DIABETES MELLITUS IN SOLDIERS, WHAT'S NEW

Muhammad Hafeez, Abdul Hameed Siddiqi, Imran Ahmed*

Combined Military Hospital Multan Pakistan, *Military Hospital/ National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To find out the frequency of diabetes mellitus (DM) and its complications in serving soldiers.
Study Design: Observational cross sectional study.
Place and Duration of study: This was carried out at the medicine department of CMH Multan, from Oct 2016 to Sep 2017.
Material and Methods: Admitted in active service soldiers with polyuria, polydipsia, polyphagia, weight changes and delayed wound healing in the Medical ward during this period meeting the criteria of DM according to American diabetic association (ADA) guidelines were included in this study. Non active soldiers, civilian employees and not meeting the DM criteria were excluded from the study. They were inquired in detail about the symptoms, examined and investigated thoroughly according to pre designed Performa, to find out their number and DM associated complications. The results were analyzed on IBM SPSS version 22.
Results: Out of seven hundred and seventy-two, 55 (7.12%) had diabetes mellitus. The age ranged from 25 to 50 years with mean age of 36.15 ± 5.542. 39 (71%) had type 2 and 16 (29%) type 1 DM. Twenty (36%) had DM associated complications, commonest being nephropathy, retinopathy i.e. 8 (14.5%) and 7 (12.7%) respectively; others were macro vascular, peripheral neuropathy with foot ulcer, diabetic ketoacidosis and hyperosmolar non ketotic coma (HONK), other associated complications were hypertriglyceridemia in 21 (38%) and 6 (11%) hypertension. About 22 (40%) had family history of DM and only one was obese.
Conclusion: Diabetes Mellitus and associated complications are not uncommon in young active soldiers.

Keywords: Diabetes mellitus in soldiers, Diabetes mellitus complications, Military health problems.

INTRODUCTION

Diabetes is a chronic ailment requiring continuous monitoring to prevent complications. Only with good glycemic control long term complications can be prevented[1]. According to ADA guidelines diagnostic criteria for diabetes are fasting blood sugar (FBS) level ≥7 mmol/L, 2 hours after breakfast ≥11.1 mmol/L, glycosylated hemoglobin (HbA1C) ≥6.5% or patient with classical symptoms of hyperglycemia and blood glucose random (BSR) ≥ 11.1mmol/L. It has been classified into type-1, type 2, gestational diabetes and specific types due to other causes[2]. The traditional paradigm of diabetic types in different ages is no longer accurate as diabetic keto acidosis (DKA) can occur in type-2 DM[3] According to global estimates for diabetic prevalence in a literature review by Ogurtsova *et al*, 8.8% world population was diabetic in 2015, and expected to reach 10.4% by 2040[4]. The prevalence of diabetes is alarmingly increasing in uniform personals may be because of their life styles and stressful conditions as explained by Tesfaye *et al* in Ethiopian police[5] and Chao *et al* in US Army but still it was low as compared to general population because of military weight and fitness standers[6]. According to International diabetic federation (IDF), Pakistan rank seventh in countries with most prevalent DM[7] Physical fitness in all aspects is the criteria for enrolment in military, and presence of DM precludes in the army induction. Army has to look after their servicemen with DM, developed during service. DM is a costly disease, estimated cost of diagnose diabetes in United States in 2012 was 245$ billion that will double in next 25 years[8]. No data is available about the burden of diabetes in our

Correspondence: Dr Muhammad Hafeez, Classified Medical Specialist, Combined Military Hospital Multan Pakistan
Email:hfeezm338@gmail.com
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army personnel. Frequent admissions of diabetic soldiers with new diagnosis, poor control and associated complications require assessment to streamline our resources to handle the problem; this study was designed to find out the magnitude of the issue.

MATERIAL AND MERTHODS

This cross sectional study was carried out in CMH Multan from 1st October 2016 to 30th September 2017. Study was approved by the ethical committee of hospital. Non probability consecutive sampling was done. All serving soldiers admitted in medical ward during this period meeting the diagnostic criteria for diabetes i.e. BSF >126mg/dl or BSR ≥ 200 mg/dl, HbA1c >6.5 or with classical symptoms of hyperglycemia or hyperglycemic crises with random blood sugar ≥ 200 mg/dl[1] were included in the study. Retired army personnel, defense civilian employees or patients not meeting the above mentioned criteria were excluded from the study. Informed consent was taken from every patient. The patients were inquired in detail about symptoms like polyuria, polydipsia, polyphagia, weight loss, weight gain, delayed wound healing, visual deterioration and impaired sensations. Family history of patients was also taken to analyze hereditary association of diabetes. Their general and systemic examinations were carried out including blood pressure levels, peripheral neuropathy with microfilament, paleness, signs of fluid overload like pedal edema, periorbital puffiness, pleural effusion, and ascites pointing to nephropathy. Fundo scopy was done by consultant ophthalmologist for diabetic retinopathic changes. Investigation included blood sugar fasting, Two hours after breakfast, urine for proteinuria, renal functions, alanine aminotransferase (ALT), lipid profile i.e. serum total cholesterol, triglyceride, low and high density lipoprotein levels (LDL,HDL) after 13 hours of fasting, HbA1C levels and abdominal ultrasound for associated nonalcoholic fatty (NAFLD) changes were carried out. Descriptive statistics were used to describe the data i.e. mean and standard deviation (SD) for quantitative variables, while frequency and percentage for qualitative variables were calculated usingSPSS IBM version 22.

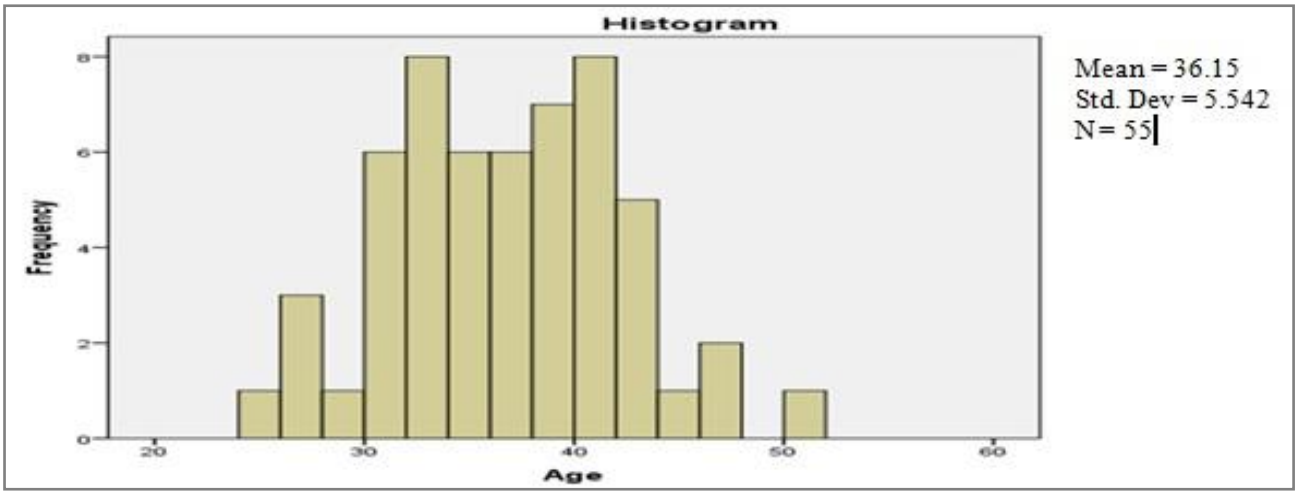

Figure: Frequency of age whom admitted serving soldiers in the medical ward.

RESULTS

Fifty out of 772 (7.12%) admitted serving soldiers in the medical ward had DM. Their age range was 25-50 years with mean age of 36.15 ± 5.542. Their age mode is shown in figure. Maximum (Max) no of patients i.e. 29 (53%) were between 35 to 44 years of age i.e. 22 (40%). Type 2 DM was in 39 (71%) patients and type-1 in 16 (29%). Associated hypertension, obesity and hypertriglyceridemia were present in 6 (11%), 1 (1.8%) and 20 (36%) patients respectively. On admission in the hospital, mostly soldiers

had poor glycemic control as minimum, maximum BSF, BSR and HbA1C is shown in table-I. NADFLD changes were present in 22(40%). Nephropathy and retinopathy were more frequent complications. Frequency and percentage of all other complications are shown in table-II.

DISCUSSION

Rising trend of Diabetes is a matter of concern world over. According to IDF, 1 in 10 (645 million) world population will be diabetic by 2040[4,9]. Same trend is being observed in US army as well[6]. In our study 7.12% of our service men had diabetes that is quite low as compared to US Army which was 13.55% in 2010[6]. In another study by Gorham *et al*, in US army incidence of type 1 diabetics was 17.5 per 100,000 and double in 31.5 per 100,000 per year in blacks[10] that is less than our observation i.e. 29%. That may be because of overall increasing burden of DM in Pakistan observed in last 2 decades[11]. Type 2 diabetes was in 39 (71%) as compared to rate of type 2 DM in US army that was 74.5 cases per 100,000 p-yrs and rates doubled within each successive age group[12]. The studies in US military were carried in both genders, black, white races, in active and non- active service men. Pitfall of our study is females; retired army personals and patients of different races were not included. Obesity and sedentary life style are the key risk factors for type 2 DM[13,14]. Only one patient (1.8%) in our group was obese, rest all were physically active and had normal BMI. So this factor was not contributory in our patients. Chronic kidney disease occurs in 20 to 40% of the cases in DM, is the leading cause of end stage renal disease (ESRD)[15]. Frequency was quite low in our study i.e. 14.5%. Diabetic retinopathy is principle cause of visual impairment. Diabetics may have macular edema and advanced diabetic retinopathy in 7% of cases and dyslipidemia played a major role[16]. Twelve point seven percent had diabetic nonproliferative diabetic retinopathy changes and no one had proliferative diabetic retinopathy despite 21(38%) had associated dyslipidemia. Complications like

Table-I: Glycemic control of the Patients at the time of admission.

	BSF(mg/dl)	BSR(mg/dl)	HBA1c
Mean	198.5818	311.7273	8.4465
Std. Deviation	63.86145	97.57684	
Minimum	130.00	193.00	
Maximum	429.00	630.00	

Table-II: Complications of Diabetes Mellitus.

Diabetic Complication	No of Patients	Percentage (%)
Nephropathy	8	14.5
Retinopathy	7	12.7
Macrovascular	2	3.6
Peripheral Neuropathy and foot ulcer	1	1.8
Diabetic Ketoacidosis	1	1.8
HONK(Hyper Osmolar Non Ketotic Com	1	1.8

Table-III: Geographic comparison of complications in different countries

Complications (%)	All	South Asia	East Asia	North Africa	Latin America	Our study
Macro vascular	27.2	26.5	28.8	24.2	29.4	3.6
Microvascular	53.5	56	62.8	59.4	62.8	29
Renal	27.9	20.3	33	40.8	33	14.5
Eye	26.3	16.3	32.3	33.9	32.3	12.7
Foot Ulcer	5.4	3.6	7.5	8.6	7.5	1.8
Neuropathy	38.4	36.9	43.1	53.4	43.1	1.8

peripheral neuropathy, diabetic ketoacidosis and hyperosmolar non- ketotic coma were reported in one patient each i.e. One point eight percent that is the lowest in geographic comparison of complications in different countries as shown in the table-III by Litwak *et al*[17]. Highest rate of complications has been seen in Russians because of late diagnosis, delay in initiation of treatment and other lifestyle factors. Low rate of complications in our patients was probably because of early diagnosis, effective treatment, close monitoring of the blood sugar levels and non-sedentary life style. In study by Zia *et al*[18]. Macrovascular complications like ischemic heart disease, cerebrovascular accident and perivascular disease were more common as compared to our observation where microvascular complications like nephropathy and retinopathy were more frequently found. Our patients had average HbA1c 8.4% at the time of admission that showed poor control. Microvascular complications were seen in 29% that is quite low in comparison to study by Ali *et al*, where 89.9% patients with HbA1C >6.5% had microvascular complications[19]. ADA recommends HBA1c <7 g/dl to prevent complication that is a difficult target[20]. UK prospective diabetes study (UKPDS) found 1% reduction in HBA1c reduces 37% microvascular and 14% microvascular complication[21]. This gives a clear massage of need for mass education about the disease awareness to prevent dreadful and irreversible complications.

CONCLUSIONS

DM is equally common in active servicemen as general population despite non sedentary life style. Low rate of complications may be because of early detection, timely management and better monitoring system in army. More studies are required to find out the exact prevalence of diabetes and its complications in army, so we can optimize our resources to handle the issue in a better way.

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CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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