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Screening and Correlation Between Nephropathy and Risk Factors of DM II Among Army Members Older than 45 in the City of Tehran

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Considering the importance of military forces health and high prevalence of diabetes in Iran in addition to the the high burden (more than 50% of the whole disease's burden on the health system) of controlling and treating the complications of DM II, make investigating factors that cause these complications in military forces significant. The aim of this study is to evaluate the relation between DM II risk factors (including metabolic syndrome) and Micro-Albuminuria among military members older than 45 in the city of Tehran. A cross-sectional study is designed using the outputs of a study down in 2010 in Iranian Army which revealed DM II prevalence and it's relation with career and non-career dependent risk factors.36 diabetic patients were entered to the study and the subjective of the study was evaluated among them in three different sessions having 3 months intervals.The results were put into analysis using SPSS17 software. Among all factors studied only LDL(p-value<0.01) and age(p-value<0.05) had a meaning-full correlation with Micro-Albuminuria. Comparing the results of this study and the others we could dedicate that except LDL (which it's rule in Micro-Albuminuria progression is controversial in other studies) and Age(which is mostly known as an etiologic factor for DM II itself), diabetic nephropathy is not mainly under effect of factors causing DM II. In the other words these factors have an etiologic impact on the disease rather than it's progression and prognosis.

Key words: Diabetes, Army, Risk Factor, Nephrotic Complications.

With the reduction of morbidity and mortality caused by infectious diseases and the change of life style in recent decades[1], cardiovascular diseases, cancer, diabetes and metabolic syndrome have gained special importance in health care systems[2]. Among these, diabetes has become a great concern for everyone because of its huge influence on both the health care system and subsequently economy. According to latest studies it is the sixth(fifth in some other studies) human being killer in U.S.A[1,2].

Micro-vascular and macro-vascular complications of diabetes –including cardiovascular diseases, neuropathies, lower limb amputation- are among important factors which increase the morbidity and mortality of the disease. For example diabetes is the most prevalent etiology of ESRD, non-traumatic lower limb amputation and blindness.Also it stands as one of the most important risk factors for cardio-vascular which

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itself is the most prevalent death etiology in developed countries[1,2].

It is of importance that diabetes has variation in its distribution in different areas; in China it is 3% prevalent but in places like India and Middle East statistics shows an 8% prevalence[3]. Iran is also in the red district of diabetes (more than 8% prevalence) and although some good contributions have been done in the country, there is still a long way to go.

Considering the high prevalence of the disease, being symptomless in early stages and easy preventive methods for preventing diabetes complications, WHO and ADA have suggested some protocols for screening of the disease. The designed protocols are too general and should be edited according to countries economic situations and health priorities.

For this purpose there is a vital need of data even in sub-organizations of any country about the prevalence, complications, risk factors, relative burden and the relation between complications and the risk factors of the disease; the question here is whether or not could we use ADA or any other country's suggestions in Iranian army. This make us focus on population pattern, conditions and previous studies in Iranian army:

-About the population pattern of the army we should mention that although the members are chosen from the whole population but they are not a random sample and the selection bias exists; it is due to the different tendencies and physical conditions of applicants who want to enter the army and also the selection of healthy people by the system. In addition considering the inevitable physical and mental stresses associated with militant responsibilities, the military life style is much different from others.

The process for making health policies would be easier in military systems compare to other systems because of the presence of specific military discipline which is the availability of the individuals and existence of registration systems and the basic mechanisms for practicing health policies are present in armies and has a lower burden in comparison with non-military society.

It is logical that the results of studies down in armies are considered military secrets and each country has to do its own study; the only studies found in the literature were from U.S.A army which reported the prevalence of diabetes 1/10 of normal population[4] and from Indians who reported the prevalence of un-diagnosed diabetes 2.7% in their army[5].

In a study down in 2010 between 858 of the army employees in Tehran, Iran aged over 45 diabetes prevalence was reported 10.8%,IFG 35.3%; among which 43% were known cases and 57% were not aware of their disease[6].Considering the importance of military employee's health and the statistics mentioned with comparison with national statistics of Iran (7.7% for DM2 and 16.8% for IFG) and the high percentage of un-diagnosed diabetes[6], there is no data about the prevalence of the complications of the disease.

Diabetic Nephropathy

The increase in protein excretion in urine is the first clinical manifestation of diabetic nephropathy[7,8] and measuring albumin excreted in urine is an appropriate method for reporting proteinuria .Normal albumin excretion in urine is less than 20 Mg per day(15 Micro-g per minute) and micro-albuminuria is defined as persistent excretion of 30to 300 Mg albumin in urine per day (20 to 200 Micro-g per minute) which is diagnostic of nephropathy in diabetic patients in the absence any other renal disease.Excretion of more than 300 Mg albumin per day(more than 200 Micro-g per minute) is considered macro-albuminuria (proteinuria, clinical renal disease with positive deep-stick test)[9].

The golden standard for micro-albuminuria detection is the 24 hours urine test[9, 10], and in the other hand and according to some studies measurement of albumin to creatinine ratio is the preferred method for screening micro-albuminuria in diabetic patients because it gives a quantitative criteria which is in proved relation with protein excreted in 24 hours urine sample, is easy to be done, is economic and could be easily repeated to prove the persistence of micro-albuminuria[7, 9, 10, 11].

This study is focused on the prevalence of renal complications of diabetes (BUN/Cr, U/A and micro-albuminuria) and the correlation of these complications with risk factors such as HTN, age, lipid profile, BMI, metabolic syndrome, different family histories and the impact of membership in different forces of the army among employees aged over 45 in Tehran, Iran

MATERIALS AND METHODS

1. Personal Information: from the aspect of perpetuity and justifiability are fully reliable.
2. Past Medical History: because in most medical centers this information has been claimed by the patients themselves, its justifiability could not be fully trusted.
3. Anthropometric Measures: performed by trained personnel and fully trusted.
4. Blood Pressure: reliable blood pressure measurement needs sufficient training and in this study has been down by experienced GPs.
5. Laboratory Data: FBS, TG, Cholesterol and HDL were measured with auto-analyzer device using enzymatic method. LDL levels were computed using cholesterol,TG and HDL(in cases in which HDL was more than 400 Mg/dl the case was excluded).
6. In addition to DM2 risk factors extracted from textbooks and articles, some other factors were hypothetically considered potential risk factors using the basics of physiopathology of renal complications of DM2 and the conditions of military employees and were added to the variables.
7. In three different stages (with more than three months intervals) patients were invited, interviewed and examined. After rolling out other factors which could cause proteinuria, BMI and W/H ratio was measured and BUN,Cr,24 hours urine analysis test for micro-albuminuria, FBS, Cholesterol, HDL, LDL, TG,HbA1c and U/A were requested. Same kits, same staff and same devices were used for all patients and in all three stages.
8. For evaluation of the correlation of risk factors with renal complications the SPSS software was used; the sample was divided to 4 groups (2*2 table) for each risk factor and if P-Value was lower than 0.05 odds ratio was calculated respectively. For quantitative variables (BMI,W/H & …) patients were divided to two groups with and without nephropathy and the average of the variable was compared between them. The correlation of the variable with nephropathy was calculated using T-Test and when P-Value was lower than 0.05, the correlation was reported with 95% confidence.

RESULTS

Among 11500 files in the army database 37 had the criteria of entering the study;

1. The age average was 56.71, the oldest case 66 y/o
2. 25 patients (67.6%) had a positive smoking history and HTN history was positive in 13 cases (35.1%).
3. Positive family histories were as following:
   1. DM2: 56.8%
   2. HTN:51.4%
   3. HLP: 35.1%
   4. IHD: 40%
   5. CVA: 18.9%
4. 13 patients (35.1%) have a W/H ratio> 0.9.Systolic BP average was 121.25 mmHg and the diastolic 81.42 mmHg
5. Other averages of lab data were as following:
   1. Cholesterol: 174.97
   2. HDL: 50.97
   3. LDL: 104.14
   4. TG: 182.3
   5. BUN/Cr: 15.61

LDL and age had a direct significant correlation with diabetic nephropathy and the higher sensitivity of measuring micro-albuminuria excretion level in urine in comparison with BUN/Cr level for the diagnosis of nephropathy was obvious.

DISCUSSION

In this research the correlation between nephrotic complications and risk factors of military diabetic patients over 45 y/o in Tehran was studied which showed that only higher LDL cholesterol and age are significantly related with the micro-albuminuria as the gold standard of nephropathy diagnosis.

High LDL cholesterol level could contribute to the progression of nephropathy and albuminuria by sedimenting in renal vascular system causing glomerulosclerosis. Similar to this is the role of aging in otosclerosis. In addition aging is the only cause of gradual and progressive

Table 1. The Results of the study

Effective Factors	W/H	Cholesterol in three tests	LDL in three tests	HDL in three tests	TG in three tests	Bun/Cr in	Age
Micro-albuminuria *<.05*	Pvalue >.05	P-value >.05	*P-value <.01*	P-value >.05	P-value >.05	P-value >.05	*P-value*
Effective Factors	HTN Hx	HLP Hx	HLP FH	IHD FH	CVA FH	W	BMI
Microalbuminuria >.05	P-value >.05	P-value >.05	P-value >.05	P-value >.05	P-value >.05	P-value >.05	P-value
Effective Factors	Smoking Hx	Membership in different forces					
Microalbuminuria	P-value >.05	P-value >.05					

reduction in functionality of nephrons, which highlights aging as an etiological factor[12].

The employees of Iranian Army are genetically more healthy than general population and get DM2 due to environmental and job related factors and the proof of the mentioned claim is the presence of lower family positive history of DM2 among them in comparison with normal population (in the research of Larijani et al in the city of Tehran 28 percent had positive family history of DM2 but only 8.3% of our patients have this history)

Due to security and protective issues, there is not a reach data about DM2 in Armies in medical sources[13]. Chapin (2001) run a study in USA army among samples without a positive history of DM2 and reported undiagnosed and IFG 0.5 and 1 percent respectively; which is 0.1 of DM2 prevalence in USA[7].

Nephropathy is responsible for 44% of new ESRD cases[14] and could be present in patients for many years before clinical diagnoses of DM2 in the form of micro- albuminuria. Its progression is slow in the first 10-15 years of getting DM2 but becomes faster significantly afterwards and reaches its height in 18 years period. As Fallo et.al studied in 2008, 7% of DM2 patients suffer micro-albuminuria at the time of diagnoses. According to the study known as UKPDS incidence of micro-albuminuria among DM2 patients is 2%. In each year and its 10 years prevalence is reported 25%. The prevalence of micro albuminuria has variation according to genetic factors (Asians and Hispanics are more in danger than white people)[15]. In a study in the UK among 5100 new DM2 patients, it is mentioned that 6.5%-7% suffers from micro-albuminuria and macro- albuminuria respectively. And the annual rate of progression from normo-albuminuria to micro- albuminuria reported 2%.

Mykkanen et.al reported that age and micro- albuminuria are related in the time of DM2 diagnoses; among 891 non-diabetic individuals, 69 got DM2 in a 35 years periods among which 44% and 68% had micro- albuminuria and hypertension respectively in the time of diagnoses. These statistics where significantly different with the ones reported previously in a population with a 52 y/o age average (30% and 54%)[16].

At the end, according to the results of this study and comparing it with others (although there are different basics among them) we could dedicate

that the diabetic nephropatic is not much affected by the risk factors of DM2 and these factors play an etiologic role in creating DM2 rather than being effective in the progression and prognoses of the kidney health. Of course it is highly recommended that future studies with large samples investigate these relationships.

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