INTERNATIONAL JOURNAL OF ADVANCES IN PHARMACY, BIOLOGY AND CHEMISTRY

Research Article

An Epidemiological Study and Assessment of Risk Factors of Diabetes Mellitus among Different Age Groups of the Population

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ABSTRACT

Diabetes is a metabolic disorder characterized by insulin secretion, insulin action or both factors which determine the prevalence of diabetes and its manifestations, obesity is on among them. In the present investigation findings reveals that the number of people with diabetes is increasing due to population growth, agingand urbanization and increasing prevalence of obesity and physical in activity. A total of 4565 participants were included in the study from different places of Bhagalpur city. All participants were selected by filling one questionnaire containing all the information regarding themin various medical clinics. A total 1678 males (74.43%) and 1471 females (83.52%) were found normal whereas 510 males (23.57%) and 300 females (15.48%) were reported as diabetic. Diabetic subjects were selected randomly. In normal population 2042(56.8%) subjects were found obese and in diabetic population 670 (73.1%) subjects were obese. Number of male obese was maximum in 45-54 age group in both the population where as number of female obese were maximum in 35-44 age group. Obesity has shown statistically significant association with diabetes.Estimated relative risk of diabetes in chi-square test was found 78.42.

Keywords: Normal and Diabetic Population, Risk Factor, Obesity, Bhagalpur.

INTRODUCTION

Rapid globalization and industrialization has resulted in considerable increase in lifestyle related diseaseslike diabetes. The prevalence of diabetes is rapidly rising all over the globe at an alarming rate (Sridhar and Madhu, 2002).

Over the past three decades the status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity affecting the youth and middle aged people. Diabetes mellitus is projected to affect AshianIndians most among all others in the world by 2030 (Huberta et al, 2007).It has been described as the most complex and demanding of any common chronic disease to manage.The rapid increase in population, increased longevity and high ethnic susceptibility to diabetes, coupled with rapid urbanization and changes from traditional life styles will most likely trigger a diabetes epidemic (Kapur,2007). WHO recently revised its estimates of the person with diabetes in India in 2011 to 32.06 million ,this number is likely to be increased to about 80 million in 2030 (Wild et al,2004). A large number of studies have highlighted that the primordial strategy of diabetes mellitus involved control of lifestyle related risk factors. Like obesity, hypertension, physical in activity, sedentary lifestyle etc. (kapuret al,1997).

The rise in the prevalence of type-2 diabetes and related disorders like obesity and hypertension and metabolic syndrome could be related to the rapid changes in lifestyle that has occurred during the last 5 decades. The risk of diabetes increases with small weight changes at a BMI above 22kg\m^2. Obesity can be measured in term of BMI and WHR. Obesity is

associated with insulin resistance and fat is presumed to secrete potentially diabetogenic factor that can act on distant tissue to induce insulin resistance. The relationship between diabetes and obesity is well established. Several studies have shown that Asian Indians have an increased risk for developing type 2 diabetes and related metabolic abnormalities compared to other ethnic group (Misra et al. 2004 and Chandalia et al, 1999) thus having a greater degree of central obesity and again for any given body fat they have increased insulin resistance (Yajniket al, 2003). Diabetes develops in Indians at very young age at least 10-15 years earlier than white population(Zimmet,1992) Indian show significantly higher age related prevalence when compared with white population in U.S.A. It is shown that risk of diabetes starts to increase at very low level of BMI (Yajnik, 2002). The goal of the study was to estimate the number of obese among different age groups of the normal and diabetic population.

MATERIALS AND METHODS

The present investigation was carried out among the normal and diabetic population of Bhagalpur city. A number of 3959 participantsaged between 10-54 years were examined who attended the various medical camps and O.P.D. of JNMCH hospitals. Performa was prepared incorporating information regarding demographic, anthropometric and clinical data. This included the age, family history of diabetes and details of various life styles related factors. The physical examination emphasized measurement of height, weight, waist and hip circumference. Height, weight, waist and hip circumference was measured in centimeters and weight in kilograms using a calibrated spring balance. The diabetes subjects were selected by applying strip test method. The criteria for diagnosis of diabetes were fasting plasma glucose level more than 126 mg/dl of venous blood. The data thus collected were analyzed by applying chi square test to find out the association of obesity with diabetes to compute obesity body mass index were used.

RESULTS AND DISCUSSION

Table-1 shows the number of subject studied in normal and diabetic population match in according to their age. A total 3149 subjects (79.54%) were found to be normal and 810 subjects (20.45%) were diabetic. Males diabetic were more than female in both groups. A total 1678 males (53.28%) and 1471 females (16.47%) were found normal and 510 males (62.96%) and 300 females (37.04%) were found diabetic (Table 2 and 3). Maximum numbers of male diabetic cases were found in 35 to 44 years age group i.e. (238) 45.66% and maximum female diabetic were found in35 to 44 years age group i.e.(90) 30.00%. Minimum number of diabetics was found in 10 to 24 years age group in both males 12(2.35%) and females8 (2.66%). Table 4 has shown the number of obese in normal and diabetic population and it has been found from the Table-4 that statically significant association existed between diabetic and obesity.

According to Table 5 the number of obese in males were found maximum in 35 to 44 years age group in males and both population (normal558-33.25%, diabetic238-45.66%) while minimum number were 102(6.07%) in normal males of more than 54 years age group and 12(2.35%) in diabetic males of 10 to 24 years age group. Accordingly, Table- 6 has shown the number of females obese in different age groups. Maximum numbers of obese were found in 35 to 44 years age groups (normal648-44.05%, Diabetic90-30.0%). Minimum number of obese was also found in a common age group of more than 54 years in normal 45(3.05%) and diabetic 8(2.66%) females was found in 10-24age group. In the present study it is attempted to find out the prevalence of diabetes mellitus and the prevalence of obesity a risk factor for diabetes. Prevalence of diabetes increases with age. In the present study it is found that highest diabetic in 45 to 54 years age group was 7.6%, while Rao et al(1998) found 4.69% diabetic of 45 to 64 years age group in Rural India. Rabi et al (2006) reported a very high number of diabetic i.e., 27.4% in 51 to 60 years age group during a population based studied. The significant association between obesity and diabetes is clear from the present study. The similar work was reported by Zimmet et al (1992) and Joshi (2003) and according to them obesity has long being accepted as a risk factor for NIDDM and the risk was related to both the duration and degree of obesity (Krishnaveni et al, 2005). Age wise prevalence rate of diabetes and obesity was higher in middle age groups in all population, Deepa et al. (2006) and Mohan et al. 2006 reported the similar observation in their studied.

However age and obesity remainedtobe most significant risk factor for diabetes among the Indian population. With the increase of bothprevalence of diabetes also increases. If the current trend could not be checked India will have the largest number of diabetes cases by 2030 therefore the need of the today is to take crucial preventive measures like life style modification, reduction of body weight increasing physical activity and planned urbanization etc.

Table 1: Age-wise Distribution of normal and diabetic subjects

Age Group	Normal	Diabetic	Total
10-24	321(10.19)	24(2.96)	345(8.71)
25-34	816(25.91)	104(12.83)	920(23.23)
35-44	1120(35.56)	218(26.91)	1338(33.79)
45-54	702(22.29)	331(40.86)	1033(26.09)
More than 55	190(6.03)	133(16.41)	323(8.15)
Total	**3149(79.54)**	**810(20.45)**	**3959**

Values are mean ± S.E.M.,The values in parenthesis is percent value in comparison to total in each group, data were analyzed by two-way ANOVA, ns- not significant, *P<0.05,**P<0.0

Table 2: Age-wise distribution of normal male and female subjects

Age Group	Male	Female	Total
10-24	196(2.35)	105(2.66)	301(9.55)
25-34	342(4.90)	443(30.00)	785(24.92)
35-44	558(30.78)	648(28.66)	1206(38.29)
45-54	480(45.66)	230(23.33)	710(22.54)
More than 55	102(16.47)	45(15.33)	147(4.66)
Total	**1678(53.28)**	**1471(16.47)**	**3149**

Values are mean ± S.E.M.,The values in parenthesis is percent value in comparison to total in each group, data were analyzed by two-way ANOVA, ns- not significant, *P<0.05,**P<0.01.

Table 3: Age-wise distribution of diabetic male and female subjects

Age Group	Male	Female	Total
10-24	12(2.35)	8(2.66)	20(2.46)
25-34	25(4.90)	90(30.00)	115(14.19)
35-44	157(30.78)	86(28.66)	237(29.26)
45-54	238(45.66)	70(23.33)	308(38.02)
More than 55	84(16.47)	46(15.33)	130(16.04)
Total	**510(62.96)**	**300(37.04)**	**810**

Values are mean ± S.E.M.,The values in parenthesis is percent value in comparison to total in each group, data were analyzed by two-way ANOVA, ns- not significant, *P<0.05,**P<0.01.

Table 4: Age-wise distribution of diabetic male and female subjects

Age Group	Normal	Diabetic
Non-obese	1107(35.15)	140(17.28)
Obese	2042(64.84)	670(82.71)
Total	**3149**	**810**

Values are mean ± S.E.M.,The values in parenthesis is percent value in comparison to total in each group, data were analyzed by two-way ANOVA, ns- not significant, *P<0.05,**P<0.01.

Table 5: Age-wise distribution of obesity in normal and diabetic male subjects

Age Group	Control	Diabetic
10-24	196(11.68)	12(2.35)
25-34	342(20.38)	25(4.90)
35-44	558(33.25)	238(45.66)
45-54	480(28.60)	157(30.78)
More than 55	102(6.07)	84(16.47)
Total	**1678**	**510**

Values are mean ± S.E.M. The values in parenthesis is percent value in comparison to total in each group, data were analyzed by two-way ANOVA, ns- not significant, *P<0.05,**P<0.01.

Table 6: Age-wise distribution of obesity in normal and diabetic female subjects

Age Group	Control	Diabetic
10-24	105(7.13)	8(2.66)
25-34	443(30.11)	86(28.66)
35-44	648(44.05)	90(30.00)
45-54	230(15.63)	70(23.33)
More than 55	45(3.05)	46(15.33)
Total	**1471**	**300**

Values are mean ± S.E.M.,The values in parenthesis is percent value in comparison to total in each group, data were analyzed by two-way ANOVA, ns- not significant, *P<0.05,**P<0.01.

CONCLUSION

Age and obesity remained to be most significant risk factor for diabetes among the Indian population. With the increase of both prevalence of diabetes also increases. If the current trend could not be checked India will have the largest number of diabetes cases by 2030 therefore the need of the today is to take crucial preventive measures like life style modification, reduction of body weight increasing physical activity and planned urbanization. Number of male obese was maximum in 45-54 age group in both the population where as number of female obese were maximum in 35-44 age group. Obesity has shown statistically significant association with diabetes. Estimated relative risk of diabetes in chi-square test was found 78.42.

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