks a genetic or racial tendency for diabetes.²³ Evidence showing that Indian migrants have a high tendency to develop diabetes led to national studies in India^{24,25}

II. Material And Methods

Method of collection of data: For the present study permission was taken from CMD of the NPDCL to conduct the research work. In research work in their corporate office by putting of forth a letter forwarded by HOD, Department of Community Medicine Kakatiya Medical College. Later notice was displayed in the NPDCL office. Four weeks after informing the employees the study was conducted.

Definition: A patient or person described as suffering from Diabetes Mellitus, if he had been diagnosed by the physician or qualified doctors or was on treatment for diabetes. In the study employees where whose RBS 200 mg for Diabetes Mellitus with symptoms was considered to be diabetic patient as per the recently notified diagnostic Criteria (ADA)⁷⁵.

Procedure ; the random blood sugar level was determined and the prevalence of Diabetes Mellitus estimated by using cut of level of 200mgs. Known diabetics under treatment were classified under diabetics category irrespective of their screening test results. The index finger was cleaned, dried and pricked with a sterilized pricker. Blood was allowed to collect, the first few drops were wiped off gently after which the glucose strip was inserted and the reading was noted. the data was analyzed and necessary statistical applications.

Material : A cross sectional study was conducted from June 2012 to January 2013. The study included 310 members of NPDCL corporate office. The employees were asked to fill a questionnaire after which their anthropometric measurements were taken then RBS samples collected Blood pressure was measured by Sphygmomanometer in sitting posture.

Study variables:

1. Demographic characteristic profile like age, gender, marital status and literacy status.
2. Socio economic status variables.
3. Anthropometric measurements
4. Diet History

Inclusion Criteria:

1. Employees aged above 21 years and bellow 60 years.
2. Employees who are willing to participate.
3. Employees who have given their consent

Exclusion Criteria:

1. Above the age group 60years are not there.
2. Employees who did not give written consent.
3. Some of Employees who went to field.
4. Some employees who are not willing to participate.

Methods :

1. A pretested questionnaire was used to interview the employees.
2. Height was measured with stadiometer.
3. Weight was measured with weighing machine.
4. Blood pressure was measured using a mercury sphygmomanometer.

5. Waist and hip circumference was measured using a measuring tape.
6. RBS was done by using Glucometer.

Study variables:

1. Socio demographic variable like age, gender, marital status, religion, socio economic status and type of family.
2. Personal habits variable like smoking, alcohol consuming.
3. Diet history variable vegetarian and mixed.

Questionnaire

A detail pretested, precoded and pre designed questionnaire was used having necessary information regarding study.

Results

Table 1: Sex Wise Distribution Of Diabetes Mellitus

| Sex | Dm present | Dm absent | Total | Percentage |
|--------|------------|-----------|-------|------------|
| Male | 48 | 211 | 259 | 83.5 |
| Female | 03 | 48 | 51 | 16.5 |
| Total | 51 | 259 | 310 | 100.0 |

$X^2=4.961$ Df= 1 P=<0.050

Table 2: distribution of diabetes according to per capita income (bg prasad classification).

| Per capita income for month | Dm present | Dm absent | Total |
|-----------------------------|------------|-----------|-------|
| 5156 and above | 41 | 135 | 176 |
| 2578-5156 | 6 | 74 | 80 |
| 1547-2577 | 4 | 37 | 41 |
| 775-1546 | 0 | 13 | 13 |
| Total | 51 | 259 | 310 |

$X^2= 14.55$ df=3 p<0.002

Table 3: Smoking In Relationship With Diabetes Mellitus

| Smoking | Dm present | Dm absent | Total |
|---------|------------|-----------|-------|
| Yes | 11 | 39 | 50 |
| No | 40 | 220 | 260 |
| Total | 51 | 259 | 310 |

$X^2=1.335$ df= 1 p =0.248

Table 4: Alcohol In Relationship With Diabetes Mellitus

| Alcohol | Dm present | Dm absent | Total |
|---------|------------|-----------|-------|
| Yes | 32 | 133 | 165 |
| No | 19 | 126 | 145 |
| Total | 51 | 259 | 310 |

$X^2=2.222$ df=1 p =0.136

Table 5: Exercise Practice In Relationship With Diabetes Mellitus

| Exercise | Dm present | Dm absent | Total |
|----------|------------|-----------|-------|
| Yes | 39 | 139 | 178 |
| No | 12 | 120 | 132 |
| Total | 51 | 259 | 310 |

$X^2=9.062$ df=1 p =0.003

Table 6: Body Mass Index In Relationship With Diabetes Mellitus

| Body mass index | Dm present | Dm absent | Total |
|---------------------|------------|-----------|-------|
| Under weight <18.5 | 0 | 3 | 3 |
| Normal 18.6-24.99 | 19 | 153 | 172 |
| Over weight>25-29.9 | 29 | 84 | 113 |
| Obese>30 | 3 | 19 | 22 |
| Total | 51 | 259 | 310 |

$X^2=11.350$ df=3 p =0.010

Table 7: Family History In Relationship With Diabetes Mellitus

| Family history | Dm present | Dm absent | Total |
|----------------|------------|-----------|-------|
| Father | 12 | 40 | 52 |
| Mother | 10 | 28 | 38 |
| Both | 12 | 20 | 32 |

| | | | |
|-------|----|-----|-----|
| No | 17 | 171 | 188 |
| Total | 51 | 259 | 310 |

$$X^2=22.173 \text{ df}=3 \text{ p}=0.005$$

Table 8: Physical Activity In Relation To Diabetes Mellitus

| Physical activity | Dm present | Dm absent | Total |
|-------------------|------------|-----------|-------|
| Sedentary | 12 | 121 | 133 |
| Moderate | 38 | 124 | 162 |
| Severe | 1 | 14 | 15 |
| Total | 51 | 259 | 310 |

$$X^2=12.16 \text{ df}=2 \text{ p}<0.002$$

Table 9: Waist Hip Ratio In Relationship With Diabetes Mellitus

| Waist hip ratio | DM present | DM absent | Total |
|-----------------|------------|-----------|-------|
| <0.9/0.85 | 35 | 224 | 259 |
| >0.9/0.85 | 16 | 34 | 50 |
| 1 | 0 | 1 | 1 |
| Total | 51 | 259 | 310 |

$$X^2=10.618 \text{ df}=2 \text{ p}=0.005$$

Table 10: Distribution Of Blood Pressure In Relation To Diabetes Mellitus

| Blood pressure | Dm present | Dm absent | Total |
|----------------------|------------|-----------|-------|
| Normal | 1 | 86 | 87 |
| Pre hypertensive | 32 | 123 | 155 |
| Hypertensive stage 1 | 13 | 44 | 57 |
| Hypertensive stage 2 | 5 | 6 | 11 |
| Total | 51 | 259 | 310 |

$$X^2= 25.211 \text{ df}= 3 \text{ p} < 0.001$$

III. Discussion

The Prevalence of diabetes for all age groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The Prevalence of diabetes mellitus in the present study was 16.5% and similar to the findings of previous results are 12.3%, 16.30%, 10.1%, 15%, 16.6% & 16.9%^(50, 32, 51, 61, 3&79). The current study has found a significantly higher prevalence of diabetes mellitus in males (18.53%) when compared to the females (5.88%). The prevalence in Capingana DP, Mangalhaes P, Silva AB et al⁸² (2009 to 2010) is men 5.5% and women 5.9%. The above studies were conducted in different parts of the world and thus the considerable variation were found and may be considerer to ethnic, genetic and life style and environmental changes. In the present study, about 23.3% of diabetes mellitus belongs to upper class, 7.5% were upper middle class and 9.8% were belonging to lower middle class the observed difference between these was statistically significant ($p < 0.002$) the heigh socioeconomic status significantly associated with diabetes mellitus. Several other researchers found that socioeconomic status is directly proportional to development of diabetes mellitus H .A .M.NAZMUL AHASAN MD.BILAL ALAM, MD. TITU MIAH et al⁵⁰ and Ramachandran A, Snehalatha C et al⁸¹. Same finding was observed by Ramachandran A, Snehalatha C et al⁸² Sep,2002 in the same year conducted another study and found that prevalence of diabetes mellitus was more in high income group people which was statistically significant ($p=0.002$).

The association of smoking has directly proportional to diabetes mellitus and association was statistically significant^{60, 52, 83 & 84}. In the present study 22 % were smokers and 15.40% were non smokers. In the study participants 53.2 % (165) were consumed alcohol and 46.8 % (145) were non alcoholics. Among the alcoholics, the prevalence of diabetes was 19.4% and non alcoholic persons the prevalence of diabetes was 13.1%. MAS, Cutter J et al⁸⁴ (2003) and Ramachandra A, Snehalatha C et al⁸² (2002), they found the alcohol consumption significantly associated with diabetes mellitus. Lu W, Jablonski KA et al found that the alcohol consumption did not appear to significantly increase the risk for worsening glucose tolerance. In the present study 21.9% diabetics were practicing exercise and 14.25% were not practicing any exercise. Ramachandran A, Snehalatha C et al⁸² stated that diabetes mellitus indirectly related with the duration of exercise.

Body Mass Index (BMI) is very important tool in the measurement of obesity. The prevalence of diabetes type 2 among normal with BMI >18.4 to 24.5 was among the normal subjects. Those subjects overweight >25 who are having BMI >25 was 25.7% and those who subjects having BMI > 30 (13.6%). Chi square test showed that the findings were statistically significant. This study is correlated with other studies^{51, 50, 84 & 85}.

Out of 51 diabetics, 12 (23.1%) people were giving family history of father having diabetes, about 10 (26.3%) were giving history of mother having diabetes and lastly 12 (37.5%) people were giving both parents

having diabetes mellitus. This finding was correlated with De Silva SN, Weerasuria N et al and Oneymer KU, Lipton RB et al⁸⁶ conducted a study in Chicago and concluded that a positive parenteral history of diabetes appears to be more strongly related to childhood type 2 than type 1 diabetes mellitus. A similar finding was observed with the Ramachandran A, Snehalatha C et al⁸² found that families with apposite family history of diabetes significantly associated with type 2 diabetes mellitus. Ramachandran A, Snehalatha C et al⁸¹ (2002) conducted a study in urban population of cennai and stated that physical activity associated with the diabetes mellitus. Costacou T (Columbia) et al⁸⁷ reviewed that increased level of physical activity would decrease the incidence of type 2 diabetes mellitus. In the present study participants about 9.0 % (12) diabetics from sedentary activity, 23.5% (38) were moderate activity and only 6.7% diabetics were severe activity.

W/H RATIO was the best predictor for type 2 diabetes mellitus. Among the study participants the prevalence of type 2 diabetes those who are having <0.9/0.85 w/h ratio was 13.5 % (35) and those who are having more than >0.9/0.85 was 32.0% (16), the difference between these was statistically significant (P=0.005). The present study was accordance with previous studies^{32& 52}, W/H ratio was significantly associated with type 2 diabetes mellitus. According to the JNC VII criteria: Systolic blood pressure is >140 mm hg considered as the hypertension. In the present study the prevalence of diabetes was those who having normal blood pressure was 1.1% ,120/80-139/89mmhg prehypertensives were 26.0% , 140/90- 159/99mmhg were 22.8% and >160mmhg were 9.8%. D. Prabhakaran, Pankajshah, Vivek Chaturvedi et al⁶¹ study conducted in a large industry of northern India stated that blood pressure associated with the diabetes mellitus. Capingana DP, Magalhaes P, Silva AB et al⁸⁰ study was conducted in prevalence of cardiovascular risk factors among public sector workers in Angola stated that blood pressure associated with the diabetes mellitus.

IV. Conclusions

The research study involved 310 employees of N.P.D.C.L. in urban Warangal who were examined during 6 month period from June 2012 to January 2013.

1. The prevalence of diabetes mellitus in the present study is found to be 16.5% being significantly higher in males (18.5%) compared to that in females (5.88%).
2. Significantly higher prevalence was found with increasing age being highest in 41-50years-25% and 51-60 years- 50% compared to those in other age groups
3. Significantly higher prevalence was found in relation to semiprofessional 24.7% professional 23.5% and semi skilled 22.20%.
4. The proportion of diabetes mellitus was significantly found to be higher in relation to joint family;
5. The association between different age groups and diabetes mellitus was statistically significant and found that as the age advances the prevalence of diabetes also increasing
6. A statistically significant association was observed between the high socio economic status and diabetes mellitus (p<0.01)
7. Physical activity association with the type 2 diabetes mellitus
8. Body mass index was more in Diabetic individuals. BMI was strongly associated with the diabetes mellitus in the study population and the finding was statistically significant (p<0.05)
9. Majority of Diabetics were giving the history of both parents suffered from Diabetes. Family history and Diabetes was statistically significant (p<0.01)
10. More number of Diabetics having waist circumference of W|H Ratio in males 0.95|0.85 and in females >0.85 this association was statistically significant
11. No significant difference in the proportion of diabetes was found with regard smoking and alcohol

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