Journal of General Practice
ISSN: 2329-9126

Ahmed and Qurashi, J Gen Pract 2014, 2:3
DOI: 10.4172/2329-9126.1000152

Research Article Open Access

Do we Achieve the Targets for Diabetic Patients; Deep Looks to Primary Care Practice

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Received date: Feb 06, 2014, **Accepted date:** Mar 20, 2014, **Published date:** Mar 25, 2014

Abstract

Introduction: Diabetes care to the standard targets is an art need trained health care provider's work in harmony. It is not an easy job; it is a continuous process of hard team works. Primary care practice is a busy practice where diabetes care is part of a complex daily care covering other health problems. In spite of this multiple daily care services, we raised the question if our care took our patients to meet target goals settled by the American diabetes association or not?. Assessing the current situation is the first step to catch the standards.

Objectives: To determine the degree of glycemic control by using HbA1c and lipid profile control by measuring total cholesterol, low density lipo-protein, high density lipo-protein and triglycerides.

To detect variations in HbA1c, lipid or Vit D control during the year 2013

Methodology: Cross sectional study was designed and conducted at Alwaha medical specialist center; one of the National Guard health affairs / WR primary care centers. Chronic disease registry was designed. A list of 1224 diabetic patients' records were reviewed and 302 patients' records were randomly selected. HbA1c values were detected with total cholesterol (T-Chol), low density lipoprotein (LDL) and vitamin D. HbA1c and lipid profiles were clustered into three groups; group A (1st Jan – 30st April 2013), group B (1st May – 31st August 2013). Group C (1st Sep – 31st Dec 2013). The American Diabetes Association 2014 target goals for diabetic patients were adopted. Data was collected and analyzed using SPSS software.

Results: Three hundred and two, medical records were reviewed (110 males, 192 females) with mean age 57.31 ± 11.47. The overall means of HbA1c 8.73 ± 2.04 , total cholesterol (T-Chol) 4.6 ± 1.17 mmol/L, low density lipoprotein (LDL) 2.7 ± 0.85 mmol/L, high density lipoprotein (HDL) 1.02 ± 0.23 mmol/L, Triglyceride (TG) 1.68 ± 1.08 mmol/L and vitamin D 42.32 ± 22.56 nmol/l were calculated as shown. There were no statistical differences in HbA1c between groups A vs B or C (7.65 ± 3.49 vs 8.03 ± 2.85 and 7.69 ± 3.28), P values were 0.3 and 0.9. For Vit D means there were no statistical differences between groups (32.46 ± 26.12 nmol/l vs 31.83 ± nmol/l and 29.54 ± 29.68 nmol/l; P values were 0.8 and 0.36.

There was no statistically difference between male and female in their overall mean HbA1c values (HbA1c 8.49 ± 1.86 vs 8.86 ± 2.14); P value was 0.13.

Males showed better LDL means than females; 2.54 ± 0.88 vs 2.81 ± 0.83 (P value 0.0082).

Interestedly, those who did there HbA1c once, twice and thrice were 42.4%, 31.8% and 25.8% respectively while 61.2% meet ADA HbA1c target goal.

Conclusion: Targeted glycemic and lipid control was difficult to achieve in primary care setting. More studies were recommended to analyzed barriers to achieve control and how to overcome them.

Keywords: Diabetes; Glycemic control; Lipid control; VitD, Primary care

Abbreviations

HbA1c: Glycated Haemoglobin; T-Chol: Total Cholesterol; LDL: Low Density Lipoprotein; HDL: High Density Lipoprotein; TG: Triglyceride; GP(s): General Practitioner(s); CVDs: Cardiovascular Diseases

Introduction

Diabetes mellitus is one of the most common chronic disorders worldwide, affecting people of all age groups. The prevalence of

diabetes increases with age–at least one in ten older people resident within the UK have diabetes. Diabetes is also more common in people of South Asian, African and African Caribbean origin. The World Health Organization predicts a doubling of the number of people with diabetes worldwide between 1995 and 2010 [1]. Diabetes is a leading cause of blindness, kidney failure and limb amputation and greatly increases the risk of coronary heart disease and stroke. It can also threaten the successful outcome of pregnancy. Diabetes accounts for at least 5 per cent of healthcare costs. Up to 10 per cent of hospital inpatient resources are used to care for people with diabetes [2].

Meticulous metabolic control can prevent or delay the onset of the complications of diabetes. The impact of these complications can also be greatly reduced if they are detected early and appropriately managed. Thus, regular surveillance for and early diagnosis of the complications of diabetes are also important.

In view of the high risk of cardiovascular disease in people with diabetes, particularly those with Type 2 diabetes, the careful management of other cardiovascular risk factors, including smoking, physical inactivity and especially hypertension and dyslipidaemia, is essential.

The overall aim of diabetes care is to enable people with diabetes to achieve a quality of life and life expectancy similar to that of the general population.

Assessing the current situation is the first step in any improvement process. Analysis of the current situation usually raise the perception of working teams on the necessity of catching international standards as long as they did not meet them.

The maintenance of near normal blood glucose levels is crucial to the prevention of the microvascular complications of diabetes [3,4]–diabetic retinopathy, diabetic renal disease and diabetic neuropathy–as well as to the alleviation of the symptoms of diabetes and the avoidance of the acute metabolic crises (hypoglycaemia and ketoacidosis).

The provision of diabetes services is complex–care is provided by a wide range of professionals, including general practitioners (GPs) and other primary healthcare professionals and specialist diabetes teams, as well as people with diabetes and their careers. The achievement of good outcomes for people with diabetes is dependent on the provision of well-organized and coordinated diabetes services that draw on the knowledge and skills of health and social care professionals working across primary and secondary care.

It is usually the GP who makes the initial diagnosis of diabetes and it is usually the GP who is responsible for agreeing with the person with diabetes where they will receive each element of their diabetes care and who will provide this. Increasingly, the routine follow up of people with diabetes is also undertaken within primary care.

Maintaining optimal glycemic control is an important goal of therapy in patients with diabetes mellitus.

Methodology

Alwaha Medical specialist center is one of the National Guard health affairs–west region primary care centers. The services were presented to National Guard employees and their families exclusively and to those who have permissions. The majority of our patients were Saudi. All diabetic patients were usually reviewed every 4 months unless there is need for nearest appointment. Cross sectional study was designed and conducted at Alwaha medical specialist center. Chronic disease registry was designed. A list of 1224 diabetic patients 'records were reviewed and 302 patients' records were randomly selected. HbA1c values were detected with total cholesterol (T-Chol), low density lipoprotein (LDL) and vitamin D. HbA1c and lipid profiles were clustered into three groups; group A (1st Jan – 30st April 2013), group B (1st May – 31st August 2013). Group C (1st Sep – 31st Dec 2013). The American Diabetes Association 2014 target goals for diabetic patients were adopted.

Criteria for selection were settled:

i) Subjects should be Saudi

ii) Subjects should have diabetes type 2

iii) Subjects should not have overt cardiovascular diseases

iv) Subjects should have active medical record during the year 2013

All selected medical records lab results were reviewed from the period of 1st Jan–31 Dec 2013. HbA1c, T. Chol, LDL, HDL, Vit D results were collected. Subject medical record was reviewed once.

American Diabetes Association 2014 target goals were adopted [5] (Table 1).

HbA1c	T.Chol	LDL*	HDL	TG	Vit D
<7%	<4 mmol/L	<2.6 mmol/L	1 mmol/L in male >1.3 mmol/L in female	<1.7 mmol/L	>50 nmol/l

Table 1: American Diabetes Association target goals, *Patients without overt cardiovascular diseases.

Data analysis was done using SPSS software. Means and standard deviations were calculated. Chi-square test was used to determine statistical significant differences between variables, defined as significant for a p-value <0.05.

Results

Three hundred and two (302) subjects were included in this study (110 males and 192 females). The mean age was 57.31 ± 11.47 (Table 2).

	Male	Female
Total	110 subjects (36.5%)	192 subjects (63.5%)
Age	57.71 ± 12.59	57.07 ± 10.84
DM duration	17.56 ± 10.56	19.47 ± 8.5
Number of participants	110	192
Nationality	Saudi	Saudi
Recorded CVDs	0	0

Table 2: Participants characters.

The over-all HbA1c mean was 8.73 ± 2.04 (95% CI ± 0.23) .The over-all T. Chol, LDL, HDL and TG means were 4.6 ± 1.17(95% CI ± 0.13), 2.7 ± 0.85(95% CI ± 0.1), 1.02 ± 0.23(95% CI ± 0.03), 1.68 ± 1.08

(95% CI ± 0.12) respectively. For Vit D, the over-all mean was 42.32 ± 22.56 (95% CI ± 2.54) (Table 3) (Figures 1A-F).

HbA1c means were cluster into three group based on time interval; Group A (1 Jan–30 April 2013), group B (1 May–31 Aug 2013) and group C (1 Sep–31 Dec 2013). The means for group A, B and C were 8.03 ± 2.85, 7.69 ± 3.28 and 7.65 ± 3.49 respectively. There was no statistical difference between groups (Table 4).

In subanalysis for differences between males and females subjects, we noticed statistical differences between LDL means; 2.54 ± 0.88 vs 2.81 ± 0.83 (P value 0.0082) and for HDL means; 0.9 ± 0.22 vs 1.09 ± 0.22 (P value 0.0001) (Table 5 and Figure 2).

There was statistical difference in HbA1c male and female cluster groups between group B and C; 8.28 ± 2.98 vs 6.69 ± 3.46 (P value 0.0001) and 8.16 ± 3.39 vs 6.64 ± 3.51 (P value 0.0003) respectively. For Vit D, it was statistically different through all groups (P value 0.0001) (Table 6, Figures 3 and 4).

HbA1c	T.Chol mmol/L	LDL mmol/L	HDL mmol/L	TG mmol/L	Vit D nmol/L
8.73 ± 2.04 (95% CI ± 0.23)	4.6 ± 1.17 (95% CI ± 0.13)	2.7 ± 0.85 (95% CI ± 0.1)	1.02 ± 0.23 (95% CI ± 0.03)	1.68 ± 1.08 (95% CI ± 0.12)	42.32 ± 22.56 (95% CI ± 2.54)

Table 3: American Diabetes Association target goals.

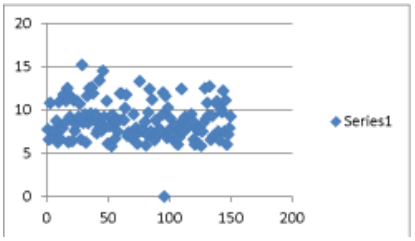

Figure 1A: Scatter of HbA1c% participants means of 2013.

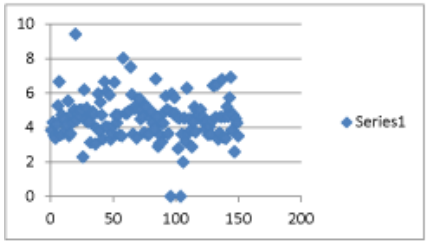

Figure 1B: Scater of T.Chol mmol/L participants means of 2013.

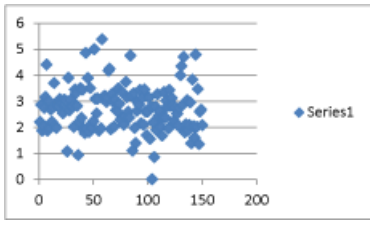

Figure 1C: Scater of LDL mmol/L participants means of 2013.

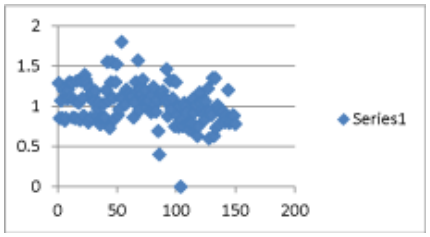

Figure 1D: Scater of HDL mmol/L participants means of 2013.

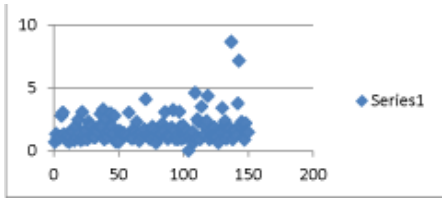

Figure 1E: Scater of TG mmol/L participants means of 2013.

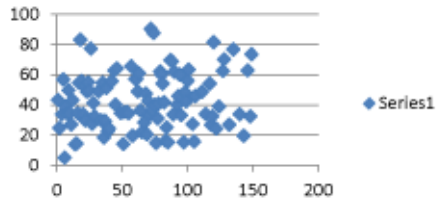

Figure 1F: Scater of Vit D nmol/L participants means of 2013.

HbA1c	T.Chol mmol/L	LDL mmol/L	HDL mmol/L	TG mmol/L	Vit D nmol/L
8.73 ± 2.04 (95% CI ± 0.23)	4.6 ± 1.17 (95% CI ± 0.13)	2.7 ± 0.85 (95% CI ± 0.1)	1.02 ± 0.23 (95% CI ± 0.03)	1.68 ± 1.08 (95% CI ± 0.12)	42.32 ± 22.56 (95% CI ± 2.54)

Table 4: Over all glycemic control and vit D means through 2013 (4 months interval cluster).

	Male	Female	P value
HbA1c %	8.49 ± 1.86	8.86 ± 2.14	0.13
T.chol mmol/L	4.37 ± 1.35	4.61 ± 1.14	0.10
LDL mmol/L	2.54 ± 0.88	2.81 ± 0.83	0.0082
HDL mmol/L	0.90 ± 0.22	1.09 ± 0.22	0.0001
TG mmol/L	1.92 ± 1.49	1.54 ± 0.72	0.63
Vit D nmol/L	46.41 ± 31.02	40.96 ± 18.98	0.059

Table 5: Male vs Female glycemic and lipid control.

	HbA1c% Group A 1st Jan–31st April 2013	HbA1c% Group B 31st May– 31st Aug 2013	HbA1c% Group C 1st Sep– 31st Dec 2013	Vit D nmol/L Group A 1st Jan– 31st April 2013	Vit D nmol/L Group B 1st May– 31st Aug 2013	Vit D nmol/L Group C 1st Sep– 31st Dec April 2013
Female	8.02 ± 2.85	8.28 ± 2.98	8.16 ± 3.39	28.54 ± 31.28	24.99 ± 30.95	28.32 ± 25.71
Male	8.03 ± 2.88	6.69 ± 3.46	6.64 ± 3.51	39.1 ± 25.63	38.16 ± 25.76	44.41 ± 24.95
P value	0.97	0.0001	0.0003	0.003	0.0001	0.0001

Table 6: Male vs female glycemic control and vit D means through 2013 (4 months interval cluster).

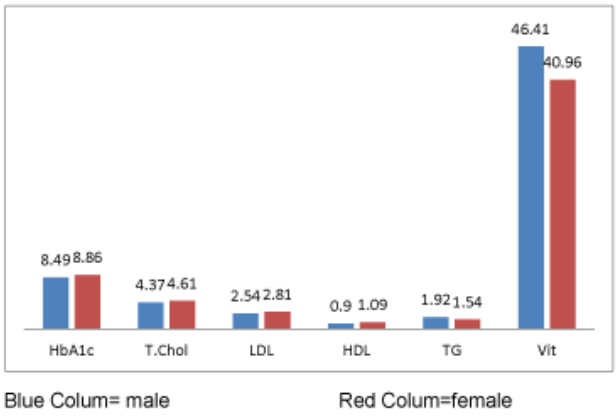

Figure 2: Over all means of participants.

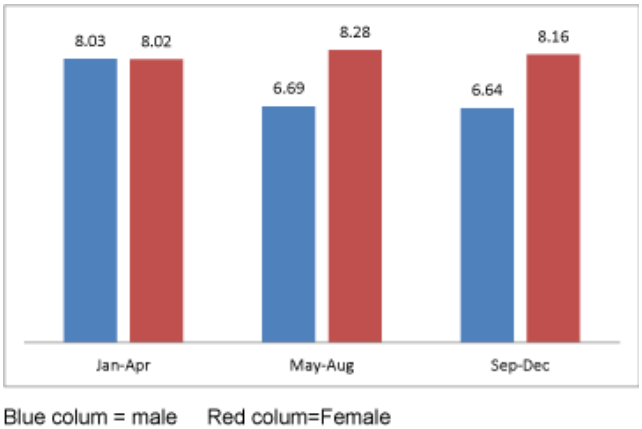

Figure 3: Participants means in clusters for HbA1c.

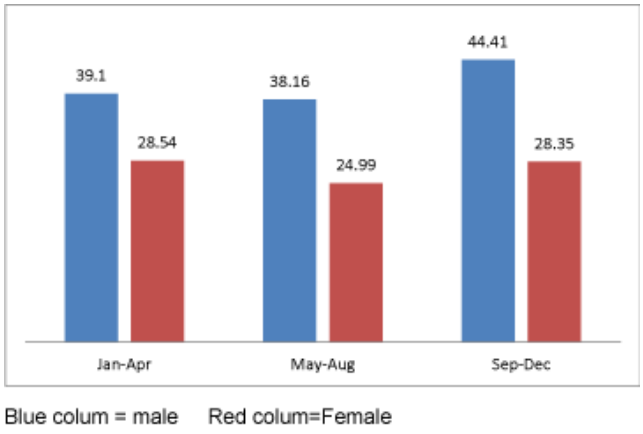

Figure 4: Participants means in cluster for Vit D.

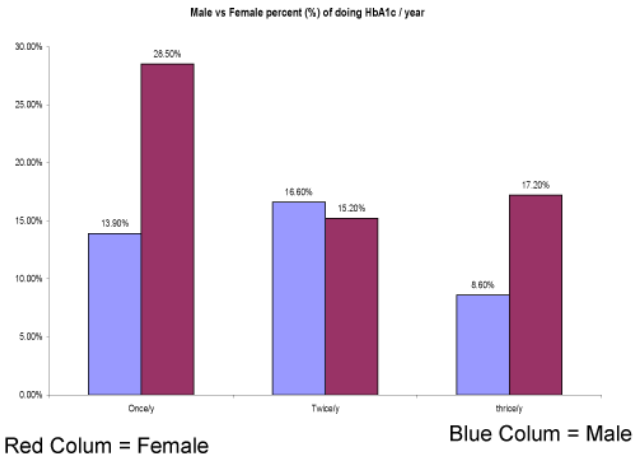

Figure 5: Male vs. Female percent of doing HbA1c / year.

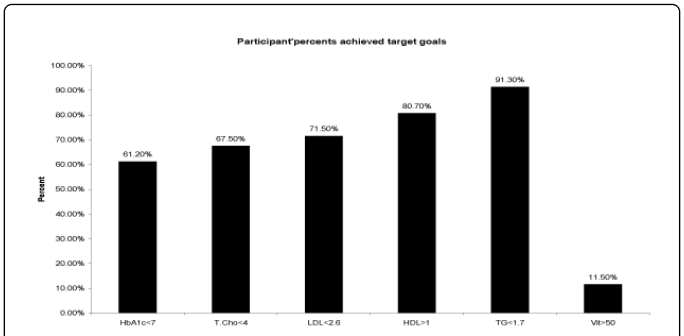

Figure 6: Participants percents achieved ADA target goals.

It was interestedly to know that 42.4% (128 subjects) did HbA1c once per year, 31.8% (96 subjects) did HbA1c twice per year and 25.8% (78 subjects) did HbA1c did HbA1c thrice per year. Majority of subjects did HbA1c thrice per year were male subjects (52 male subjects' vs 26 female subjects) (Table 7) (Figure 5).

	Once/year	Twice/year	Thrice/year
Over all	128 (42.4%)	96 (31.8%)	78 (25.8%)
Male	42 (13.9%)	50 (16.6%)	26 (8.6%)
Female	86 (28.5%)	46 (15.2%)	52 (17.2)

Table 7: Number of participants did HbA1c per year.

Interestedly, 61.2% of participants achieve HbA1c ADA target goal. Male participants achieve better than female participants (63.6% vs 59.9%) as well as in LDL ADA target goal (74.5% vs 69.8%) (Table 8) (Figure 6).

	HbA1c < 7%	T.Chol < 4mmol/L	LDL <2.6 mmol/L	HDL < 1mmol.L (male) <1.3mmol/L (female)	TG < 1.7 mmol/L	Vit D nmol/L
Total (302 subjects)	185 (61.2%)	204 (67.5%)	216 (71.5%)	244 (80.7%)	276 (91.3%)	<25 21 (6.9%) subjects >50 35 (11.5%) subjects
Male (110 subjects)	70 (63.6%)	75 (68.5%)	82 (74.5%)	88 (80%)	100 (90.1%)	<25 5 (4.5%) subjects >50 10 (9.1%) subjects
Female (192 subjects)	115 (59.9%)	129 (67.2%)	134 (69.8%)	156 (81.3%)	176 (91.7%)	<25 16 (8.3%) subjects >50 10 (5.2%) subjects

Table 8: Percents of participants meet ADA target goals.

Discussion

Many factors affected diabetes control in primary health care. Glycemic and metabolic control is a real challenge in primary health care settings.

An interested cross sectional study [6] done in Canada to provide insight into the care and treatment of type 2 diabetes in Canadian primary care settings found the mean of HbA1c was about 7.3% with 49% of patients not at target (HbA1c ≥ 7%). In our study the mean HbA1c was 8.73 ± 2.04% and 38.8% of patients not at target (HbA1c ≥

7). This variation can be explained by the quality of standards applied at Canadian primary care settings and our. It was interested to found that we have less percent of participants not meet the target. This could be explained but our small sample size.

In comparison with a multicenter cross sectional epidemiological survey [7] conducted in nine countries in Latin America, 43.2% achieved HbA1c<7%. Interestedly to notice that the researchers in this study pointed to non compliance to recommended diet and exercise as a reason for their result. Situation was differed in our study as non compliance to recommended diet and exercise was a real challenge for us but the frequent follow up may overcome this and improve our HbA1c means. From Hungary, came another interested paper [8] recruited 679 patients under continues care where the researchers found that 42.5% of diabetic patients achieved the target of HbA1c<7% vs 61.2% in our study which is better than the study finding and in patients with dyslipidaemia, the target level of triglyceride was reached by 40.6% vs 91.3% in our study, recommended total cholesterol by 14.2% vs 67.7% in our study and the HDL cholesterol by 71.8% vs 80.7% in our study this could be explained by the different nature of food intake and social habits such as alcohol intake in Hungary people. Another study done in Korea [9] to evaluate LDL-cholesterol after medication. Researchers found that 87.6% of participants attained their LDL-cholesterol goal vs 71.5% in our study. Interestedly, adherence to medication was strongly associated with the achievement of target LDL cholesterol in Korean study as well as our study.

Another interested small sized retrospective study [10] recruited 177 subjects from Oman, most of subjects were female (60%). This study found that only 35% of participants attained HbA1c target goal (HbA1c<7%) vs 61.2% in our study.

Another cross sectional study was done in King Khalid University Hospital [11]. In these study 1520 subjects was selected randomly. Medical charts were reviewed and data collected and analyzed. The overall glycemic control as evaluated by HbA1c<7% was found to be 39.7% which was far to our result (61.2%). The small sample size and frequent follow up with the participants may explain this. For lipid targets there were significant differences. In this study and our study, for TG<1.7 mmol/l, LDL 2.6 mmol/l and HDL>1 mmol/l, they are 56.6% vs 91.3% , 24.6% vs 71.5% and 54.2% vs 80.7% (P value <0.0001).

Another study [12] done in Saudi Arabia enquiry about meeting the American diabetic association standards of diabetic care found that in 1180 diabetic patients, only 21.8% achieved HbA1c goal target of <7% and 55.5 % achieved LDL target goal <2.6 mmol/l which are lower than our results. This can be explained by good adherence to treatment and frequent follow up with our participants.

Interested study done at military primary care setting in Saudi Arabia [13] looked for the quality of care for type 2 diabetes mellitus in military primary care setting. This study recruited 543 subjects and found that only 10.4% achieved HbA1c target goal <7%. This was very low than our study level 38.8%, although there was reported less level of goal target achievement in a primary care practice in Riyadh, Saudi Arabia, which ranged between 7.65% and 7.84% [14]. In the previous study [13], the researchers reported that 95.6% did HbA1c twice annually while it was 31.8% in our study. In our study 42.4% did HbA1c once annually and 25.8% did it thrice annually. This may explain partially poor glycemic control among our subjects.

A cross-sectional study [15] was carried out on a total of 465 young adult Saudi females aged 19 to 40 years old who were selected from primary health care centers of King Abdulaziz medical city, Riyadh, KSA , 25-hydroxy vitamin D [25(OH)D], Parathyroid hormone (PTH) and bone biochemical parameter were measured. Vit D mean level was found to be 18.34 ± 8.2 nmol/L while it was 42.32 ± 22.56 nmol/l in our study. This could be explained that our participants were both male and female while this study only recruited female. Female participants in our study had mean of 40.96 ± 18.98 nmol/l. Again this is higher than the mean found in the previous study, but factors affected Vit D could have a role on this.

There were some limitations in our study; the sample size was small (302 subjects), large community base study recommended. Most of our participants were female (63.5%).

Conclusion

In conclusion, the results of this study indicate poor glycemic control and relatively accepted lipid control in primary care setting. Adoption of more intensive, early and comprehensive management is highly recommended in primary care.

Conflict of Interest

I had declared that I have no any conflict of interest. Also I had no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years and any other relationships or activities that could appear to have influenced the submitted work.

Acknowledgement

The author would like to thank Mrs Mayada Abubakr Alsaeed for her valuable help in editing and organizing this paper.

References

1. Groop L (2002) Epidemiology and Clinical Heterogeneity of Adult-Onset diabetes. In: Wass, J A H and Shalet (Eds) Oxford Textbook of Endocrinology and Diabetes. Oxford University Press. pp 1688-1695.
2. http://www.publications.doh.gov.uk/nsf/diabetes
3. Krentz AJ, Bailey C J (2001) Type 2 diabetes in practice. RSM Press, London.
4. Williams G, Pickup JC (2004) Handbook of diabetes, 3rd edition. Oxford: Blackwell Publishing Ltd.American Diabetes Association.
5. Harris SB, Ekoé JM, Zdanowicz Y, Webster-Bogaert S (2005) Glycemic control and morbidity in the Canadian primary care setting (results of the diabetes in Canada evaluation study). Diabetes Res Clin Pract 70: 90-97.
6. Lopez Stewart G, Tambascia M, Rosas Guzmán J, Etchegoyen F, Ortega Carrión J, et al. (2007) Control of type 2 diabetes mellitus among general practitioners in private practice in nine countries of Latin America. Rev Panam Salud Publica 22: 12-20.
7. Szigethy E, Jancsó Z, Móczár C, Ilyés I, Kovács E, et al. (2013) Primary care of patients with high cardiovascular risk : Blood pressure, lipid and diabetic target levels and their achievement in Hungary. Wien Klin Wochenschr 125: 371-380.
8. Lee JA, Sunwoo S, Kim YS, Oh HJ, Kang HC, et al. (2013) Achieving recommended low density lipoprotein cholesterol goals and the factors associated with target achievement of hypercholesterolemia patients with rosuvastatin in primary care. Curr Med Res Opin 29: 751-760.
9. Al Balushi KA, Al-Haddabi M, Al-Zakwani I, Al Za'abi M (2014) Glycemic control among patients with type 2 diabetes at a primary health care center in Oman. Prim Care Diabetes .

10. Al-Rowais NA (2013) Glycemic control in diabetic patients in King Khalid University Hospital (KKUH) – Riyadh – Saudi Arabia. Saudi Pharm J.
11. Kharal M, Al-Hajjaj A, Al-Ammri M, Al-Mardawi G, Tamim HM, et al. (2010) Meeting the American Diabetic Association standards of diabetic care. Saudi J Kidney Dis Transpl 21: 678-685.
12. Ali H Guzu , Abdullah Al Shehri , Hesham I Al Khashan, Adel M Mishriky (2012) Quality of care for type 2 diabetes mellitus in a military primary care setting . J Clin Outcomes Manager 19:551-556.
13. Alfadda AA, Bin-Abdulrahman KA, Saad HA, Mendoza CD, Angkaya-Bagayawa FF, et al. (2011) Effect of an intervention to improve the management of patients with diabetes in primary care practice. Saudi Med J 32: 36-40.
14. Al-Mogbel ES (2012) Vitamin D status among Adult Saudi Females visiting Primary Health Care Clinics. Int J Health Sci (Qassim) 6: 116-126.