57

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Study of anthrometric status and dietary practices of employees of University of Agricultural Sciences, Bangalore, Karnataka for diabetics

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ABSTRACT

World Health Organization endorses and asks for development of global strategy in diet, physical activity, health and anthropometric transition associated health consequences. Anon (2002) suggests for biochemical confirmation of diabetic state to substantiate the clinical findings. The present study was carried out on 100 randomly selected employees voluntarily attending to UAS clinic in the age group of 30-60 years. The demographic profile revealed that the incidence of diabetes was in higher in the age group of 40-50 years with nuclear family system (83%) who were dependent on bus services for mode of transport and mainly belonged to table type of activities (clerical). There was a positive and significant relation between incidence of diabetes and body weight BMI and body fat per cent. Incidence of diabetes was also influenced by income and type of work (clerical) which reflects on quantum of exercise and stress of the respondents.

Keywords: Diabetics; non-diabetics; anthropometric measurements; diet survey

INTRODUCTION

There are only few studies in India where the nutritional status of the workers has been assessed by taking their anthropometric measurements. Ramdasmurthy et al (1983) reported that height, weight, arm circumference and fat fold at triceps of industrial workers were below normal values of well to do Indian subjects. Comparative study on nutritional status of women working outside home revealed that working women's weight was heavier compared to housewives (Prema 1984). The relationship between different variables were computed taking age, body weight as the independent variables, the height was linearly correlated with other variables while body weight was found to be better related (Nag 1987). Satyanarayana et al (1987) showed that the work output of the individuals with lower body weight was significantly lower than that observed in workers with higher weight. In

the preset work anthropometric status and dietary practices of employees of UAS, Bangalore, Karnatka were studied.

MATERIAL and METHODS

The study was conducted at university hospital of the University of Agricultural Sciences, GKVK, Bangalore, Karnataka. One hundred subjects were selected from the university in the age group of 30-60 years and their willingness to participate as subject throughout the period of study. A detailed schedule was formulated to elicit information on various aspects like general information on respondents, anthropometric measurements and diet survey. Dietary intake of the respondents was recorded by 24 hours recall method. Anthropometric measurement of the physical dimensions of the gross composition of the human body at different age levels and degrees of nutrition was carried out as per Jellife (1986). The mean, standard, t-test and correlation coefficient tests were used to analyze the data.

RESULTS and DISCUSSION

In the present study the emphasis was made to know the relation of anthropometric status and dietary practices over the incidence of diabetes mellitus. Various anthropometric measurements were included like height, weight, mid arm circumference (MAC) and triceps. The anthropometric indices calculated were body mass index (BMI), body fat per cent (BFP). Mean and standard deviation of all the above mentioned anthropometric measurements have been shown in Table 1.

The statistical analysis indicates significant differences in all the anthropometric measurements except weight between diabetic subjects at 1 per cent level. Distribution of employees by body mass index reveals that 60 per cent of the diabetic subjects had a normal BMI, 6 per cent were found to have undernourished BMI and 34 per cent of the subjects had BMI of overweight. In non-diabetic group 65 per cent of the subjects had a normal BMI, 3 per cent were found to be undernourished with BMI and 32 per cent of the subjects had BMI of overweight (Table 2). According to lean body mass index (LBMI) subjects were classified as chronic energy deficient (CED), normal and obese. Majority of the diabetic subjects were normal, few were obese and very few were subjected to CED. In non-diabetic group 83 per cent were normal, 14 per cent were obese and 3 per cent were CED (Table 3).

Table 3 gives the distribution of employees according to LBMI. The study shows that most of the diabetics (77%) and non-diabetics (83%) fell under normal range of LBMI.

Table 1. Anthropometric status of employees

Variable	Diabetic (n= 30) Mean±SD	Non-diabetic (n= 70) Mean±SD	t-value
Height (cm)	159.2±5.39	159.27±7.22	12.02**
Weight (kg)	64.60±7.89	62.90±7.92	1.20
MAC (cm)	24.96±2.64	24.40±3.64	13.58**
Triceps (mm)	16.76±1.45	14.91±1.64	14.63**
BMI	25.23±3.76	24.30±2.77	15.90**
Body fat (%)	30.37±5.41	28.72±4.14	13.95**
LBMI	397±54.4	411±45.3	10.21**

** Significant at 1% level

Table 2. Distribution of employees according to BMI

BMI classification	Diabetic		Non-diabetic	
	n	%	n	%
Undernourished (< 18.5)	2	6	2	3
Normal (18.5 to 25)	18	60	46	65
Over weight (25 to 30)	10	34	22	32

Table 3. Distribution of employees according to LBMI

LBMI classification	Diabetic		Non-diabetic	
	n	%	n	%
CED (> 500)	2	7	2	3
Normal (300-500)	23	77	58	83
Obesity (< 300)	5	16	10	14
Total	30	100	70	100

Majority of the employees were non-vegetarians (67%) and only 33 per cent were vegetarian in diabetic group. Whereas in non-diabetic group 60 per cent were non-vegetarians and only 40 per cent were vegetarians. The mean intake of nutrients namely calories, protein, fat, calcium, iron, thiamine, riboflavin, niacin and vitamin C for diabetics and non-diabetics are presented in Table 4.

The mean daily intake of nutrients was analyzed using t-test to know the significant differences between the diabetic and non-diabetic subjects and compared with intake of nutrients for diabetics and non-diabetics with RDA. The results revealed significant differences in intake between the diabetic and non-diabetic subjects. The comparison between RDA and nutrient intake revealed that except energy and fat no other nutrient met the RDA in diabetic as well as in non-diabetic subjects.

Functional relationship between socio-economic factors and the dietary intake for diabetic subjects was carried out by multiple regression analysis with selected independent variables on dependent variables to determine the influence of each socio-economic factor on various dietary intake (Table 5).

Functional relationship between socio-economic factors and the dietary intake for non-diabetic subjects was carried out by multiple regression analysis with selected independent variables on various dependent variables and is presented in Table 6. The analysis revealed that mode of reaching office significantly influenced for fat, energy and calcium intake and vitamin C consumption. Protein intake was

Table 4. Mean daily nutrient intake of employee

Nutrient	RDA	Diabetics			Non-diabetics			t- value
		Mean	SD	% adequacy	Mean	SD	% adequacy	
Energy (k. cal)	2225	2351	219	105	2321	151	104	7.15**
Protein (g)	60	59.12	7.0	98	59.33	5.02	98	-0.02
Fat (g)	20	24.03	6.5	120	20.65	4.55	103	4.68
Calcium (mg)	400	352.3	102	88	319.8	72.98	79	11.33
Iron (mg)	30	24.2	5.2	80	23.08	5.06	76	1.56
Thiamine (mg)	1.4	1.29	0.3	92	1.128	0.19	80	1.03
Riboflavin (mg)	1.6	1.515	1.6	94	1.167	0.24	72	1.19
Niacin (mg)	18	14.12	2.4	78	13.47	3.14	74	1.31
Vitamin C (mg)	40	28.58	6.9	71	29.17	6.13	72	-0.75

Table 5. Multiple regression of dietary intake with socio-economic factors (diabetic)

Nutrient	Age	Education	Income (₹)	Mode of office	Type of family	Constant	R^2
Protein (g)	0.0280 (0.106)	-0.405 (-0.273)	0.00069 (1.562)	-1.041 (-0.489)	1.699 (0.356)	51.94* (1.084)	0.35
Fat (g)	0.057 (0.31)	0.835 (0.651)	-0.00016 (0.486)	0.66 (0.359)	2.919* (0.707)	60.32* (1.46)	0.52
Energy	2.917* (1.589)	15.96 (0.434)	-0.29 (2.725)	4.693* (0.089)	-35.65* (-0.301)	1887.73* (1.589)	0.52
Iron (mg)	-0.045 (-0.31)	-0.751 (-0.722)	0.0017 (0.55)	-2.464* (-1.652)	3.547* (1.06)	68.73* (2.489)	0.56
Calcium (mg)	-1.94* (-0.69)	-16.29* (-0.845)	-0.00134 (-0.233)	-26.914* (-0.973)	39.027* (0.29)	1309.02* (2.104)	0.65
Thiamine (mg)	0.0122 (1.084)	-0.0179 (-0.23)	-0.00023 (0.792)	-0.0098 (-0.088)	0.135 (0.537)	0.487 (0.194)	0.58
Riboflavin (mg)	-0.051 (-1.18)	-0.396 (-1.314)	-0.00023 (-0.255)	-0.531 (-1.228)	0.859 (0.866)	7.458* (0.767)	0.58
Niacin (mg)	0.0678 (1.056)	-0.29 (-0.65)	0.000168 (1.267)	-0.69 (-1.078)	1.507 (1.05)	33.88* (2.355)	0.42
Vitamin C (mg)	-0.674 (-0.35)	-0.01 (0.008)	0.000792 (0.541)	-2.682* (-1.405)	-1.433 -(0.335)	56.79* (2.42)	0.65

*Significance at 5% level

Table 6. Multiple regression of dietary intake with socio-economic factors (non-diabetic)

Nutrient	Age	Education	Income (₹)	Mode of reaching office	Type of family	Constant	R^2
Protein (g)	0.200 (0.18)	0.335 (0.697)	3.607* (2.432)	-1.18 (-1.143)	2.372* (2.53)	46.02* (2.737)	0.35
Fat (g)	0.002 (-0.25)	0.397 (0.853)	-0.002 (0.991)	-1.843* (-1.955)	-1.382 (-0.976)	16.81 (1.095)	0.62
Energy	-0.126 (-0.05)	23.90 (1.603)	0.0018 (0.794)	-60.14* (-1.992)	-38.16 (-0.842)	1842.64* (3.747)	0.50
Iron (mg)	-0.115 (-1.17)	0.453 (0.864)	0.0018 (0.663)	-1.411 (-1.327)	-1.221 (-0.765)	39.46* (2.279)	0.50
Calcium (mg)	0.131 (0.09)	7.53 (1.054)	0.0035 (1.47)	-28.44* (-1.965)	-15.45 (-0.711)	101.02 (0.433)	0.52
Thiamine (mg)	0.002 (0.32)	0.0025 (1.261)	0.0017 (0.254)	0.00449 (-1.089)	0.007 (-1.134)	1.358* (2.025)	0.42
Riboflavin (mg)	-4.67 (-1.05)	3.19 (1.329)	7.78 (0.955)	-8.20 (-1.689)	-0.102 (-1.399)	0.749 (0.947)	0.42
Niacin (mg)	-2.79 (-0.47)	0.551 (1.737)	-2.12 (-0.16)	-0.492 (-0.766)	8.40 (0.087)	-5.012 (0.479)	0.68
Vitamin C (mg)	-0.116 (-0.99)	0.714 (1.14)	-1.02 (-0.47)	-3.334* (-2.263)	0.221 (0.116)	1.242 (0.06)	0.68

*Significance at 5% level

positively influenced by type of family and income of employee and none of the minor elements was found to be significant with the socio-economic factors.

CONCLUSION

Study revealed that higher body weight was due to higher body fat per cent among diabetics. Their intake of calories and fat were also higher. Incidence of diabetes was also influenced by income and type of work (clerical) which reflects on quantum of exercise and stress. The incidence was higher in the age group of 40- 50 years. This makes it imperative for an institution to extend possible welfare activities such as health screening, identifying risks, monitoring and timely counseling to maintain efficiency.

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