DOI: 10.7860/JCDR/2013/5466.3134

Original Article

Physiology Section

Association of Occupational & Prediabetes Statuses with Obesity in middle aged Women

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ABSTRACT

Background: The association between Type 2 Diabetes Mellitus and Obesity is very close. The prediabetes status i.e Impaired Fasting Glucose (IFG) reflects an intermediate condition between normality and diabetes. The socioeconomic position (SEP) is one of the non traditional determinants of type 2 DM. The occupational status, which is a good indicator of the socioeconomic status, also indicates the level and the type of stress that they are exposed to, as well as the individual lifestyle choices. The present work was planned to study the relationship of the prediabetic status with obesity and the occupational status by estimating the Fasting Blood Glucose (FBG) levels.

Objectives: To study the association of the occupational status with the fasting blood glucose levels and obesity in middle aged women.

Method: The Fasting Blood Glucose levels and the BMI were estimated in 300 asymptomatic middle aged women who had no family history of Type 2 Diabetes Mellitus (D.M.), who had been divided into the Control (I), the Pre – obese (IIa) and the Obese groups (IIb). The occupational status was broadly divided into the categories of housewives and service women. The results was analysed statistically by using the correlation coefficient and the 'z' test.

Result: The mean FBG levels in the pre – obese and the obese groups were higher than those in the control group. We found significant differences in the FBG levels in the normal weight, the pre – obese as well as in the obese groups among the service women, but no significant correlation was found in the pre – obese and the obese groups. Among the housewives, we found significant differences in the FBG levels of the normal weight and the obese groups, but not in the pre – obese group. Also, no significant correlation was found in the pre – obese and obese groups among the service women.

Conclusion: The BMI may be good risk predictor for Type 2 D.M. irrespective of the occupational status, especially in middle aged women.

Key words: Occupation, Prediabetes status & Obesity

INTRODUCTION

India is undergoing a rapid epidemiological transition with increased urbanization and socio-economic development, which has led to an increased incidence of lifestyle diseases like hypertension, type 2 Diabetes Mellitus dyslipidaemia, obesity and ischaemic heart diseases [1,2].

Obesity may be considered as a dynamic process of accumulating and 'filling' of the fat cells .This process of 'supporting and carting' of weight for many years apparently takes its toll on the vascular system and when the crude relative risks of obesity for each disease condition are calculated, diabetes mellitus is found to be have the highest risks [3].

As the prevalence rises, there is an urge to understand the determinants beyond the traditional risk factors, e.g. sedentary behaviour and obesity. The socio-economic position (SEP) is one example of such a determinant. The occupational status is a good indicator of the socioeconomic status, which also indicates the level and the type of stress that the patients are exposed to, as well as the individual lifestyle choices .Both stress and faulty life styles can lead to obesity [4].

There is a growing evidence of Impaired Fasting Glucose (IFG) or prediabetes that reflects an intermediate condition between normality and diabetes [5-7]. Obesity is more common among women than among men, especially in the age group of 45 – 49 years [8]. The prevalence of IFG also seems to be higher in women than in men in the Indian population.

As the causal path ways between the occupational status, type 2 diabetes and obesity have not been fully understand, this study was planned to find out the correlation between the occupational status and the fasting glucose levels.

MATERIAL AND METHODS

This was a cross sectional study which was conducted in private dispensaries and the Bharati Vidyapeeth University Medical College, Pune, India. We first found that the subjects visited private dispensaries for acute symptoms. They had no chronic disease. Then they were followed up with their consent and we asked them to talk about our project to their relatives and friends of the said age group. We took their information along with their addresses and visited them for undertaking the further procedures .The study period was Feb 2008 – Jan 2010. The research protocol was approved by the local ethical committee and informed consents were obtained from each subject prior to their inclusion in the study.

This study was conducted on 300 women volunteers who were in the age group of 45 – 49 years. The volunteers who suffered from any chronic aliment, those with a family history of Diabetes Mellitus, those who had Diabetes Mellitus and those who had a history of taking any kind of long term medications were excluded from the

study. The purpose of this study was explained to all the volunteers and written consents were obtained from them. A detailed medical history was taken and a thorough physical examination was performed on all the volunteers.

The body weight was measured and it was recorded to the nearest of 1 kg between 8 to 9 a.m. while the subject was minimally clothed and was standing motionless on a weighing scale with bare feet. The height was measured to the nearest of 1 cm while the subject was standing in an erect position, barefoot, on a flat floor against a vertical scale and with the heels touching the wall and the head held straight. The BMI was calculated and the volunteers were divided into the control, the pre – obese and the obese groups by using the well documented Quetelet's Index [9].

A fasting blood sample of 2 ml was drawn by taking the appropriate aseptic precautions, in the early morning between 7– 8 a.m., after a minimum of 8-10 hours of fasting. The fasting plasma glucose was estimated by the Glucose Oxidase Peroxidase (GOD/POD) method [10]. The Fasting Blood glucose levels (mg/dl) were classified as normal if the FBG levels were < 100 and as IFG if the FBG levels were between 100 – 125 as per the Expert Committee of the ADA norms [5].

The occupational status was broadly divided into the categories of housewives and service women. Those who were not exposed to daily traveling, office work, etc and those who were not required to go outside were labeled as housewives and those who had to go outside daily for their jobs and those who did office jobs were labeled as service women. The data was analyzed statistically by using the SPSS software version 10, along with the correlation coefficient and the 'z' test.

OBSERVATIONS AND RESULTS

Parameter	Control Group (n=100) Mean ± SD	Pre – obese (n=100) Mean ± SD	Obese (n=100) Mean ± SD
FBG in mg/dl	81.12 ± 6.34	84.62 ± 10.08	86.7 ± 10.68

[Table/Fig- 1]: Mean fasting blood glucose level in study and control groups

Occupation	Fasting Blood glucose level		
	Group I	Group II A	Group II B
	Mean ± SD (n= 66)	Mean ± SD (n= 56)	Mean ± SD (n= 54)
House wife	81.17 ± 6.35	84.50 ± 6.64	86.67 ± 8.91

[Table/Fig- 2]: Occupation wise comparison of Fasting Blood glucose level in Housewives

House wife: Group I Vs Group II a: z = 3.08, p<0.002 (Highly Significant)
Group I Vs Group II B: z = 4.67, p<0.0001 (Highly Significant)
Group II A Vs Group II B: z = 1.51, p>0.05 (Not Significant)

Occupation	Fasting Blood glucose level		
	Group I	Group II a	Group II b
	Mean ± SD (n= 34)	Mean ± SD (n= 44)	Mean ± SD (n= 46)
Service	81 ± 4.57	84.77 ± 13.31	86.77 ± 14.03

[Table/Fig- 3]: Occupation wise comparison of Fasting Blood glucose level in service women

Service: Group I Vs Group II A: z = 1.58, p>0.05 (Not Significant)
Group I Vs Group II B: z = 2.27, p<0.05 (Significant)
Group II A Vs Group II B: z = 0.63, p>0.05 (Not Significant)

DISCUSSION

In our study, it was seen that the mean FBG levels in the pre – obese group were higher than those in the control group. The mean FBG levels in the obese group were still higher than those in the control group [Table/Fig- 1], Among the housewives, we found a significant difference in the FBG levels of the normal weight and the obese groups but not in the pre – obese group. Also, no significant correlation was found in the pre – obese and the obese groups. [Table/Fig- 2] We found a significant difference in the FBG levels of the normal weight and the pre – obese as well as the obese groups among the service women but no significant correlation was found in the pre – obese and the obese groups [Table/Fig- 3].

Occupation reflects the social standing/status and it may be related to the health outcomes. Occupation may reflect the social networks, work based stress, control, and the autonomy and it may thereby affect the health outcomes through psychosocial processes [11].

The occupational status not only denotes the socioeconomic status, but it also indicates the stress level to which the person is exposed during the undertaking of the day to day activities . In middle aged women, various reasons were given for the impaired glucose status, among which stress or depression was most commonly found. But no studies have compared the occupational status with the fasting glucose levels.

The stronger association of education with death from cardiovascular causes than with other causes of death, may reflect the function of education as an index of the socioeconomic circumstances in early life, which appear to have a particular influence on the risk of cardiovascular disease, among which diabetes is one of the important diseases which causes a major health burden.

Various studies [12-14] which were done on the depressive symptoms and the stressful life events among middle-aged women, found that psychosocial factors were associated with the dysregulation of the hypothalamo – pituitary – adrenal axis, which had resulted in an increased release of cortisol, a decreased glucose uptake, and elevated glucose levels. It was also observed that low levels of serotonin were found in most of these obese subjects [15]. Serotonin is not only responsible for the mood, but it also regulates the food intake. Having no control on the food intake due to the low serotonin levels which are associated with a lack of exercise, may probably account for this weight gain.

A study which was done by Annette M et al., [16] showed the effects of aging on the pancreatic β-cell function in humans. Some observations have suggested that fat produces chemical signals that act on the muscles and the liver, which can increase the insulin resistance [17,18]. A variety of knockouts of the intracellular second messengers have been reported to increase the insulin resistance. It is unclear as to how-or indeed – these findings fit together to provide an explanation on the correlation of obesity with the insulin tolerance, but the topic is obviously an important one, and it is under intensive investigations.

In middle aged women with Type 2 DM apart from diet and exercise, there could be other factors which are responsible for the increased weight. They could be physical factors and the psychological work

environment. So, our study suggested that whatever may be the occupational status , obesity which is caused by stress may be an important indicator of type 2 DM.

In our study, occupation reflected the social networks, work based stress, control, and the autonomy and it was found to thereby affect the health outcomes. Various studies [4,11,19] have provided evidence on the association between the work stress and metabolic disorders. The occupational status was associated significantly with type 2 DM, arterial hypertension, and dyslipidaemia in both genders in various studies .

In Type 2 DM with obesity, a low energy, low carbohydrate diet, by itself, may be effective in controlling the disease in most of the patients. A reduction in the amount of body fat increases the sensitivity to endogenous insulin, it diminishes the need for an excessive secretion of insulin by the beta cells and it prevents beta cell exhaustion [20].

It is very important to note that the people with impaired fasting glycaemic can change their life style to stare off to delay the onset of diabetes [21]. Weight control would be the most effective method for reducing the risk of Type 2 DM Unfortunately, obesity is difficult to treat and it requires a high order of motivation on the patient's part.

Thus, weight gain and increased IFG correlate well and it supports our study of higher percentage of IFG incidence with increased BMI. Yoga and meditations are important means for reducing the stress which is related to the occupational work. So, the use of such therapies should be encouraged. The general public does not recognise the connection between overweight or obesity with diabetes and so greater efforts for educating the obese and the pre – obese are needed.

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Financial or Other Competing Interests: None

Date of Submission: **18 Dec, 2013**
Date of Peer Review: **07 May, 2013**
Date of Acceptance: **17 May, 2013**
Date of Publishing: **01 Jul, 2013**