https://doi.org/10.33451/florafauna.v29i1pp179-185
FLORA AND FAUNA ISSN 2456 - 9364 (Online)
2023 Vol. 29 No.1 PP 179-185 ISSN 0971 - 6920 (Print)

A study of Type-2 Diabetes Mellitus in working women of Lucknow city, Lucknow (U.P.) India

Soundarya Ratna Singh[1],*Manorama Singh and Anamika Sinha

[1]Department of Nutrition
Isabella Thoburn College,
LUCKNOW - 226020 (U.P.) INDIA
IGNOU Regional Center,
LUCKNOW-226029(U.P.)INDIA
*Corresponding Author
E-mail : manoramasingh@ignou.ac.in

Received **:** 11.03.2023; ***Accepted*** : 08.05.2023

ABSTRACT

The present study was undertaken to evaluate the prevalence of type-2 diabetes mellitus in working women (45- 55) yrs from various institutions of the Lucknow city. Samples were randomly selected from a private clinical setting. It covers the aspects like dietary assessment among detected diabetic, factors influencing emergence of diabetes and guiding the detected diabetics about low Glycemic Index Diet. The main outcome of the study was that, the BMI, waist hip ratio, meal irregularity, physical inactivity are the major factors responsible for the appearance of diabetes mellitus. We observed that, lifestyle of working women of Professional Institutes were very busy, but their physical activity level was very low.

Various factors associated with the prevalence of diabetes in the studied subjects were lack of physical activity, family history, meal irregularity, lack of knowledge on dietary restrictions, not following any life style modifications with regularity and stress in managing both professional work and family.

Figure : 01 References : 09 Tables : 04

KEY WORDS : Body Mass, Diabetes Mellitus, Dietary practices, Impaired Glucose, Index (BMI), Lifestyle Management, Non insulin – dependent diabetes mellitus (NIDDM), Tolerance (IGT), Waist – to – hip ratio (WHR)

Introduction

Diabetes mellitus (DM) is a syndrome characterized by a state of chronic hyper glycemia causing disturbance in metabolism of carbohydrate, fat and protein. This condition is also associated with the absolute or relative deficiency in insulin secretion or insulin action. Type 2 Diabetes mellitus may give rise to the risk of micro vascular damage. This disease is generally associated with the reduced life expectancy, significant morbidity due to diabetes related micro vascular complications (retinopathy, neuropathy and nephropathy), increased risk of macro vascular complications (ischemic heart disease, stroke and peripheral vascular disease), and diminished quality of life[9].

In a survey of global diabetes prevalence in 2019, there are estimated to be 463 million people, and the number would significantly raise to 578 by 2030 and 700 million by 2045.[8] The prevalence is higher in urban areas *i.e.* (10.8%) than rural (7.2%) areas, and in high-income (10.4%) than low-income countries (4.0%)[8].

Recent studies showed that urbanization and economic development are causing high prevalence of diabetes mellitus even in the developing countries[1]. Asian Indians have been identified as one of the ethnic groups with a high prevalence of Non Insulin Dependent Diabetes Mellitus[6]. According to a study, Diabetes Mellitus is highly prevalent in the urban southern Indian population. The prevalence of Diabetes Mellitus in rural areas of Asian Indians was significantly lower in comparison to urban population[6]. The ratio of prevalence of diabetes in men versus women varied markedly between populations with little discernible trend, although impaired glucose tolerance was generally more common in women[3]. There is a trend which increases in prevalence of diabetes with age. Diabetes showed a positive and independent association with age, BMI, WHR, family history of diabetes, monthly income and sedentary physical activity[7].

Prevalence of type2 diabetes was 5.2% in men and 3.2% in women. On top of the lifestyle's into different occupations, working life adds more risk factors in the form of long sitting times, irregular working hours and stress[2]. Prevalence of diabetes mellitus and Impaired

TABLE-1: General Information about population studied

S.No.	Criteria	Responses	Frequency (f)
1.	Age	45-47	17
		48-50	18
		51-53	11
		54-55	10
2.	Level of education	Intermediate	15
		Graduate	19
		Post Graduate	18
		Doctorate	04
3.	Family type	Joint	32
		Nuclear	24
4.	Other family members with Diabetes Mellitus	Yes	14
		No	10
5.	Any Diabetic therapy taken	Yes	20
		No	04
6.	Type of Diabetic therapy taken	Diet	16
		Physical activity	06
		Glucose lowering drugs	02

Glucose Tolerance was higher among urban working women and is increasing with increase in age. Obesity plays a major role in development of Type2 diabetes[5].

Job hours or working hours were directly linked to the Type 2 diabetes risk with increase in age. Women working for 41 hours per week or more have more risk of developing diabetes mellitus in comparison to women working for 20 hours per week. These women had an increased risk of diabetes compared with women working 21–40 hours per week in paid employment. In contrast, job strain was unrelated to diabetes[4].

Methodology

This study was a cross sectional study to measure disease and exposure status simultaneously in our target group. The research work was a Retrospective study in which, the backward data related to the factors responsible for diabetes mellitus in working women have been figured out. The sampling procedure in the study was random sampling. Target group was the working women of 45 to 55 years of age, suffering with diabetes mellitus, women who belonged to the Lucknow city in Uttar Pradesh, India.

Inclusion criteria for selection of subject were their age, working/non-working, diabetic or not, their residing place. Taking 10% of the sample size as study population, it comes to about 62 women. Subjects were chosen from a private clinical setting. Data have been collected from the participants using pretested structured questionnaire that have anthropological, biochemical, clinical, behavioral factors, with closed ended questions together qualitative data from the selected individuals.

Results and Discussion

A total of 56 women participants were involved in the study. All participants were working women from age group of 45-55-year-old, and a mean age of 50-years old. Most of them *i.e.* 19% were graduate, 18% were post graduate and 15% intermediate. All participants belonged to the urban area of Lucknow city. 32% of the

TABLE-2 : Dietary assessment among detected diabetics

S.No.	Information Sought	Responses	Frequency (f)	Percent (%)
1.	Workplace/ company provide food	Yes	18	75
		No	06	25
2.	Outdoor buying of the meals (in restaurants, cafes or order food on line in previous week	**Breakfast**		
		Never	00	
		1-2 times	22	91.6
		3-4 times	02	8.3
		5-6 times	00	
		Lunch		
		Never	00	
		1-2 times	15	62.5
		3-4 times	07	29.1
		5-6 times	00	
		Dinner		
		Never	00	
		1-2 times	21	87.5
		3-4 times	03	12.5
		5-6 times	00	
		Snacks		
		Never	00	
		1-2 times	08	33.3
		3-4 times	00	
		5-6 times	16	66.6
3	Regularity of all three major meals i.e., breakfast , lunch, dinner on time	Yes	9	37.5
		No	15	62.5
4	Manage blood sugar levels through proper diet	Agree	20	83.3
		Not	4	16.6
5	Attitude toward follow- ing a proper diet plan	Agree	18	75
		Not	6	25
6	Importance of weight management to control diabetes	Agree	22	91.6
		Not	2	8.3

TABLE-3 : Distribution of several factors influencing emergence of diabetes

Factors influencing diabetes		Distribution among study population(n=56)	Distribution among diabetics(n=24)
Age group (in years)	45-47	17	0
	48-50	18	6
	51-53	11	12
	54-55	10	6
Physical activity	Sedentary	28	18
	Moderately heavy	15	5
	Heavy	13	6
Monthly income (in Rs.)	35,000-25,000	17	6
	25,000-15,000	35	12
	>15,000	4	2
BMI(kg/m2)	15-20	3	0
	21-25	5	6
	26-30	22	14
	30-35	26	4
Waist hip ratio	<0.85	4	2
	>=0.85	52	22

Figures in parenthesis are in percentage.

women were from joint family whereas 24% were from nuclear families.

(Table-2) indicates that 75% were getting evening tea and snacks at their workplace. The behavior of outdoor buying was observed in the participating women as 91.6% take 1-2-time breakfast meal outside their home per week, while 8.3% women take 3-4 times breakfast out of their home. 62.5% women take 1-2 times lunch meals out of their home and 29.1% women take 3-4 times meals out of their home. 87% women were enjoying 1-2 times dinner outside their home per week, and 12% women were taking 3-4 times outside their home per week. 33.3% women buy snacks 1-2 times in a week, while 66.6% were doing it 5-6 times in a week. 37.5% participants were regular in their meal timings whereas 62.5% were not taking their all meals on time. It shows most of the subjects were irregular with their meal timings of lunch, breakfast and dinner. 83.3% women agreed that sugar level in diabetes mellitus could be managed through proper diet, while 16.6% did not agree with this fact. 75% women agreed with following a proper diet plan while 25% did not agree in this. It indicates the positive attitude of participants in this study about following a proper diet plan to control diabetes mellitus and co-morbidities associated and linked with it. 91.6% women agreed with the fact that weight management is important factor in diabetes control while 8.3% do not agree with this fact. It depicts that the more subjects are aware with the link between obesity and diabetes.

The data related to food frequency in terms of breakfast, lunch dinner and snacks was compared with the frequency of these articles taken within a week. The results indicated that the frequency of food as well as their particulars were different significantly (p<0.05, p=0.004515, df=15, f=7.42, one-way ANOVA: single factor). The results reflected that the food taken in breakfast, lunch, dinner and snacks would have the

TABLE-4 : Recommended menu of Diabetes Mellitus Diet

Schedule	Meals	Diet-Options/Preference
On Wakening (06:30-07:00hrs)	Early Morning	01 cup(150ml) of normal tea/ or 02 pc. of high fiber biscuits (oats/ragi/wheat) without sugar.
Breakfast (08:30-09:00hrs)	Breakfast	01 cup (150ml) – skimmed milk without sugar 01 bowl - veg upma/veg poha/veg Dalia/ veg oats
Mid-Morning (11:00-11:30hrs)	Beverage & Snack or Fruit	One fruit / 1 small bowl-cut fruit - (guava, orange, musambi, papaya, apple, pear) with 01 bowl sprouts/ roasted chana
Midday Meal (13:00-13:30hrs)	Lunch	03 nos. of chapatti, ½ bowl - boiled rice, 01 bowl-seasonal vegetable, choice of legumes and pulses or cottage cheese, curd
Mid Afternoon (16:30-17:00hrs)	Evening Snacks	01cup (150ml) normal skimmed milk tea without sugar and 01 bowl of roasted makhanas/roasted Channa / peanuts or any light snack – wheat puffs/single slice veg. sandwich / 2 biscuits(oats/ragi/high fiber)
Evening Meal (19:30-20:00hrs)	Dinner	01 bowl of veg soup, vegetables/lentils/tomato/ lemon coriander etc.03 nos. of chapatti, 01 bowl – seasonal vegetable curry,Choice of legume and pulsed, cottage cheese.
Before Bedtime (21:00-21:30hrs)	Post dinner	01 cup (200ml) – skimmed milk

impact on blood glucose level in the volunteers of the study.

t-Test between paired two samples gave Mean value of variable 1 as 17.8 and variable 2 as 6.2.variance between variable 1 and variable 2 is of 11.2.t stat value of variable 1 is 3.875288 and t critical one-tail is 2.131847. P (T<=t) one- tail value. 0.029949 and P (T<=t) two-tail value is 0.059898. t critical two-tail value for variable 2 is 2.776445. These values depict the significant difference between both the variables.

The data related to food frequency in terms of breakfast, lunch dinner and snacks were compared with the frequency of these articles taken within a week. The results indicated that the frequencies of food as well as their particulars were different significantly (p<0.05, p=0.004515, df=15, f=7.42, one-way ANOVA: single factor). The results reflected that the food taken in breakfast, lunch, dinner and snacks would have the impact on blood glucose level in the volunteers of the study.

It was observed that as the age advances the incidence of diabetes also increase and is generally maximum in the age group of 48 to 50 years of age.

The data also show that from each category *i.e.* sedentary, moderately and heavy worker 50%, 27% and 23% diabetic cases were detected, respectively. The physical activity was estimated like hours of daily household work, daily activities like hours of walking /

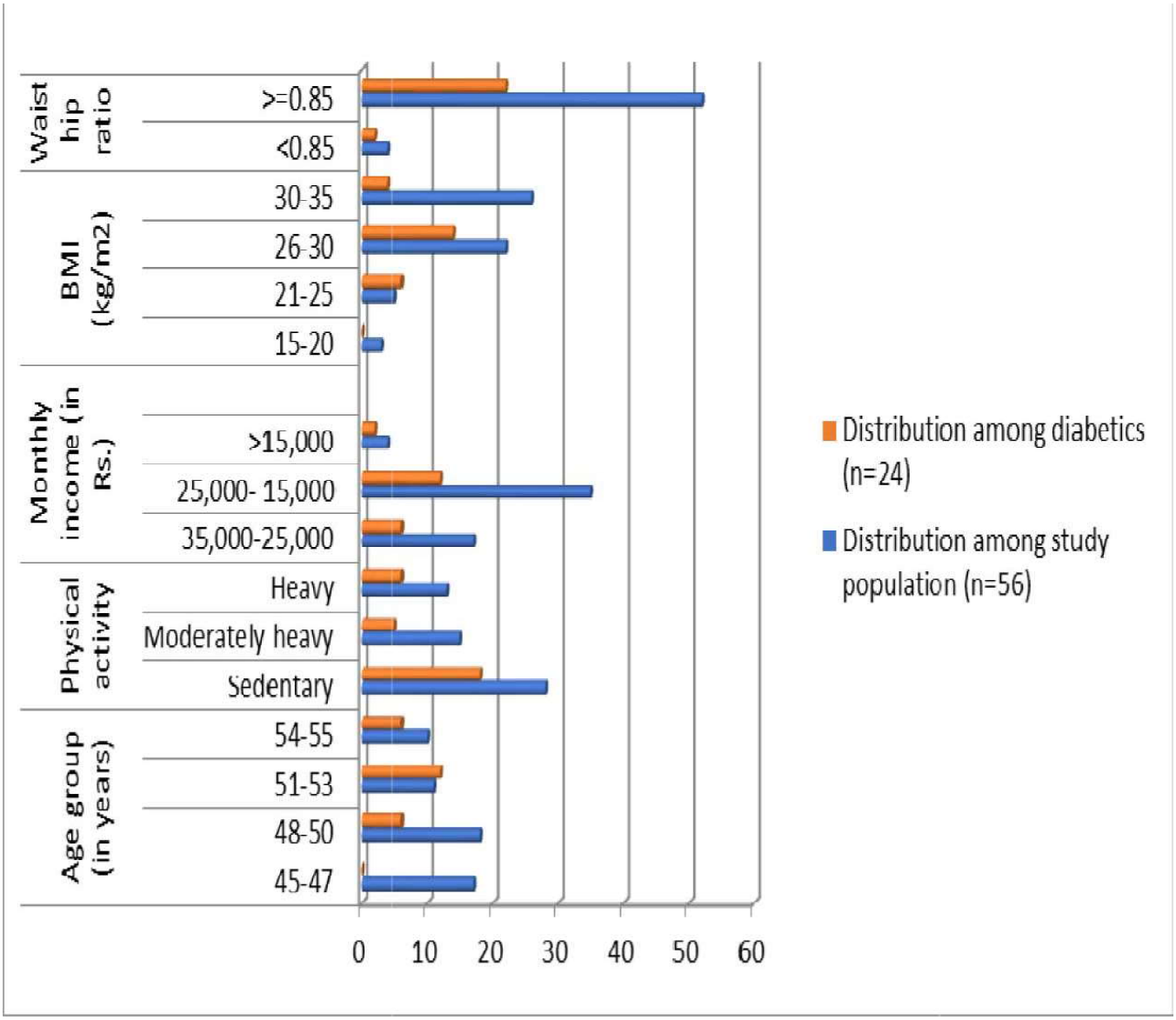

Fig.1: Distribution of several factors influencing emergence of diabetes

cooking / gardening *etc.* These women were classified into three categories (heavy workers 6-8 hrs. moderate workers 4-6 hrs. sedentary workers 2-4hrs).

The sample group belongs to an elite population and basically, they all are sedentary workers although the fact that, they all are working women. These were classified as per the working hours for the convenience of the study, so all the categories had nearly equal risk of developing diabetes.

Distribution of study population according to monthly income showed that 30%had >25000 rupees while 63% had monthly income between >15,000 rupees, and 7% have <15,000 rupees.

It is evident from the data that 9% of study population were having BMI between 21 and 25 which is normal, 39% were having BMI between 26 and 30 which is pre-obese and 46 % were having BMI in range from 31 to 35 which is obese. It was also found that as BMI increases, the percentage of persons with Diabetes increases accordingly (BMI: 15-20, 5%, BMI: 21-25, 9%, BMI: 26-30, 39%, BMI: 31-35, 46%).

Distribution of study population according to Waist Hip Ratio (WHR) showed that 93% of them were having WHR>=0.85.

Conclusions

Diabetes in majority of Women is seen in 46-50 yrs of age group and it is prevalent in all categories of workers *i.e.,* heavy, moderate, and sedentary. Most subjects prefer diet as a diabetic therapy over physical activity and glucose lowering drugs. Most subjects were concerned with the weight management for glucose lowering and control of diabetes mellitus. Participants of this study agreed with the fact that a proper diet can

manage blood glucose but still some of them were irregular with their meals. There is a positive association of Diabetes with monthly income. Most of the detected Diabetes cases had BMI >26 and WHR > 0.85 which is a risk factor for development of Diabetes. Majority of them had a positive family history and majority did not practice any exercises or dietary restrictions and because of that, there was need for life style modifications among working women.

Most of our participants work in elite jobs hence are involved in sitting works which result in very low physical activity. There are many factors like physical inactivity, family history, lack of knowledge on dietary restrictions, lack of interest in life style modifications, stress in managing both professional work and family together among working women result in emergence of diabetes.

Suggestions

Medical nutrition therapy (MNT) is important in preventing/managing the diabetes mellitus. Hence the modification should be done in the Patient dietary plan.

Reduction or control of calories, simple carbohydrates, proteins and fat intake should be managed and keep under control. The diet should be with normal dietary protein however less in simple carbohydrates and fat.

References

1. Amaiya KL, Kodali VRR, Alberti KGMM. Epidemiology of Diabetes in Asians of the Indian Subcontinent. *Diabet Metab Rev.* 1990; **6**:125–146.
2. Carlsson S, Andersson T, Feyching M. Incidence and Prevalence of Type 2 Diabetes by Occupation: Results from All Swedish Employees. 2019; 95-103.
3. King H, Rewers M. Global Estimate for Prevalence of *Diabetes Mellitus* and Impaired Glucose Tolerance Among Adults. WHO Ad Hoc Diabetes Reporting Group. *Diabetes Care* 1993; **16**:157-76.
4. Kroenke CH, Spiegelman D, Manson J, Schernhammer ES, Colditz GA, Kawachi I. Work Characteristics and Incidence of Type 2 Diabetes in Women. Vol. 165, 15 January 2007, 175-183.
5. Malini DS, Sahu A, Mohapatro S, Tripathy RM. Assessment of Risk Factors for Development of Type-II Diabetes Mellitus among Working Women in Berhampur, Orissa. 2009; 232-236.
6. Ramachandran A, Snehalatha C, Dharmaraj D, Viswanathan M. Prevalence of Glucose Intolerance in Asian Indians: Urban-Rural Difference and Significance of Upper Body Adiposity. *Diabetes Care.* 1992; **15**:1348–1355.
7. Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan V, Das AK, Rao PV, Yagnik CS, Kumar PKM, Nair DJ. High Prevalence of Diabetes And Impaired GT in Indians-National Urban Diabetes Survey. *Diabetologia.* 2001; **44**:1094-1101.
8. Saeedi P, Petersohn I, Salpea P, Brright D, Williams R. Global and Regional Diabetes Prevalence Estimates for 2019 and Projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition' **vol. 157**, 107843, September 10, 2019.
9. World Health Organization. Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications: Report of a WHO Consultation. Part 1: Diagnosis and Classification of Diabetes Mellitus. Geneva, World Health Org. 1999.