Association Between Body Mass Index and Diabetes Mellitus in Perimenopausal Women in an Urban Slum of Mumbai

Dr. Kirti Vinayak Kinge	Dr. Amit Chandrakant Supe
MD Community Medicine IGGMC Nagpur	MS Orthopaedics MGIMS Sewagram, Wardha

ABSTRACT *This study has been undertaken to find association between body mass index and diabetes mellitus in perimenopausal women in an urban slum of Mumbai. The cross-sectional community-based descriptive epidemiological study was conducted in slum area during the period of January 2012 to June 2013. Out of 61 diabetic cases 39.4% were in pre obese class, 18% were in obese class, 32.8% were with normal BMI only 9.8% were underweight. Out of 389 nondiabetic subjects, 26.7% were in pre obese class, 6.2% were in obese class, 50.6% had normal BMI and 16.5% were underweight.*

There was significant statistical association between body mass index and diabetes mellitus among perimenopausal women in an urban slum.

Introduction-

Diabetes mellitus is an 'ice-berg' disease. Diabetic patients, if undiagnosed and inadequately treated, develop multiple chronic complications leading to irreversible disabilities and death. More than 90% of the cases of Diabetes mellitus are type 2 Diabetes mellitus.[1]

India is currently experiencing an epidemic of diabetes mellitus[2]. Data available shows rising pattern in the prevalence of type 2 Diabetes mellitus in India both in urban as well as rural areas. The population in India has an increased susceptibility to Diabetes mellitus.

Factors responsible for development of type 2 Diabetes mellitus are age, familial and genetic ethnicity, obesity, physical inactivity, diet, smoking, socioeconomic status, high blood pressure and high cholesterol, history of gestational diabetes.

Early detection and appropriate treatment are the cornerstones for delaying the onset and progression of the diabetic complications.It is therefore particularly important that recognition and management of multiple risk factors should be a primary goal in comprehensive preventive care.

Studies suggest that Diabetes mellitus is no longer a disease of the affluent or rich man's disease. It is becoming a problem even among the middle income and poorer sections of the society. Studies also have shown that the poorer diabetic subjects are prone to complications as they have little access to quality health care.

As per U. N. Population Report (by Mid-year 2001), India's urban slum population is estimated as 158.42 million[3].Such large population always goes ignored. It is therefore important that effort should be made for recognition of multiple risk factors to reduce diabetic complications.

The decline in estrogen concentrations at the menopause has some adverse effects. The changes occurring at or after the menopause are increased insulin resistance, decreased insulin secretion, decreased insulin elimination and increased android fat distribution[4].

Few community studies have been conducted in the perimenopausal age group with varying definitions of perimenopausal age. For the present study, the perimenopausal age was considered to be 40-50 years[5].

Taking into consideration the above factors, a study has been undertaken to find association between family history of Diabetes mellitus and Diabetes mellitus among perimenopausal aged women in an urban slum.

MATERIALS AND METHODS:
Administrative approvals:
The necessary approvals were obtained from the following authorities to carry out the study.

i) The Dean of Parent Medical College.
ii) Ethics committee of Parent Medical College
iii) Professor and Head, Department of Community Medicine, Parent Medical College.
iv) In-Charge of the Urban Health Centre.

Study area:
The study was conducted at an urban slum Shivaji nagar which is a field practice area of Department of Community Medicine of Topiwala National Medical College, Mumbai

This slum consists of 50 plots (1 to 42, 43, 43A, 44 to 49). Each plot is divided into two parts. Each part has 10 lines, these lines are numbered from A to K (except I) on left side and from L to U on right side. Each line has 9 houses numbered from 1 to 9.Total 180 houses are there in each plot. Total population of study area is approximately 84,783.

Study design:
The present study is a cross-sectional community-based descriptive epidemiological study.

Duration of study:
The Study was conducted during the period of January 2012 to June 2013.

Calculating Sample size:
Total population of study area was 84,783.

Female population between 40 to 50 years was 10.1%3.

So, female population between 40 to 50 years in study area was 8,563. (Applying national demographic parameters)[1].

Taking 5% of perimenopausal women of 40 to 50 years = 428.15

It was divided among 50 plots equally – 428.15/50 = 8.56 = 9.

So, 450 perimenopausal women were included in the study.

From each plot, with the help of systematic random sampling method every 20th house was selected for the study, with a random start. All the females in age group 40 to 50 years in selected households were included for the study, till the sample size was met

Females who were not aware about their diabetic status were screened at Urban Health Centre for fasting blood glucose level and oral glucose tolerance test[6] by semi-autoanalyser. In the remaining females who had reported physician diagnosis of Diabetes mellitus, the diagnosis was further confirmed by checking for one of the evidence of disease like blood sugar report, medical record or prescription from physician or medicines.

Waist Circumference:
From the definition in the 1998 National Institutes of Health obesity clinical guidelines[88] cut-points for abdominal obesity was ≥88 cm for women.

Statistics- Statistics used here is chi-square test.

Result-
Association between Waist circumference and Diabetes mellitus in the study subjects:

Waist circumference		Diabetic	Non-diabetic	Total
<88	N	19	174	193
	%	31.2	44.7	42.9
≥88	N	42	215	257
	%	68.8	55.3	57.1
Total	N	61	389	450
	%	100	100	100

Chi-square value=3.972 df=1 p value=0.046
Out of 450 subjects, 193 (42.9%) were having waist circumference <88 cm and 257(57.1%) were having waist circumference ≥ 88 cm.

Out of 61 diabetic cases 19 (31.2%) were having waist circumference <88 cm and 42 (68.8%) were having waist circumference ≥ 88 cm.

Out of 389 nondiabetic subjects 174 (44.7%) were having waist circumference <88 cm, 215 (55.3 %) were having waist circumference ≥ 88 cm.

The association found was significant between waist circumference and Diabetes mellitus as p value is <0.05.

Discussion-
The study showed that out of 61 diabetic cases 19 (31.2%) were having waist circumference <88 cm and 42 (68.8%) were having waist circumference ≥ 88 cm. There was significant association between Waist circumference and Diabetes mellitus (p=0.046).

Similar results of significant association between waist circumference and diabetes mellitus were obtained in studies done by Ramachandran A et al[8], Kumar S et al[9], Bharati et al[10] (p<0.0001), Anjana R.M.et al[11].

Conclusion-
There is significant statistical association between waist circumference and diabetes mellitus among perimenopausal women in an urban slum.

Recommendations-
1. The increasing prevalence of abdominal obesity, particularly among female adults, highlights the urgency of addressing abdominal obesity as a healthcare priority to prevent the development of Diabetes mellitus in the future.
2. It is necessary to develop a need based planned exercise programme for the benefits of obese people on a regular basis where expert opinion is made available.
3. Walking as an exercise can be incorporated in the health programme by taking help of community health volunteers.

REFERENCE 1. K. Park. Textbook of Preventive and Social Medicine. 22nd Edition. Jabalpur: M/s Banarsidas Bhanot Publishers; Feb 2013.p. 363,444. 2. Mohan V, R. Pradeepa. Epidemiology of Diabetes in Different Regions of India. Health administrator. 2009; 22 (1-2):1-18. 3. Government of India, Ministry of Housing & Urban Poverty Alleviation, National Buildings Organisation New Delhi, Report of the committee on slum statistics/census; 2010. 4. Spencer C. P, I. F. Godsland, J. C. Stevenson. Is there a menopausal metabolic syndrome? Gynaecological Endocrinology.1997; Volume 11(5): 341-355. 5. Kakarala Madhuri, Laura Rozek, Michele Cote, Samadhi Liyanage and Dean E. Brenner. Breast cancer histology and receptor status characterization in Asian Indian and Pakistani women in the U.S.-a SEER analysis. BMC cancer 2010; Volume 10(1): 191. 6. WHO, Prevention and Control of Non-communicable Diseases: Guidelines for Primary health care in low resource settings. 2012; pg.no.20 7. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—the Evidence Report. National Institutes of Health. Obes Res. 1998; 6(suppl 2):51S–209S. 8. Ramachandran, Ambady, Simon Mary, Annasami Yamuna, Narayanasamy Murugesan, and Chamukuttan Snehalatha. "High prevalence of diabetes and cardiovascular risk factors associated with urbanization in India." Diabetes care 2008; 31(5): 893-898. 9. Kumar, S., Sarmistha Mukherjee, and P. Mukhopadhya. "Prevalence of diabetes and impaired fasting glucose in a selected population with special reference to influence of family history and anthropometric measurements- The Kolkata policeman study." JAPI 2008; 56: 841-844. 10. Bharati, Dharamvir Ranjan, Ranabir Pal, Sumit Kar, R. Rekha, T. V. Yamuna, and Mausumi Basu. Prevalence and determinants of diabetes mellitus in Puducherry, South India." Journal of pharmacy & bioallied sciences 2011; Volume 3(4): 513. 11. Anjana, R. M., R. Pradeepa, M. Deepa, M. Datta, V. Sudha, R. Unnikrishnan, A. Bhansali et al. "Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: Phase I results of the Indian Council of Medical Research–INdia DIABetes (ICMR–INDIAB) study." Diabetologia 2011; 54.(12): 3022-3027.