

IMPACT OF SEDENTARY LIFESTYLE AND WAIST CIRCUMFERENCE ON PREVALENCE OF TYPE II DIABETES MELLITUS IN REFERENCE TO CENTRAL INDIA

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Abstract- It has been reported that occurrence of diabetes in a late age is linked with over all obesity, lifestyle, eating habits besides genetic constraints. Clinician use to put prime focus on BMI criteria to identify diabetes risk, though waist circumference has not been widely adopted in clinical practice. Recent studies [1] suggest abdominal fat measured by waist circumference can indicate a strong risk for diabetes whether or man considered over weight or obese, according to BMI. It was also observed that in elderly population sedentary lifestyle is the prime factor of diabetes instead of high BMI. Objective of this study to explore the relation (i) between waist circumference and BMI at the onset age (40-50) of diabetes (ii) to examine the impact of sedentary lifestyle in elderly population (50 and above). Study reported majority of cases with higher waist measurement (average 93.4cm in males and 90.3 cm in females) along with normal BMI in age group of 40 to 50 yrs. In case of elderly persons it was observed that their BMI was in normal range still they are severely diabetic and at the same time they were suffering with the related disorders.

Keywords: Type II Diabetes, BMI, Sedentary lifestyle, waist circumference

Introduction

One in eight Indian adult either has or is at the high risk of tolerance. According to the IDF Diabetes Atlas IVth edition India has a second highest number of people with diabetes at 5 crore (50 million) adults. In addition to this (40 million) have impaired glucose tolerance*. Current load of diabetes in India (50 million) is expected to increase by 170 % in the next 20 years.

New Guidelines

- Over weight if the BMI (Body Mass Index) is 23 kg./m² or more. The International standard is 25 kg./m².
- Obese if the BMI is 25 kg./m² or more as opposed to 30 kg./m². as international standard..
- An Indian Needs drug therapy for obesity if BMI is 25 kg./m²
- An Indian qualifies for bariatric surgery for obesity if the BMI is 32.5kg./m². as opposed to 35 Kg./m² for international patients.
- Waist circumference indicating abdominal obesity

Men: 90cm (as opposed to 102 cm according to international guideline)

Women: 80 cm (as opposed to 88 cm as per international guidelines)

The occurrence of type II diabetes increases with the age [onset age (35-50)]. There are different risk factors for diabetes that is -family history of diabetes; obesity [7, 14, 5, 3, 2], sedentary life style, urbanization [4, 13, 10,

6, 11, 14], tobacco & alcohol consumption [8]. With the publication of new clinical review, it is becoming increasingly clear that physical activity may be a therapeutic tool in a variety of patients which are at risk for diabetes[17, 19].Clinician use to put prime focus on BMI criteria to identify diabetes risk, though waist circumference has not been widely adopted in clinical practice. Recent studies * suggest abdominal fat measured by waist circumference can indicate a strong risk for diabetes whether or man considered over weight or obese, according to BMI. Body fat distribution is an important risk factor for obesity related disease. Excess abdominal fat that is central body mass is associated with diabetes though waist circumference has not been widely adopted in clinical practice. The present study is an epidemiological survey mainly focused to find out relation between waist circumference and BMI at the onset age (35-50) of diabetes We are not giving any new finding but we are trying to suggest some parameters to minimize the rate of diabetes and to strengthened the view to observed waist circumference with BMI at early age of detection.

The occurrence of type II diabetes increases with the age and the vast majority of subjects are elderly, there are physiological reasons for this and that are related to lifestyle. Muscle mass decrease with advanced age, this is due to sedentary lifestyle and aging processes [3]. It was also observed that in elderly population sedentary lifestyle is the prime factor of diabetes instead of high

BMI. Though high BMI and sedentary lifestyle consistently observed in numerous studies, however it is been questioned whether high BMI is a determinant or a consequences of sedentary lifestyle. It is necessary to relies that primary prevention of type II diabetes requires a long term plan and must include a range of activity targeted at different age groups from fetal to old age.

The present study mainly focused on the pattern of diabetes in central India. It is an epidemiological survey to find out the factors involved in the onset of diabetes. This study also explores the relation between waist circumference and sedentary life lifestyle with the prevalence of diabetes in central region.

Material and Method

The clinical study includes subject population from Jabalpur city of central India. 100 Patients who were diagnosed for the first time as type II diabetes were included in this study. Blood glucose was routinely analyzed by using glucometer. BMI & W/H ratios were determined by using anthropometric data viz; height, weight and waist that were measured by standard measuring tape and weighing scale. A self prepared questionnaire based on IPAQ (International Physical Activity Questionnaire) was used to get information regarding physical activity.

Result and Observation

Out of 100 patients 28 patients were of 40-50 age group (I) and 72 were of 50 and above age group(II). In the age group (I) 10 Males and only 4 females were reported to be diabetic that indicates the early onset of type II diabetes among males than females, but further at the age of 45 to 50 the ratio among male and female was observed to be 8:6, which indicates the decrease ratio of type II with the increase of age. It was also observed that menopause triggers diabetes and **post menopausal** ladies are more prone for **diabetes**. (**Table 1 & Graph 1**).

Type II diabetes mainly related with the life style. As the age increases as compare to males, female's lead more sedentary life style and the percentage of diabetes were higher in them. (**Table 2 & Graph 2**.)

Patients' height and weight were measured to calculate BMI. The average height for females was 146 ± 6.2 cm and average weight was 58.25 ± 7.2 Kg. The average BMI was 24.9 ± 3.45 calculated in the present study. Female waist measures in between 70-100 cm. In males average weight was 68.4 ± 70.08 Kg and average height was 158.6 ± 3.07 cm. Average BMI was 24.9 ± 3.45 . Male waist measures were found between 75-120 cm .Average FBS in males and female were 185 ± 70 mg/dl and 189 ± 73 mg/dl respectively and PPBS were 292 ± 96 mg/dl and 296 ± 19 mg/dl. (**Table 3 & Graph 3**)

Discussion and Conclusion

Indians are highly susceptible for the Type-II DM disorder. The number of detected cases of DM reflects only the tip of the iceberg, because in India there are a large number of undetected cases. It is a chronic disease

which leads into many complications specially if untreated. Recently it was observed that prevention of the disease with the drug is difficult because none of the drugs has been found without side effects and these drugs are costly too. As it is a multi factorial disease, no single method is sufficient to prevent it.

In the present study 100 Diabetic patients were taken from different hospitals of central India to asses the role of life style and wc in diabetes. It was observed that onset of diabetes were from the age group of 40-45 years. The rate of incidence was higher in males as compare to female. In females post menopausal age was found to be high alarming stage because maximum number of diabetic females belongs to this age group. In the present study average BMI of males was 24.03 ± 2.4 and in females it was 24.9 ± 3.45 . About 40 % patients having BMI more than 23 kg./m². According to new guideline they can be included in obese side, which means obesity is one of the factors for diabetes. Significant obesity may be a co-morbid condition along with type 2 diabetes in region of central India.

It was as in [16] reported that BMI of the diabetics both in male and female were in normal range in their study (according to old guide line) and W/H ratio was in normal range as per WHO guidelines. According to them obesity is not the main factor to develop diabetes. Though the reports was just contrast to [9, 12]. New guidelines itself contradicts the results of [16]. In the present study we have also observed that 50%of the patients were found in the normal range of BMI but still they were severely diabetic. The waist size may be more important indicator of health risk than BMI. Diabetes foundation of India and 20 other national health organizations declared that central obesity is the main cause of type-II diabetes which can be calculated by waist measurement.

As per new guide line of ministry of health waist circumference should be < 90 cm. for males and < 80 cm. for females. Our study also strengthens the view that instead of taking only BMI, waist measurement should also be considered for getting the concrete idea of obesity. In the present study more than 60% patients with the normal BMI were observed with central obesity in a higher side.

Recent studies indicate that sedentary life style is the prime factor for the development of diabetes. American Diabetes Association recommended, physical activity less than 30 minutes a day comes under sedentary work. . In the present study it was observed that as the age increases people involved in watching TV they spent maximum time in sitting rather than moving out. This directly reflects that with the increasing age group percentage of diabetes and sedentary life increases. In the survey from central Rajasthan that 85% of sedentary worker were diabetic out of them only 40.9% were obese [18]. We have also observed that sedentary working is the main risk factor than obesity for type II diabetes in elderly population.

Waist circumference provides unique indicator of body fat distribution, which can identify patients who are at the risk of diabetes, which is above and beyond the measure

of BMI. WC measurements provide additional information to help the clinician to determine, which patient should be evaluated for the presences of diabetes factors with out change of BMI. Diet plan and exercise can change wc, which can help to control diabetes. Therefore, wc cutpoint establishment with the BMI may help to evaluate the risk factors, though selection of appropriate wc values will be complex because they are likely influenced by sex and ethnicity group, age, BMI and other factors. Instead of using currently recommended wc cut points – it should be possible to establish new wc cutpoints guidelines for clinical practice keeping in mind different geographical region of India.

This studies reports sedentary life style and obesity as prime factors responsible for type II diabetes besides genetic predisposition .Keeping one's weight in proportion to height is an effective way to control diabetes. By exercising for just 30 minutes a day, five days a week, people can prevent pre diabetic condition from becoming type II diabetes. If a person already suffering from type II diabetes, the same amount of exercise can help them minimizing health risks and improve control of their condition. Research has shown that even one session of physical activity can help improve a person's ability to use insulin. However, the effect lasts only 12 to 48 hours, which means regular physical activity is needed to keep insulin working effectively. Above preventive strategies are effective and should not only be recommended for high risk individual but can also be considered for primordial prevention in view of rapid urbanization, changes in diet and life style.

Acknowledgement

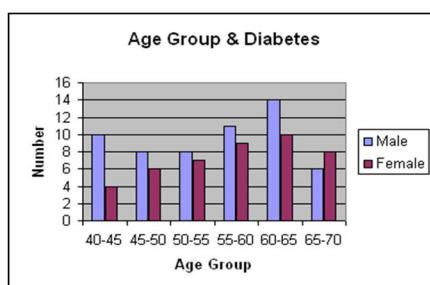
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References

- [1] Agency for Healthcare Research& Policy. The efficacy of Interventions to Modify Dietary Behavior Related to Cancer Risk . AMPQ, Rockville, MD ,USA, 2001.
- [2] Chandalia M., Abate N., Garg A., et al (1999) *J Clin Endocrinol Metab.*, 84 : 2329-2335.
- [3] Colditz G.,Willett W.C.,Stampfer M. J.,Manson J. E., Hennekens C. H., Arkey R Aetal. (1990) *Am J Epidemiol.*, 231:501-513.
- [4] Connolly V., Unwin N., Sheriff P., et al (2000) *J Epidemiol Community Health*, 54 : 173-177.
- [5] Curse G.K., Zimmet P.Z., Gareeboo H., et al (1991) *Diabetes Care*, 14 : 271-282.
- [6] Gupta A., Gupta R., Sarna M., et al (2003) *Clin Pract.*, 61 : 69-76.
- [7] Kisseebah A., Peiris A. N. & Evans D. (1988) *Acta Med Scand Suppl.*, 723: 79-89.
- [8] Lacroix A.X., Long J., Scherr P. et al (1991) *N Engl J Med*, 324:1619-25.
- [9] Maratos-Flier E., Flier J.S., Khan C.R., King G.L., Moses A.C., Weir G.C., Jacobson A.M., Smith R.J., Eds. In *Joslin's Diabetes Mellitus*, 14th edition 2005; Section IV, Chapter 31: pp 533-45.
- [10] Misra A., Pandey R.M., Rama Devi J., et al : (2001) *Int. J. Obes.*, 25 : 1-8.
- [11] Mohan V., Shantirani S., Deepa R., et al (2001) *Diabet Hed* 18, 280-287.
- [12] Pi-Sunyer F.X. (1996) *Am J Clin Nutr.*, 63:426S-429S/
- [13] Rama Chandran A., Snehalatha C., Kapur A., et al (2001) *Diabetologia*, 44 : 1094-1101.
- [14] RamachandranA,Snehalatha C., Satyavani S., Vijay V. (2000) *DiabetesObes.Metab.*, 2(3):149-154.
- [15] Ramachandran A., Snehalatha C., Ltha E., et al (1999) *Diabetes has Chin Pract.*, 44: 207-213.
- [16] Shekar M.A., Somashekhar H.M., Vishwanth B.S. (2005) *Int J Diab Dev Ctries*, 102-4.
- [17] Task Force on Community Preventive Services . Increasing Physical Activity .A Report on Recommendations of the Task Force on Community Preventive Services: Morbidity& Mortality Weekly Reports Recommendations & reports 2001. Centers for Disease Control Vol. 50, no. R R-18.
- [18] Udwat H., Maheswari S., Goyal R.K. (2001) *The antiseptic*, 98 (2): 58-61.
- [19] Williams C. (1994) *Physiological response to exercise &sports in Diabetes*. Burr B, Nagi D, eds.John WileyChichester, England,1-24.

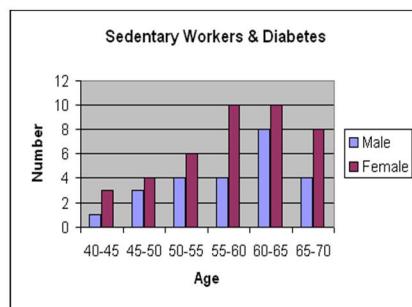
Impact of Sedentary lifestyle and waist circumference on prevalence of Type II Diabetes mellitus

Table 1-Different age groups and cases of diabetes



Age	Male	Female
40-45	10	4
45-50	8	6
50-55	8	7
55-60	11	9
60-65	14	10
65-70	6	8

Table 2 Sedentary workers and cases of diabetes



Age	Male	Female
40-45	1	3
45-50	3	4
50-55	4	6
55-60	4	10
60-65	8	10
65-70	4	8

Table 3- Relationship between BMI & WC among Males & Females in different age group

Age	Male		Female	
	BMI (Kg/M ²)	WC in cm	BMI(Kg/M ²)	WC in cm
40-45	(n=10) 21.54	92.8	(n =4) 22.6	88.6
45-50	(n =8) 22.17	94.1	(n =6) 20.6	92
50-55	(n =8) 24.26	92	(n =7) 27.03	92.2
55-60	(n =11) 23.41	91.5	(n =9) 23.8	89.1
60-65	(n =14) 24.27	90.2	(n =10) 23.4	84
65-70	(n =6) 23.6	87.5	(n =8) 22.01	82.5

