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Metabolic Syndrome and its components are related to psychological disorders: A population based study

Running title: anxiety and depression in metabolic syndrome

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Abstract

Background: Psychological disorders are considered as today's one of the most important public health problems all around the world. Another alarming condition, which attributed to cardiovascular disease (CVD) is metabolic syndrome (Mets). The aims of the current study were to explore (1) the prevalence of anxiety and depression in a large representative population of Iran, and (2) evaluate their possible association with MetS patients.

Method: Applying a randomized stratified-cluster approach, 9829 adults, aged 35–65 years, were recruited as part of the MASHAD study. Socio demographic, anthropometric and biochemical analyses were performed. Beck's anxiety inventory and Beck's depression inventory II were applied to assessment of the degree of anxiety and depression among the subjects.

Results: The prevalence of MetS, anxiety and depression were 38.8%, 25% and 31.5%, respectively. The prevalence of these factors was significantly ($P<0.05$) higher in women, compared to men and subjects with MetS were significantly ($P<0.05$) associated with both anxiety and depression. Additionally, multivariate analysis after adjusting for potential confounders showed a significant relationship between MetS and anxiety ($p=0.04$).

Conclusion: Our data demonstrates the significant association of MetS components with anxiety and depression and high prevalence of these co-morbidities in adults, particularly in women.

Abbreviations: CI confidence interval, BAI Beck's Anxiety Inventory, BDI-II Beck Depression Inventory – Second edition, BMI Body Mass Index, FBG Fasting Blood Glucose, LDL-C low Density Cholesterol, HDL-C High Density Cholesterol, HS-CRP Hormone Sensitive C Reactive Protein, OR Odds Ratio.

K**eywords**: Metabolic Syndrome; Anxiety; depression; Beck.

Introduction

Psychological disorders such as anxiety and depression have become important public health problems throughout the world (1, 2). In women and men, depressive disorder considered as a fourth and seventh leading cause of disease burden respectively (3, 4). In about 15% of depressive patient especially young and elderly men suicide attempt may happen (5). The prevalence of depressive disorders among Iranian adults is higher than Western countries. It was estimated previously that about 21% and 20.8% of Iranian adults suffer from depressive and anxiety symptoms respectively (6). However, another alarming condition which has attracted the attention of health authorities is Mets. Mets is associated with insulin resistance and it has a strong correlation with diabetes mellitus and CVD morbidity and mortality (7). It has been shown that the prevalence of this metabolic disorders has increased to a considering level in both industrial and developing countries, which makes it to a major public health concern (8). According to the National Cholesterol Education Program's Adult Treatment Panel III report (ATP III) definition, the prevalence of the Mets have estimated between 9.6% to 55.7% in Europe, Asia, Australia, and North and South America (8). It has been shown that the increasing in the prevalence of chronic disease especially cardiovascular disease is more rapidly among developing countries than the industrial countries (9). In Iranian adults, the reportages of the Mets prevalence were varied between 33.2% in Tehran (10) and 23.3% in Isfahan and Arak (in the center) (11) and 42.3% in the North (Babol) (12) based on ATP III criteria. The association between Mets and psychological disorders remain controversial. For example, previous studies showed the significant relationship between Mets and depression but not with the anxiety (13, 14). The other study showed that there were not any correlation between Mets and psychological factors such as depression and anxiety

(15). Nevertheless, in another study Mets is associated with anxiety, depression and distress (16). It is suggested recently that more assessment in this kinds of studies are needed (16).

To the author's knowledge, there are only a very few study in Iran which have estimated the prevalence of depressive disorders and the association between MetS and psychological factors based on the comprehensive community sample. Therefore, this study was conducted with the aims of determining the prevalence of mental disorders and evaluation of the association between Mets and its components include fasting blood glucose (FBG), triglyceride (TG), high density lipoprotein cholesterol (HDL-C) waist circumstance (WC), systolic and diastolic blood pressure, and other variables include low density lipoprotein cholesterol (LDL-C), also with body math index (BMI), physical activity and socio demographic variables such as level of education and occupation with depression and anxiety among a representative large adult population in Iran.

Method and Material

Population

This cross sectional study is a part of the Mashhad stroke and heart atherosclerotic disorder (MASHAD) study, the comprehensive prospective cohort study which is currently being implemented (17, 18). The protocol was founded and supported by Mashhad University of Medical Sciences. Ethic Committee of Mashhad University of Medical Sciences approved the study.

As it explained in detail elsewhere (17, 18), using a stratified cluster random sampling technique, participants were chosen from three regions in Mashhad. After dividing each of these three regions into nine sites centered upon Mashhad Healthcare Center divisions, family members who were between 35-65 years of ages were informed about the study with a brochure of the study. Finally, from a total of 2427117 residents of Mashhad city, 11800 individuals were chosen through

stratified cluster random sampling, of which 9829 met the inclusion criteria. All of the participants were asked to fill consent form before enrolling.

Phenotypic definition of MetS

The National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) and International Diabetes Federation (IDF) guidelines were used to define metabolic syndrome (19, 20).

Assessment of depression and anxiety

Psychological interviews were performed by a psychiatrist blinded to the data. Subjects were characterized by Symptom Checklist 90 Revised (SCL-90-R), Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI). According to validation data and normative measures, a BDI score of 0–7, minimal level of anxiety; 8–15, mild anxiety; 16–25, moderate anxiety and 26–63, severe anxiety. To assess the depression, we used the Beck's depression inventory II (BDI-II) to interpret the scores with cut-offs: 0–13, minimal depression; 14–19, mild depression; 20–28, moderate depression; and 29–63, severe depression.

Assessment of Socioeconomic and Lifestyle Factors

A structured questionnaire administered by a study physician was utilized to investigate employment, physical activity, marital and smoking status, and medical history including prior CVD. Marital status question had four choices, Likert-type scale (1=single, 2=married, 3=divorced, 4=widow. For the job question using 4 choices (1=student, 2=having job, 3=jobless, 4=retired). Physical activities of each subjects were divided into four categories: inactive, low active, active and very active.

Anthropometric and Biochemical Measurements

Anthropometric parameters including body weight, Body mass index (BMI), waist circumference (WC) were evaluated in all the subjects, as described previously (21, 22).

Biochemical factors including total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C) and triglyceride (TG), C-reactive protein (CRP), fasting blood glucose (FBG) were measured, as reported earlier (23-25).

Statistical analysis

Data were calculated using SPSS-20 software (SPSS Inc., IL, USA). Kolmogorov-Smirnov test was used for assessing the normality of the data. Descriptive statistics for variables which had normal distribution was performed and reported as mean ± SD. binary logistic regression followed by multiple logistic regression analysis was also applied to express the factors correlated with depression scores > 16 as well as anxiety scores > 16. Then, if in the univariate analysis factors showed significance, they were comprised in the multiple logistic regression analysis. Depression scores (≥ 16 versus < 16) and anxiety scores (≥ 16 versus < 16) were considered as the dependent variables. All the analyses were two-sided and statistical significance was set at $P<0.05$.

Results

Table 1. shows the clinical and biochemical features of population characterized by BDI and BAI. In particular, approximately 60% of this population were women. The mean of age of total population was 48.1 (48.9 years of age in men and 47.6 years of age in women). Age distribution and socioeconomic characteristics of the study sample were presented by detailed in another place (17). The prevalence of MetS were 38.8% (N=3797) among study subjects (Table 1).

MetS and Depression

The prevalence of anxiety and depression were 25% and 31.5% in the study subjects, respectively, which were significantly higher among female than men for both ($p < 0.001$). Univariate analysis shows that female sex, unemployment and being retiree, being unmarried, physical activity, high WC, overweight, obesity and MetS have a positive significant association with anxiety ($p < 0.05$). However, high serum HDL-C and hs-CRP are inversely correlated to the anxiety among study subjects ($p < 0.05$). Nevertheless, between anxiety and factors include age, total cholesterol, LDL-C, TG, FBG, systolic and diastolic blood pressure, there were no relationship. Depression have a statistically significant positive association with female sex, unemployment and being retiree, being unmarried, physical activity, FBG>100, high WC, overweight, obesity, serum HS-CRP, and Mets. However, there are significant inverse association between high serum HDL-C and diastolic blood pressure and depression. Nevertheless, other variables include age, total cholesterol, LDL-C, TG, systolic blood pressure do not have a significant relationship with depression. Table 1. Presents the association between anxiety and depression with social demographic, anthropometric and biochemical factors in addition to Mets. After adjusting for age and sex, Multivariate analysis shows a significant association between anxiety and Mets (OR=1.1; (1.00-1.21) p= 0.04). Furthermore, unemployment and being retiree, being active, LDL-C > 130, obesity and HS-CRP have a positive significant association with anxiety ($p < 0.05$). Serum HDL-C have a negative correlation with anxiety ($p < 0.05$). Nevertheless, the relationship between marital status, being low active and very active, total cholesterol, TG, FBG, WC, systolic and diastolic blood pressure and being overweight with anxiety were not statistically significant. In addition, based on Multivariate analysis after adjusting for sex and age, depression and Mets do not have a significant correlation (OR=1.04; (0.95-1.14) p= 0.31). However, depression have a direct association with

unemployment and being retiree, being unmarried, FBG > 126, obesity and HS-CRP ($p < 0.05$). Being low active and very active, HDL-C and WC have an inverse association with depression ($p < 0.05$). Nevertheless, being very active, total cholesterol, LDL-C, TG, 100 < FBG < 126, systolic and diastolic blood pressure and overweight status do not have any significant relationships with depression. Table 2. Shows the association between anxiety and depression with social demographic, anthropometric and biochemical factors in addition to Mets after adjusting for age and sex.

Discussion

We demonstrate an association between the MetS and anxiety in our population. Among the MetS components, we observed a relationship between HDL and anxiety. Similar results were also detected for this component with depression. Furthermore, waist circumference was related with depression in patients with metabolic syndrome, which is in agreement with previous observations (48).

According to the ATP III definition 3798 (38.7%) of subjects had Mets, which is in agreement with our observations (12, 26). 2456 (25%) and 3089 (31.5%) of the participants suffered from anxiety and depression respectively, which are both significantly higher among women compared to men (18.2% among women and 6.8% among men for anxiety), and (21.9% among women and 9.5% among men for depression). A previous study estimated that about 10-12 million Iranian people suffer from the mental disorders (6). In the United States in each year the prevalence of depression and anxiety were estimated about 18% and 6.6% among adult population respectively (27, 28). In line with the results of our study, the results of the former epidemiological study showed higher mental disorders in women in comparison to the men (1).

With respect to the indecisive results about association between depression and MetS, it is suggested that counter regulatory hormones such as catecholamine a neurotransmitter, glucocorticoids, growth hormones, and glucagon activated during psychological stress and strains cause impaired insulin function and cause diabetes (29-31). It seems that this poor glycemic control and side effects of diabetes mellitus might lead to depression or worsen it (30). On the other hand, the relationship between higher hemoglobin A1c, more long-term diabetes complications, and more diabetes medications with depressive symptoms, was shown (32). However, Herva et al found no association between Mets and depression (15) though findings from other studies (33, 34) showed the significant association between depression and MetS in adult samples. Generally, the cross sectional nature of most of the studies, different categorization of age, different sampling, dissimilar tools for evaluation of depression and different definition of MetS applied in these studies, might explain these controversial findings about depression and Mets. It is worthy to note that using clinical assessment rather than self-reported questionnaires and implementing more longitudinal studies could lead to more precise results in the future.

Considering results about depression and FBG, a previous meta-analysis study showed that depression increase the likelihood of diabetes type 2 about 60% and diabetes type 2 had a modest association with depression (35). In the current study anxiety associated significantly with Mets. Although some of previous studies did not find any association between anxiety and Mets (13, 14), the others found significant association between them (16, 36) which implied the heterogonous findings in this field of study. It seems that diagnosis of Mets might lead to enhance anxiety. However, if we consider that Met followed anxiety, there may be two potential strategies: first, anxiety may affect the biological functions such as activation of sympathetic nervous system, dysregulation of hypothalamic-pituitary-adrenocortical and make lessen awakening cortisol

response which considered as a pathogenesis of Mets (36-38). Second, anxiety might contribute to unhealthy lifestyle such as unhealthy diet and physical inactivity which may result in Mets (39).

As previously have been shown frequently (40, 41), in our study marital and occupational status have an association with psychological disorders. It is proposed that unemployment could resulted in more stress (40) and it may be an indicator for lower socio economic status. A meta-analysis of longitudinal studies has been proved the association between losing job and mental disorders (42). Both depression and anxiety significantly associated with obesity, which confirm the results of previous studies showed that both anxiety and depression cause weight gain (43, 44). A recent systematic review and meta-analysis study analyzed longitudinal studies found a bidirectional association between obesity and depression. It was considered that negative consequences of obesity such as low self-image or somatic problems may lead to depression. Whereas, dysregulated stress systems or unhealthy lifestyles which are more common in the depressive persons could increase the likelihood of obesity (45). Only one component (HDL-C) of lipid profile has a significant correlation with depression, and LDL-C and HDL-C have a significant association with anxiety using Multivariate test. The results of a cohort study showed that having depression or anxiety in baseline were found to be significant predictor for only low HDL-C among lipid profile among adult population, after two years of follow up (46). Nevertheless, it has been shown that both generalized anxiety disorder and major depressive disorder cause higher plasma total cholesterol, LDL-C, TG and lower HDL-C (47).

In the current study, anxiety and depression have a significant correlation with WC though significant association was not seen for anxiety and WC after adjusting for sex and age. Although a previous study (48) found a significant association between WC and depression, another study (15) did not find significant and consistent associations. Cortisol elevation in a depressive

individuals might cause increasing in abdominal fat, which can considered as etiology of relationship between depression and Mets (49).

Multivariate analysis showed that both depression as well as anxiety has a significant correlation with hs-CRP. It was suggested previously that depression and anxiety cause increasing disorders which related to inflammation and conversely depression and anxiety followed by systematic inflammation (50, 51). In line with results of the present study, previous studies found significant association between hs-CRP with anxiety (52, 53) and depression (51, 54). Unexpectedly, multivariate analysis showed that categorized as an active individual associated with both anxiety and depression. Although the mechanism of the effect of exercise on mental health is not well known, observational studies indicated the importance of leisure physical activity to reduce depression and anxiety (55, 56). However, it should be considered that extremely active individuals usually take part in a competitive sport, which is sometimes stressful. A previous prospective cohort study, conducted among competitive collegiate student athletes showed that 21% of subjects experienced depression especially women (57).

In spite of unique sampling which is illustrative of large adult population of Iran, our study have some limitations. First, measurement bias may exist since some data including socio demographic and psychological variables were acquired by self-report questionnaire. Second, like other cross sectional studies determining of the relationship between cause and effect is impossible. For instance, the causal relationship between psychological disorders and Mets to determine which one precede the other one is not clear in this study.

Conclusion

Our findings illustrated a notably alarm for health authorities about the high prevalence of MetS and depression/anxiety among adults particularly women in Iran. Implementation of intense

interventional studies toward to improve heath situation of the community and prevent from adverse outcomes of metabolic and mental disorders are really necessary. In contrast to the apparent association between anxiety and MetS, there was not a conclusive relationship between depression and Mets. In future, more studies especially longitudinal studies will be needed to determine the precise relationship between Mets and depression and anxiety.

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Table 1. Univariate analysis of demographic, anthropometric and clinical parameters in relation to anxiety and depression.

	BAI-anxiety score		Unadjusted OR(95% CI)	P-value	BDI-II Depression score		Unadjusted OR(95% CI)	P-value
	≤ 16 N= 7373	**> 16 N= 2456**			**≤ 16 N=6732**	**> 16 N=3089**		
Age (years)								
< 40	1642 (16.7%)	561 (5.7%)	Reference		1508 (15.4%)	695 (7.1%)	Reference	
≥ 40	5722 (58.3%)	1895 (19.3%)	1.0 (0.9 - 1.1)	0.575	5224 (63.2%)	2394 (24.4%)	1.0 (0.9-1.1)	0.913
Gender								
Male	3271 (33.3%)	672 (6.8%)	Reference		3006 (30.6%)	938 (9.5%)	Reference	
Female	4102 (41.7%)	1784 (18.2%)	2.1 (1.9 - 2.3)	< 0.001	3730 (37.9%)	2156 (21.9%)	1.8 (1.7 - 2.0)	< 0.001
Job status								
Having job	5091 (52.1%)	1564 (16%)	Reference		4691 (48%)	1965 (20.1%)	Reference	
Jobless	778 (8%)	367 (3.8%)	1.68 (1.48-1.91)	<0.001	682 (7%)	463 (4.7%)	1.62 (1.42-1.84)	<0.001
Retired	1460 (14.9%)	516 (5.3%)	1.71 (1.55 – 1.9)	<0.001	1323 (13.5%)	653 (6.7%)	1.17 (1.05-1.31)	0.003
Marital status								
Married	6916 (70.4%)	2242 (22.8%)	Reference		6346 (64.6%)	2813 (28.6%)	Reference	
Other	455 (4.6%)	215 (2.2%)	1.45 (1.23 – 1.72)	<0.001	389 (4%)	281 (2.9%)	1.63 (1.38-1.91)	<0.001
Physical activity								
Inactive	1864 (19.0%)	460 (4.7%)	Reference		1688 (17.2%)	636 (6.5%)	Reference	
Low active	1963 (20.0%)	690 (7.1%)	1.42(1.24-1.62)	< 0.001	1831 (18.7%)	823 (8.4%)	1.19(1.05-1.34)	0.005
Active	2646 (27.0%)	964 (9.8%)	1.47(1.3-1.67)	< 0.001	2416 (24.6%)	1194 (12.2%)	1.31(1.17-1.47)	< 0.001
Very active	874 (8.9%)	341 (3.5%)	1.58(1.34-1.85)	< 0.001	782 (8.0%)	433 (4.4%)	1.47(1.26-1.7)	< 0.001
Total Cholesterol								
<200	4580 (46.6%)	1493 (15.2%)	Reference		4177 (42.5%)	1897 (19.3%)	Reference	

200≤	2795 (28.4%)	965 (9.8%)	1.1 (1.0 - 1.2)	0.229	2562 (26.1%)	1198 (12.1%)	1.0 (0.9 - 1.1)	0.513
LDL- Cholesterol								
<130	4949 (50.3%)	1689 (17.2%)	Reference		4530 (46.1%)	2109 (21.4%)	Reference	
130≤	2426 (24.7%)	769 (7.8%)	0.9 (0.8 - 1.0)	0.140	2209 (22.5%)	986 (10.0%)	0.9 (0.9 - 1.0)	0.365
HDL- Cholesterol								
<40 in men and <50 in women	4553 (47.6%)	1683 (17.6%)	Reference		4119 (43.1%)	2118 (22.1%)	Reference	
40≤ in men and 50≤ in women	2604 (27.2%)	728 (7.6%)	0.75(0.68-0.83)	< 0.001	2410 (25.2%)	922 (9.6%)	0.74(0.67-0.81)	< 0.001
Triglyceride								
< 150	4864 (49.8%)	1594 (16.3%)	Reference		4444 (45.5%)	2014 (20.6%)	Reference	
≥ 150	2461 (25.2%)	848 (8.7%)	1.05(0.95-1.15)	0.308	2249 (23.0%)	1061 (10.9%)	1.04(0.95-1.13)	0.382
Fasting blood glucose								
< 100	5998 (61.4%)	1957 (20%)	Reference		5502 (56.3%)	2454 (25.1%)	Reference	
100 ≤ FBG < 126	672 (6.9%)	250 (2.5%)	1.14(0.97-1.33)	0.09	607 (6.2%)	315 (3.2%)	1.16(1.00-1.34)	0.04
≥ 126	653 (6.7%)	235 (2.4%)	1.10(0.94-1.29)	0.22	583 (6%)	305 (3.1%)	1.17(1.01-1.35)	0.03
Waist circumstance								
Normal	1957 (19.9%)	500 (5.1%)	Reference		1766 (18.0%)	691 (7.0%)	Reference	
High	5416 (55.1%)	1956 (19.9%)	1.41(1.26-1.57)	< 0.001	4970 (50.6%)	2403 (24.4%)	1.23(1.11-1.36)	< 0.001
Systolic blood pressure								
< 140	6216 (63.4%)	2047 (20.9%)	Reference		4759 (484%)	2254 (22.9%)	Reference	
≥ 140	1134 (11.6%)	401 (4.1%)	1.07(0.94-1.21)	0.26	1980 (20.1%)	841 (8.6%)	1.02(0.91-1.15)	0.7
Diastolic blood pressure								

< 90	5940 (60.6%)	1976 (20.2%)	Reference		4970 (50.5%)	2345 (23.8%)	Reference	
≥ 90	1410 (14.4%)	472 (4.8%)	1.00(.89 - 1.13)	0.916	1769 (18%)	750 (7.6%)	0.89(0.8-0.99)	0.048
Body Mass Index								
< 25	2131 (21.7%)	563 (5.7%)	Reference		1944 (19.8%)	750 (7.6%)	Reference	
25 ≤ BMI <30	3193 (32.5%)	963 (9.8%)	1.14(1.01-1.28)	0.02	2888 (29.4%)	1269 (12.9%)	1.13(1.02-1.26)	0.01
≥ 30	2032 (20.7%)	929 (9.5%)	1.73 (1.53 – 1.95)	< 0.001	1891 (19.3%)	1070 (10.9%)	1.46(1.31-1.64)	<0.001
hs-CRP								
< 3 mg/L	5300 (54.3%)	1609 (16.5%)	Reference		4870 (49.9%)	2040 (20.9%)	Reference	
≥ 3 mg/L	2021 (20.7%)	832 (8.5%)	0.7 (0.7-0.8)	< 0.001	1818 (18.6%)	1035 (10.6%)	1.35(1.23-1.49)	< 0.001
Metabolic Syndrome								
No	4597 (46.9%)	1416 (14.4%)	Reference		4193 (42.7%)	1820 (18.6%)	Reference	
Yes	2762 (28.2%)	1035 (10.6%)	1.21(1.1-1.33)	< 0.001	2529 (25.8%)	1269 (12.9%)	1.15(1.06-1.26)	0.001

Table 2. Multivariate analysis of demographic, anthropometric and clinical parameters in relation to anxiety and depression.

		Anxiety					Depression			
	B	**S.E.**	**Wald**	**p-value**	**Odds with 95% CI**	**B**	**S.E.**	**Wald**	**p-value**	**Odds with 95% CI**
Job status										
Having job					Reference					Reference
Jobless	0.32	0.07	19.8	<0.001	1.39 (1.2-1.6)	0.39	0.07	31.3	<0.001	1.47 (1.28-1.69)
Retired	0.14	0.06	4.4	0.03	1.14 (1-1.3)	0.14	0.06	6	0.01	1.15 (1.03-1.3)
Marital status										
Married					Reference					Reference
Other	0.15	0.08	2.86	0.09	1.16 (0.97-1.38)	0.28	0.08	11.4	0.001	1.32(1.12-1.56)
Physical activity										
Inactive					Reference					Reference
Low active	-0.08	0.08	1.13	0.287	0.92 (0.79 - 1.07)	-0.20	0.07	8.04	0.005	0.82 (0.71 - 0.94)
Active	-0.19	0.08	5.96	0.015	0.83 (0.71 - 0.96)	-0.23	0.07	10.74	0.001	0.79 (0.69 - 0.91)
very active	-0.03	0.09	0.08	0.775	0.97 (0.81 - 1.16)	-0.03	0.08	.14	0.704	0.97 (0.82 - 1.14)
Total Cholesterol										
<200					Reference					Reference
200≤	-0.01	0.05	0.02	0.886	0.99 (0.90 - 1.01)	0.02	0.05	0.19	0.656	1.02 (0.93 - 1.12)
LDL-Cholesterol										
<130					Reference					Reference
130≤	0.11	0.05	5.05	0.025	1.12 (1.01 - 1.24)	0.078	0.05	2.67	0.102	1.08 (0.98 - 1.85)
HDL-Cholesterol										

<40 in men and <50 in women					Reference					Reference
40≤ in men and ≤ in women	-0.14	0.05	8.23	0.004	0.86(0.77-0.95)	-0.19	0.04	16.41	<0.001	0.82(0.74-0.9)
Triglycerides										
< 150					Reference					Reference
≥ 150	-0.09	0.05	3.34	0.06	1.09(0.99-1.21)	-0.06	0.04	2.03	0.15	1.06(0.97-1.17)
Fasting blood glucose										
< 100					Reference					Reference
100 ≤ FBG < 126	0.14	0.08	2.95	0.086	1.15 (0.98 - 1.34)	0.15	0.07	3.80	0.051	1.16 (1.0 - 1.34)
≥ 126	0.09	0.08	1.34	0.247	1.10 (0.94 - 1.30)	0.16	0.08	4.19	0.041	1.17 (1.0 - 1.36)
Waist circumstance										
Normal					Reference					Reference
High	-.036	.064	.312	0.57	0.96 (0.85 - 1.09)	-0.12	0.059	4.38	0.036	0.88 (0.79 - 0.99)
Systolic blood pressure										
< 140					Reference					Reference
≥ 140	0.05	0.06	0.66	0.41	1.05(0.92-1.2)	-0.02	0.06	0.13	0.71	0.97(0.86-1.1)
Diastolic blood pressure										
< 90					Reference					Reference
≥ 90	0.03	0.06	0.33	0.56	1.03(0.91-1.16)	-0.11	0.05	3.78	0.05	0.89(0.79-1.00)
Body Mass Index										
18.5-24.9					Reference					Reference
25-29.9	0.06	0.06	0.87	0.351	1.06 (0.94-1.19)	0.07	0.05	1.60	0.206	1.7 (0.96 - 1.20)

≥ 30	0.35	0.06	30.21	< 0.001	1.42 (1.25-1.61)	0.21	0.06	12.80	P<0.001	1.24 (1.10 - 1.39)
hs-CRP										
< 3 mg/L					Reference					Reference
≥ 3 mg/L	0.24	0.05	23.18	< 0.001	1.28 (1.15-1.41)	0.25	0.05	28.15	< 0.001	1.29 (1.17 – 1.41)
Metabolic Syndrome										
No					Reference					Reference
Yes	0.09	0.05	3.88	0.04	1.1(1.00-1.21)	0.04	0.04	1.00	0.31	1.04(0.95-1.14)

Abbreviations: CI confidence interval, BAI- Beck's Anxiety Inventory, BDI-II Beck Depression Inventory – Second edition, BMI Body Mass Index, FBG Fasting Blood Glucose, LDL-C Low Density Cholesterol, HDL-C High Density Cholesterol, HS-CRP Hormone Sensitive C Reactive Protein, OR Odds Ratio.