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Evaluation of Diabetes Service Provision in a Government Health Centre in Bahrain

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Objective: To examine the current diabetes service provision, initial assessment and follow-up visits during the year 2003.

Design: Retrospective study from January 1st to December 31st 2003.

Setting: Bahrain government health centre.

Methods: All diabetic patients who attended the laboratory for blood tests and pharmacy for medications in the determined health centre from January 1st to December 31st 2003, were included in the study. Criteria were used to define diabetes, hypertension, hyperlipidemia, and their control. Data sheet was prepared to collect information from patients' records on the diabetic care delivered for new and follow-up cases during 2003. Data were entered and analyzed using SPSS version 11.5.

Results: Only 430 (79.1%) patients of 543 were studied. Sixty-three of 430 were newly diagnosed during 2003. Patients were middle-aged; predominantly females, married, housewives, and one third were illiterate. The majority did not have diabetic sheets and medical history had been poorly taken. Only weight, height, and blood pressure (BP) were measured. Fasting blood sugar (FBS) was the most frequently measured test. Hemoglobin A1c (HbA1c) was done twice a year in 20.5 percent of patients. Total cholesterol and triglycerides were done once a year in more than fifty percent of patients, but lipoanalysis was done in less than 4 percent. Urine routine microscopy and 24 hours' test for proteins were rarely done. Diet and exercise advice was given to two thirds of patients, and 20.6 percent of new patients were started on drug treatment immediately. Annual eye screening was done in 9.1 percent of patients and foot examination was recorded for only one patient of the studied population. The percentage of well-controlled diabetics did not exceed 31.2 percent during follow-up visits. More than 70 percent of diabetics were found to be hypertensives, and less than 9 percent of them were controlled. Eighty to eighty nine percent of diabetics were hyperlipideamics. The level of lipid control among these patients did not exceed 5 percent.

Conclusion: The level of diabetic service provision in the studied health centre was below the recommended standard of Bahrain's Diabetic Committee, the

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British National Health Service (NHS), and American Diabetic Association (ADA). The control of diabetes and its associated co-morbidities (hypertension and hyperlipidemia) were suboptimal. Obesity, renal disease, foot and eye lesions were rarely screened for among diabetic patients. This study identifies potential areas of improvement in diabetic care provision and gives recommendations to improve this service.

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Diabetes mellitus is a common condition worldwide[1]. Diabetes now affects more than two percent of the UK population and its prevalence is rising[2]. Similarly, in the USA, the prevalence rate among adults aged twenty to forty four years is two percent[3]. In the Eastern Mediterranean and Middle East Region, diabetes was found to be one of the highest in the world ranging from 2.3 percent to 13.6 percent[4,5]. In recent years, the prevalence has exceeded twenty percent in many countries of the Region[5]. Based on WHO criteria of 1985, a study in Bahrain conducted in1995, found that the prevalence of diabetes in the population aged thirty years and above was 21.1 percent known diabetics, 8.5 percent not previously known to be diabetic, and an additional 14.8 percent with impaired glucose tolerance test (IGT). This gives a prevalence rate of 44.4 percent including IGT[5]. A similar study in 1996 revealed nearly the same prevalence[4]. Although this prevalence was based on old WHO criteria, it is very high, and it implies diabetes is adding a great burden on the government health service, especially if it is uncontrolled and leads to serious and morbid complications.

Diabetes was found to be the leading cause of renal failure, the second commonest cause of lower limb amputation, and the leading cause of blindness in the working age group[6,7]. To reduce the risk of its long-term complications, and to prevent its acute complications, diabetes needs continuing high quality medical care and patient self-management education. Diabetes care is multifaceted and requires that many issues, beyond glycaemic control, to be addressed such as controlling cardiovascular risk factors. Evidence exists that supports a range of interventions to improve diabetes outcome[8]. Both Diabetes Control and Complications Trial (DCCT) and UK Prospective Diabetes Study (UKPDS) trials have shown that intensive glycaemic control is associated with reduced rates of retinopathy, nephropathy, and neuropathy. It reduced the rate of eye disease by one quarter and early renal damage by one third in UKPDS trial. Regular recall and review of people with diabetes was shown to improve the outcome for people with diabetes[9]. It can ensure early detection of diabetic complications and thus early referrals and interventions to minimize the effects of these complications[10]. Eye screening and laser treatment was found to reduce visual loss among people with diabetes by less than half[10]. Early laser treatment was proven in the UKPDS trial to prevent up to sixty percent of diabetic blindness. Furthermore, foot care and regular checks reduced the rate of amputation by two thirds[10]. Controlling hypertension in diabetic people was found to reduce the risk of both micro-vascular complications and cardiovascular disease[11].

Because of diabetic complications, major advances were made in the diabetic care provision all over the world. While the evidence on effectiveness of treatment is clear, the cost effectiveness of diabetes services has not been demonstrated except for eye screening and certain elements of treatment such as blood pressure control[10,12]. In addition, there is no clear evidence on which model of diabetic care is most effective.

A study compared the care delivered in primary care to the one in secondary care, concluded that primary care can do as well as secondary care provided that GP has a special interest in diabetes and the care is well organized[10]. In 1995, Greenfield found that there were no significant differences in medical outcome between patients with diabetes cared for by primary care physician or a specialty physician[6]. Guidelines for the diabetes treatment in primary care are available, but doctors often find them complex and feel they have insufficient staff and time to follow the recommendations[2]. In fact, compliance with practice guidelines by primary care physicians was found to be poor. Mechanisms such as the use of patient problem lists, diabetic flow sheets in the medical records, and computerized systems with diabetic registers, were solutions to remind physicians and facilitate better adherence to these guidelines[3].

In the UK, to improve services and reduce variations in care, the National Service Framework (NSF) Programme was established. The NSF sets national standards identified the interventions and actions that would help to meet those standards, and the milestones against which National Health Service (NHS) performance would be measured[9]. In the USA, the American Diabetic Association (ADA) established standards and guidelines of diabetic care. These standards of care were made to provide clinicians, patients, researchers, and other interested groups with the elements of diabetes care, treatment targets, and tools to evaluate the quality of care[8].

Many diabetes centres, for whole diabetic care, which include eye and foot care, have been established in both UK and USA. In general practice, both the UK and USA, developed specialized diabetic clinics in their local health centres based on a proper evidence-based diabetic care program. The function of these clinics is to give adequate care and education to diabetic patients attending their general practitioners with early detection of complications and thus early intervention. In Bahrain, with the high prevalence of diabetes compared to other parts of the world, we lack concentrated efforts to look after diabetes and we are definitely in need for such a program[13].

In Bahrain 1989, a diabetic Committee for Primary Care was formed by Bahrain's Ministry of Health. It was responsible for standardizing care through establishing rules and regulations to guide physicians treating people with diabetes. A diabetes flow chart was introduced, to be completed by physicians and nurses and to be kept in the patient's records[5]. This flow sheet serves to remind physicians of the main components of recommended diabetic care. In 1997, a diabetic nurse-run clinic programme was started in governmental health centres. Unfortunately, these clinics are run only by a nurse and are not available to all health centres. This is probably due to shortage of both resources and well-trained diabetes nurses. Furthermore, due to the vast workload in these health centres and the persistence of staff shortage, most of these clinics were closed. At present, they exist only in seven out of twenty health centres. There are no available studies assessing the advantages of these clinics in terms of the level of provided care, for diabetic patients[13].

In Bahrain diabetic clinic, the nurse does the assessment, observation, monitoring the conditions of patients and providing nursing care interventions, but would refer the patient to the family physician for all abnormalities and complications, whenever they arise[14]. The nurses are given thirty minutes for initial visit and fifteen minutes

for follow-up. On the other hand, the physician who provides medical care to the diabetic patient in his/her busy general clinic has a regular appointment of 7 minutes duration only. In some health centres, coordinated nurse/physician visits were arranged so that the patients could be seen at the same time in an organized diabetic clinic, and for a longer time rather than seven minutes in physician's general clinic. Unfortunately, this could not be maintained for a long time due to the workload and shortage of physicians. In other health centres where there is no nurse-run diabetic clinic, the doctor is expected to assess the patient as recommended by the committee guidelines and as addressed in the diabetic sheet[13].

Initial assessment aims to classify the newly diagnosed patients, based on the cardiovascular risks, to detect the presence or absence of complications, and to outline the management plan. If the patient was diagnosed previously to have diabetes and is on treatment but has not attended a diabetic clinic, initial assessment should focus on reviewing the past treatment and the degree of glycaemic control[8]. The initial visit assessment should include a detailed history, examination, and investigations as indicated in the diabetic flow chart. The history includes the presenting symptoms of diabetes, cardiovascular risk factors, and symptoms of complications (e.g. visual, neuropathic, gastrointestinal, ear, nose, throat, and impotence), female history, family history, exercise and diet history and medication if any. The examination includes: height, weight, BMI, waist, hip, and waist/hip ratio, vital signs, ear nose and throat, ophthlamoscopic evaluation, pulses, cardiac, gastrointestinal, neurological system, and the foot. The investigations that should be done are: fasting blood sugar (FBS), post-prandial blood sugar (PPS), glycosylated hemoglobin (HbA1c), lipids (Total cholesterol, high density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL), and triglycerides), hemoglobin (Hb), serum creatinine if urine protein is positive, urine dipstick for proteins and ketones, urine routine microscopic examination (UR/M), baseline 24 hours' urine for proteins, echocardiogram (ECG), and chest X-Ray (CXR). All the results of the visit are recorded in the flow chart and kept in the patients' records[14.]

In the follow-up visits, the doctor should have brief but essential aspects of history, examination and investigations. The aim of follow-up is to maintain glycaemic control, identify people who are at high risk for cardiac disease and renal failure, detect complications at an early stage, and refer to secondary care whenever complications arise. The physician would screen briefly for the presence or absence of the symptoms of complications as mentioned in the diabetic flow chart sheet, and would review every three months, the level of blood pressure (BP), weight, urine dipstick for proteins, FBS, PPS, and HbA1c. In addition, the physician should review the patient's current diabetic treatment; consider adjustments if needed, and make sure that the patient had fundoscopic eye and foot screening once a year. The patient should attend regularly for follow-up visits. Assuming that the patient is maintaining good glycaemic control, the visits should be every three months. Otherwise, the patient needs to attend the clinic more frequently [14].

Although the diabetic clinic programme was initiated in governmental health centres in 1997, and maintained in some health centres, there are no previous studies or audits that examined the level of diabetes service provision in these centres to find how well these services had met the local diabetic committee standards.

The objective of this study is to examine the current diabetic service provision, initial assessment and follow-up visits, in one of the governmental health centres in Bahrain during the year 2003.

METHODS

Study design: Retrospective study from January 1st to December 31st 2003.

Study population: All diabetic patients who attended the laboratory in the determined health centre from January 1st to December 31st 2003, for blood tests (identified from laboratory requests and verified thereafter from medical records), or attended the pharmacy for diabetic medications were included in the study. To ensure that patients were not duplicated, a diabetic register was developed for this study using access 2000. Patients who were not on pharmacological treatment, thus not attending the pharmacy, or were not compliant and not attending the local health centre for follow-up visits were not included in this study (due to difficulty of tracing their records, and the unavailability of a diabetic register in the health centre).

The patient was labeled as diabetic if he/she was prescribed antidiabetic drugs or was on non-pharmacological treatment for diabetes. Targets for diabetes control as indicated in Bahrain's diabetic flow chart were FBS ≤5.8 mmol/l, PPS ≤9.0 mmol/l, HbA1c <7.0 percent. Normotensives were defined if BP < 120/80[15]. Prehypertensives were defined as patients whom systolic BP ranged from 120-139 or diastolic BP ranged from 80-89[15]. Diabetic patients were labeled as hypertensive if BP was ≥140/90 or on antihypertensive medications, or both. Systolic/diastolic BP <130/85 was used as criterion for well controlled BP for diabetic hypertensives[15-17]. Hyperlipidemia was diagnosed, as indicated in diabetic flow sheet, when the serum cholesterol concentration was >5.2mmol/l, or the serum triglycerides was >1.8 mmol/l, or both, or if the patient was on lipid lowering agent. Total cholesterol <5.2, or triglycerides <1.8 was considered as a criterion for controlled hyperlipideamia in this study. (Although it is recommended in diabetics to use LDL and HDL cholesterol as hyperlipidemia indicators, both of them could not be used as criteria here, as the number of patients who had lipoanalysis was small.)

Apart from those who developed complications or are severely uncontrolled, all patients with type II diabetes mellitus are cared for in primary health care centres. Patients with type I, or gestational diabetes mellitus, are referred to secondary care hospital for management.

Setting: The study was conducted in a health center, newly opened two years ago. It has six family physicians, four to five nurses, and one health educator who attends four days a week. The health centre serves about 26000 people with an average of 4300 patients per doctor. Computer services, diabetic register, and diabetic nurse-run clinic are not available in this health centre.

Sampling size: The total number was 543. All patients who were registered were included in the study.

Patients' data: Data sheet was prepared to collect information on the diabetic care delivered to the patients. The diabetic care service was assessed for the year 2003. Only newly diagnosed cases, were evaluated for initial assessment. The rest were assessed as follow-up cases for continuing care. It was assumed that these patients had at least four visits per year.

The information obtained, included the following:

1-Patients' characteristics:
Age, sex, nationality, block number(area codes), marital status, educational degree, occupation, date of diagnosis, and duration of diabetes.

2- Initial visit assessment:
History included the following: symptoms of diabetes, risk factors, diet and exercise. Examination included the following: weight, height, BMI, waist, hip, waist/hip ratio, BP, cardiovascular system, pulses, digestive system, ENT, eye and foot examination. Investigations included the following: FBS, PPS, HbA1c, Hb, lipids (total cholesterol, HDL, LDL, and triglycerides), renal function test if hypertensive, urine dipstick and UR/M, baseline 24 hours' proteins, ECG, and CXR. Management included the following: non-pharmacological (diet and exercise) and pharmacological (anti-diabetic agents) treatment as recommended by the diabetic committee guidelines and as addressed in the diabetic sheet.

3- Follow–up visit assessment:
History and examination included the following: symptoms of complications, weight, and BP. Investigations included the following: urine dipstick, FBS, PPS, HbA1c. Management included the following: non-pharmacological (diet and exercise) and pharmacological (anti-diabetic agents) treatment as recommended by the diabetic committee guidelines and as addressed in the diabetic sheet.
4- Eye referral (Once a year).
5- Foot examination (Once a year).

Statistical analysis: Data were entered and analyzed using SPSS version 11.5. Since the variables were not normally distributed, the Wilcoxon signed ranks test was used for comparison. A p value < 0.05 was considered to represent statistical significance.

RESULTS

Only 430 (79.1%) patients of 543 were studied, the rest were excluded. The reasons for exclusion were due to non-retrievable records 83 (73.4%), patients unregistered in the record 11 (9.7%), no history or result evidence of diabetes in the record 5 (4.4%), incomplete information 4 (3.5%) and incorrect medical record number 10 (8.8%).

Table: 1 Patients' Characteristics

Parameter	Pts (n=430)	
	New (n=63)	Follow Up (n=367)

Age (Y) Mean ± SD Median Range	 45 ± 12 42 22-92	 50± 11 48 26-94
Sex: Male Female	 22 (5.1%) 41 (9.5%)	 145 (33.7%) 222 (51.6%)
Nationality: Bahraini Non Bahraini	 63 (14.8%) 0	 363 (85%) 1.0 (0.2%)
Marital Status: No record Single Married Widow	 0.0 4.0 (0.9%) 58 (13.5%) 1.0 (0.2%)	 1.0 (0.2%) 9.0 (2.1%) 317 (73.7%) 40 (9.3%)
Educational Level No record Illiterate Primary Intermediate Secondary University	 1.0 (0.2%) 13 (3.0%) 2.0 (0.5%) 5.0 (1.2%) 41 (9.5%) 1.0 (0.2%)	 22 (5.1%) 139 (32.3%) 22 (5.1%) 52 (12.1%) 114 (26.5%) 18 (4.2%)
Occupation: No record Office Labour Military Retired Housewife	 5 (1.2%) 5 (1.2%) 11 (2.6%) 1 (0.2%) 1 (0.2%) 40 (9.4%)	 20 (4.7%) 33 (7.7%) 66 (15.5%) 18 (4.2%) 18 (4.2%) 209 (48.9%)
Diabetic Sheet:) Yes No	 1 (0.2%) 62 (14.4%)	 112 (26%) 255 (59.3%)
Duration median (Y)	0.67	5.0

Notes: *Block frequency is not shown, as the data is very long. Data are n; values in parentheses represent the percentage of Patients*

Table 1 shows the characteristics of the studied sample. Sixty-three of 430 were newly diagnosed during 2003. Mean age ± SD of the studied patients was 50 ± 12 years (range 22–94, median 47). Two hundred and sixty-three of 430 (61.2%) were women. Four hundred and twenty-nine (99.7%) were Bahrainis. One third of those studied 152 (35.3%) were illiterate. The majority 375 (87.2%) was married. The majority of patients were residents in area (block) number 1211, 116 (26.9%), followed by area (block) number 1216, 90 (20.9%).

The median duration of all cases was 4.3 years. The mode number of visits per patient per year was 5 for the new cases and was 4 for follow-up cases. While the diabetic flow chart was used for only one newly diagnosed case, it was used for 26 percent of the follow-up cases.

Table 2: Frequently Recorded data during initial visit of the newly diagnosed cases during 2003 (n=63)		
History	Symptoms of DM	15 (23.8%)
	Risk factors	14 (22%)
	Diet and exercise	14 (22%)
Examination	Weight	3 (4.7%)
	Height	2 (3.2%)
	BP	31 (49.2%)
Investigations	FBS	59 (93.7%)
	2h-PPS	12 (19%)
	HbA1c	21 (33%)
	Lipids Cholesterol LDL HDL **Triglycerides**	 46 (73%) 2 (3.2%) 2 (3.2%) 45 (71.4%)
	Renal Function Test if HTN	1 (1.5%)
	U-R/M or Dipstick	2 (3.2%)
Management	Diet and exercise advise	40 (63.5%)
	Drugs	13 (20.6%)

Note: *Items from initial assessment, which were not recorded, are not included in the table. Data are n; values in parentheses represent the percentage of Patients*

Table 2 shows the information frequently recorded during the initial visit of the newly diagnosed cases during 2003 (n=63). History (symptoms of diabetes, risk factors, and diet) was recorded in nearly 23 percent of patients. Only BP, weight and height, were recorded among the recommended criteria of examination. BP was the most frequently recorded 31 (49.2%). Weight and height were recorded in approximately 3 percent. The frequency of the investigations done by physicians was ranked as follows: FBS 59 (93.7%), total cholesterol 46 (73%), triglycerides 45 (71.4%), HbA1c 21 (33%), 2h-PPS 12 (19%), UR/M 2 (3.2%), LDL cholesterol 2 (3.2%), HDL cholesterol 2 (3.2%), and 24 hours' test for proteins 1 (1.5%). Sixty-three point five percent of the newly diagnosed cases were given diet and exercise advice, and 13 (20.6%) were started immediately on drug therapy. Five of those started on drug treatment had FBS < 11.1 mmol/l.

The frequency of information recorded during follow-up visits, over one year period, in the medical note is shown in Tables 3a and 3b. The least number of items that were recorded for diabetic patients were weight, a urine routine microscopic examination, lipoanalysis, and history of symptoms of early complications. These were not done in 97.2 percent, 95.6 percent, 91.9 percent, and 89.3 percent of patients respectively. The most common were BP and FBS. BP was measured once per year in 67.2 percent and three times per year in 25.8 percent. Seventy nine point eight percent did not have the PPS done during 2003. The percentage of patients who had HbA1c twice in a year was 20.5 percent. Diet and exercise advice were given to nearly two thirds of the patients (58.8%). Lipids measurement was done once per year in 58.4 percent for cholesterol and 57.4 percent for triglycerides.

Table 3a: Frequently recorded data during follow up visits during 2003 (n=430)				
Parameter	**1st visit (n=372)**	**2nd visit (n=351)**	**3rd visit (n=326)**	**4th visit (n=297)**
Wt	6 (1.6%)	2 (0.6%)	2 (0.6%)	2 (0.7%)
BP	86 (23.1%)	169 (48.1%)	157 (48.2%)	113 (38%)
U.R/M	13 (3.5%)	3 (0.9%)	2 (0.6%)	1 (0.3%)
FBS	283 (76.1%)	231 (65.8%)	181 (55.5%)	141 (47.5%)
2h-PPS	32 (8.6%)	22 (6.3%)	31 (9.5%)	27 (9.1%)
HbA1c	128 (34.4%)	90 (25.6%)	93 (28.5%)	65 (21.9%)
HX	24 (6.5%)	12 (3.4%)	11 (3.5%)	12 (4%)
Diet&exercise advise	185 (49.7%)	117 (33.3%)	78 (23.9%)	58 (19.5%)
Lipids				
Cholesterol	127 (34.1%)	88 (25.1%)	75 (23%)	51 (17.2%)
LDL	12 (3.2%)	10 (2.8%)	7 (2.1%)	8 (2.7%)
HDL	12 (3.2%)	10 (2.8%)	7 (2.1%)	8 (2.7%)
Triglycerides	121 (32.5%)	88 (25.1%)	78 (23.9%)	50 (16.8%)

***Note**: Data are n; values in parentheses represent the percentage of Patients*

Table 3b: Frequency of recorded data during follow-up visits for one year period. (n= 430)					
Parameter	**Frequency of recorded items per year**				
	0	**1**	**2**	**3**	**4**
Wt	418 (97.2%)	12 (2.8%)	0	0	0
Bp	141 (32.8%)	111 (25.8%)	67 (15.6%)	64 (14.9%)	47 (10.9%)
U.R/M	411 (95.6%)	19 (4.4%)	0	0	0
FBS	74 (17.2%)	100 (23.3%)	93 (21.6	102 (23.7%)	61 (14.2%)
2h-PPS	343 (79.8%)	66 (15.3%)	17 (4%)	4 (0.9%)	0
HbA1c	158 (36.7%)	184 (42.8%)	73 (17%)	14 (3.3%)	1 (0.2%)
Lipids					
Cholesterol	179 (41.6%)	181 (42.1%)	52 (12.1%)	16 (3.7%)	2 (0.5%)
LDL	395 (91.9%)	33 (7.7%)	2 (0.5%)	0	0
HDL	395 (91.9%)	33 (7.7%)	2 (0.5%)	0	0
Triglycerides	183 (42.6%)	177 (41.2%)	54 (12.6%)	14 (3.3%)	2 (0.5%)
HX	384 (89.3%)	37 (8.6%)	5 (1.2%)	4 (0.9%)	0
D & E	177 (41.2%)	139 (32.3%)	63 (14.7%)	31 (7.2%)	20 (4.7%)

***Note**: Data are n; values in parentheses represent the percentage of Patients*

Annual screening for eye disease was done in 39 (9.1%) patients. There was no record of foot examination in the notes, except for one diabetic patient.

Table 4 shows the level of glycaemic indices and pattern of control of diabetes during follow-up visits. The mean FBS level was significantly less in the follow-up visits

compared to the first visit. The percentage of patients whom FBS was less than 5.8 mmol/l in the first, second, third and fourth follow-up visits was 4.6 percent, 5.2 percent, 5.0 percent, and 9.2 percent respectively. The mean PPS ranged from 13.2mmol/l to 15.3 mmol/l in the follow-up visits. No statistical test was done to compare the difference between PPS means, as the number of patients who had 2h-PPS was small. The mean level of HbA1c varied from 8.5 percent to 10.3 percent during follow-up visits. There was no statistical difference compared to the first visit. The percentage of diabetic patients in whom HbA1c was less than 7 percent in the first, second, third and fourth follow-up visits was 21.9 percent, 18.9 percent, 31.2 percent, and 27.7 percent respectively.

Table 4: Glycaemic indices and pattern of control of diabetes during follow-up visits

Biochemical indices of glycaemic control	1st visit (n=372)	2nd Visit (n=351)	3rd Visit (n=326)	4th Visit (n=297)
FBS	11.4±4.7 (283, 76)	10.9±4.2* (231, 65.8)	11.3±4.4** (181, 55.5)	10.4±4.0*** (141, 47)
FBS <5.8 mmol/l n (%)	13 (4.6%)	12 (5.2%)	9 (5%)	13 (9.2%)
2h-PPS	14.5±6.1 (32, 8.6)	14.4±4.2● (22, 6.3)	15.3±4.4● (31, 9.5)	13.2±6.3● (27, 9.1)
2h-PPS <9 mmol/l n (%)	8 (25%)	2 (9.0%)	3 (9.7%)	7 (25.9%)
HbA1c	9.1±2.6 (128, 34.4)	10.3±9.5† (90, 25.6)	8.5±2.5†† (93, 28.5)	8.5±2.1††† (65, 21.9)
HbA1c <7% n (%)	28 (21.9%)	17 (18.9%)	29 (31.2%)	18 (27.7%)
Diabetics on drug treatment n (%)	277 (74.5%)	267 (76%)	239 (73.3%)	161 (54.2%)

Note: Data are mean ± SD. Data in parentheses represents the number and percentage of patients respectively.

** P= 0.038 for comparing FBS level between 1st and 2nd visits*

*** P= 0.008 for comparing FBS level between 1st and 3rd visits*

****P= 0.002 for comparing FBS level between 1st and 4th visits*

● *Statistical test was not done, as n was small for comparison between the groups.*

† P= 0.19 for comparing HbA1c level between 1st and 2nd visits

†† P= 0.69 for comparing HbA1c level between 1st and 3rd visits.

††† P= 0.7 for comparing HbA1c level between 1st and 4th visits

Table 5 shows the prevalence and control of hypertension among diabetic patients during follow-up visits. The prevalence of normotensives did not exceed five percent during follow-up visits. Twenty to twenty-six percent were prehypertensives. Seventy-six point six percent of diabetic patients were found to be hypertensive in the

first follow-up visit, 76.4 percent in the second visit, 71.1 percent in the third, and 73.9 percent in the fourth. Females were predominantly affected throughout all visits, more than 65percent. The mean BP among hypertensive patients is shown in the table. Except for both systolic and diastolic BP means in third visit, there was no significant statistical difference of BP means in follow-up visits compared to first visit. More than two third of patients were on antihypertensive treatment. The percentage of well-controlled hypertensive patients was less than 9 percent in the four follow-up visits.

Table 5: Prevalence and control of Hypertension among diabetic patients during follow-up visits.

Parameter	1st visit (n=372)	2nd Visit (n=351)	3rd Visit (n=326)	4th Visit (n=297)
Patients with BP records n (%)	186 (50%)	169 (48%)	157 (48%)	113 (38%)
Patients with BP records or on anti-HTN treatment n (%)	201 (54%)	178(50.7%)	170(52.1%)	119(40%)
Normotensives n (%)	8 (4.3%)	7 (4.1%)	8 (5.1%)	4 (3.5%)
Pre-hypertensives n (%)	39 (21%)	35 (20.7%)	41 (26%)	27 (23.9%)
Hypertensives n (%)	154 (76.6%)	136 (76.4%)	121 (71.1%)	88 (73.9%)
Mean BP of Hypertensives with BP records Mean ±SD n (%)	151.4±21.2 / 88.5±10.6 139 (74.4%)	154.9±26.0* / 90.1±9.9† 127 (75.1%)	147.2±21.2** / 86.2±9.9†† 108 (68.8%)	145±20.0*** / 87±7.6††† 82 (72.6%)
Hypertensives on drug treatment n (%)	103 (66.9%)	103 (75.7%)	90 (74.4%)	69 (78.4%)
Well-controlled Hypertensives n (%)	8 (5%)	3 (2.2%)	10 (8.3%)	6 (6.8%)

Note: ** P= 0.97 for comparing sys BP level between 1st and 2nd visits*
*** P= 0.029 for comparing sys BP level between 1st and 3rd visits*
****P= 0.071 for comparing sys BP level between 1st and 4th visits*
† P= 0.54 for comparing dia BP level between 1st and 2nd visits
†† P= 0.046 for comparing dia BP level between 1st and 3rd visits.
††† P= 0.47 for comparing dia BP level between 1st and 4th visits

The prevalence and control of hyperlipideamia among diabetic patients during follow-up visits are shown in Table 6. The prevalence of hyperlipideamia was high in all the visits. It ranged from 80 to 89 percent. More than 60 percent of females were affected throughout all follow-up visits. The mean lipid level did not differ significantly throughout the visits. The level of lipid control among these patients was poor. It did

not exceed 5 percent in all the visits. The number of patients who were on drug therapy was 56 (43.4 %) in the first visit, 68 (61.8%) in the second visit, 69 (67.6%) in the third visit, and 53 (73.6%) in the fourth visit.

Table 6: Prevalence and control of hyperlipidemia among diabetic patients during follow-up visits.

Parameter	1st visit (n=372)	2nd Visit (n=351)	3rd Visit (n=326)	4th Visit (n=297)
Patients with lipids records **Cholesterol (%)** **Triglycerides (%)**	 127 (34%) 121 (32.5%)	 88 (25%) 88 (25%)	 75 (23%) 78 (23.9%)	 51 (17%) 50 (16.8%)
Patients with lipids record or on lipid lowering agent n (%)	160 (43%)	130 (37%)	119 (36.5%)	81 (27%)
Dyslipidemic n (%)	129 (80.60%)	110 (84.6%)	102 (85.7%)	72 (88.8%)
Mean lipids level of dyslipidemic patients with lipid records **Ch Mean±SD (n)** **TG Mean±SD (n)**	 5.9±1.3 (96) 2.8±2.0 (91)	 5.9±1.2 (68)* 2.9±2.4 (68) †	 5.6±1.0 (59)** 3.0±1.6 (61) ††	 6.0±1.2(42)*** 2.6±1.6 (41) †††
Dyslipidemic on drug treatment n (%)	56 (43.4%)	68 (61.8%)	69 (67.6%)	53 (73.6%)
Controlled Hyperlipidemia n (%)	3 (2.3%)	5 (4.5%)	2 (2.0%)	3 (4.1%)

Note: ** P= 0.36 for comparing cholesterol level between 1st and 2nd visits*
*** P= 0.93 for comparing cholesterol level between 1st and 3rd visits*
****P= 0.80 for comparing cholesterol level between 1st and 4th visits*
† P= 0.83 for comparing dia BP level between 1st and 2nd visits
†† P= 0.90 for comparing dia BP level between 1st and 3rd visits
††† P= 0.20 for comparing dia BP level between 1st and 4th visits

Discussion

The high prevalence of diabetes among housewives (58.3%) in this study group is probably attributable to sedentary lifestyle, lack of exercise, affluent-society manifesting in employment of housemaids, all leading to obesity, thus making prone to diabetes. This result is comparable to a previous study on prevalence of diabetes in Bahrain[4].

It was observed that the majority of patients were residing in area (block) number 1211, followed by area (block) number 1216. This could be due to the fact that residents of these two blocks are native Bahrainis who have a high prevalence of diabetes (30%). They are predominantly women who have a sedentary lifestyle, low educational status, and employ housemaids. These factors make them prone to obesity and diabetes.

The poor quality of history can be attributed to short duration of medical consultation (7 minutes), and to the absence of diabetic sheets, which remind the physicians about its main components and facilitate closer adherence to practice guidelines[3]. Poor history may lead physicians to miss diabetic complications. Further investigations revealed that diabetic sheets were not available in the health centre since its opening in 2002.

Despite the fact that overweight and obesity are significantly associated with diabetes, high blood pressure, and high cholesterol, weight and height were rarely screened for and body mass index, was never screened for in these patients[18]. Prevalence of obesity is high in Bahrain[4]. In 1995, obesity was found in 15 percent of men and 31 percent of women; thirty percent of them were diabetic, hypertensive and hypercholestrolaemic[19]. Hypertension and diabetes are commonly associated and its prevalence is higher in type II diabetes than that in the general population[12]. Based on Bahrain's diabetic flow chart, BP should be measured once every three months. However, only 10.9 percent of patients had their BP measured four times a year. In this study, patients with normal BP (<120/80) did not exceed five percent. The prevalence of prehypertensives was twenty to twenty-six percent. At the age of 45 years, nearly 40 percent of patients with type II diabetes are hypertensive[12]. In this study, the percentage of hypertensive diabetics of comparable age was more than 70 percent. The high prevalence could be attributed to the finding that hypertensives are predominantly females who are prone to obesity and its complications. Although more than sixty-five percent of hypertensives were on drug treatment in this study group, less than 9 percent of them were controlled (BP<130/85). This control rate is lower than that in Al-Mahroos study of 19 percent[4] but is comparable with another study conducted in 2001 in Bahrain (9.8%), and to the finding of a report in Japan[20].The poor rate of BP control is the same worldwide, both in developed and developing countries[20].

Both UKPDS and DCCT trials demonstrated that improved glycaemic control (HbA1C≈7%) would substantially reduce the rate of micro-vascular complications[2,7,21,22]. Bahrain's diabetic committee recommends that HbA1c, as an indicator of glycaemic control, should be repeated every three months if patients are well controlled (HbA1c <7%). In general practice, 30 percent of patients do not achieve the targets for good glycaemic control[2]. In contrast, the control rate in this study was not more than 30 percent during follow-up visits. In addition, there was no significant improvement in control rate throughout these visits compared to first follow-up visit. In spite of achieving low glycaemic control rate in this study group, HbA1c was rarely done four times a year, and was done twice a year in only 20.5 percent of patients. This is much lower than that found in the Audit Commission Survey in the record of annual review on nine hospitals in UK (>90%)[10].

It is recommended that total cholesterol, LDL, HDL, and triglyceride, levels should be measured every year in adult diabetic patients, and more often if needed to achieve goals[23]. Even though annual lipid measurement was not included in Bahrain's diabetic sheet for follow-up visits, more than fifty percent of patients had it measured. However, physicians were requesting mostly total cholesterol, triglycerides, but rarely lipid profile, despite high level of total cholesterol. Using a total cholesterol of >5.2 mmol/l and triglycerides >1.8 mmol/l to define hyperlipidemia in this study, it was found that 80-89 percent of diabetics were dyslipidemics. Similar to hypertensives, more than two thirds of dyslipidemics were females, which can be attributed to obesity. Furthermore, the level of lipids control among these patients did not exceed 5 percent. The low control rate perhaps is related to under-treatment, fifty percent of patients were on drug treatment only, using sub-optimal doses or ineffective drug combination, lack of diet control and exercise, and non-compliance.

Micro-albuminuria is an early manifestation of diabetic nephropathy. Its presence is an indication to screen for, and control all other coexistent cardiovascular risk factors[24]. It is recommended that a test for the presence of microalbumin should be performed in type 2 diabetes at diagnosis, and annually thereafter if negative. In addition, Bahrain's diabetic committee recommends doing 24 hours' test for protein for all new patients, but it was rarely done in this study group. Although the median duration of diabetes in this study group was 4.3 years, urine screening for the albumin was rarely done for both new and follow-up cases. In contrast, Audit Commission Survey in UK found that 50-75 percent of patients had their kidney function done[10]. It seems that our patients in this study are at greater risk of diabetic nephropathy, due to low glycaemic control and presence of other uncontrolled cardiovascular risk factors. Therefore, micro-albuminuria should be tested for regularly.

Diet and exercise advice was given to two thirds of patients, and twenty point six percent of newly diagnosed patients were started on drug treatment immediately, five of them had FBS level <11.1 mmol/l, in which case three months non-pharmacological treatment should have been given a chance[25].

Diabetic retinopathy is the commonest cause of blindness in both UK[26] and USA[6] in the working age group. In Bahrain, there is not yet a study on the prevalence of causes of blindness, but it is estimated that diabetic retinopathy can be the first or second leading cause of blindness based on the high prevalence of diabetes itself. Annul screening of all diabetic patients for retinopathy can identify the disease at an earlier stage. Only 9.1 percent in this study group were annually screened. This is much lower than that found by Audit Commission Survey in England 70-90 percent[10], and Scottish diabetes survey in Scotland 42 percent[27]. Many patients did not have annual examination because they did not know they needed it or they were not aware of retinopathy, as it is asymptomatic in its initial stages[6]. Unlike the UK, which developed a national–screening programme that aims for 100 percent coverage by 2007[28], there is not yet a national screening programme in Bahrain.

All individuals with diabetes should receive an annual foot examination to identify high-risk foot conditions[29]. Patients studied were at risk of neuropathy, as they had poor control of diabetes, and associated co-morbidities. Only one out of 430 patients had foot examination recorded in their medical notes. This is by far much lower than

that found in UK by Audit Commission Survey 75-90 percent[10]. Providing podiatry services would be helpful to increase foot examination ate.

Regardless of diabetic committee recommendation to perform a comprehensive initial medical evaluation, many data were not recorded for new cases. These data were important to provide base-line information for continuing care. These included anthropometrical measurements (BMI, waist, hip, and W/H ratio), systemic examination (CVS, pulses, digestive system, foot and ENT), HB, ECG, and CXR. This is possibly due to lack of time or unawareness of physicians of these recommendations.

In this study, many patients did not receive a systematic diabetic care, due to non-attendance or irregular attendance to health centre, or if they attended, their records are non-retrievable, or if records were available, patients were unregistered in the records.

Furthermore, for patients who attended for diabetic care, the mode number of visits per patient per year was found to be five for new cases and four for follow-ups. The diabetic committee recommends that patient with good glycaemic control should attend every three months. Otherwise, the patient needs to attend the clinic more frequently[14]. In the presence of low glycaemic control rate in this study, one would expect a higher frequency of visits. In UK, the frequency of recall and follow-up visits depends on many factors, such as, age, state of the patient, available transport, glycaemic control, practice resources and workload[30]. However, every diabetic patient should have the annual review. In Bahrain, unlike UK, there is no a special visit called annual review. Nevertheless, except for annual fasting lipids and annual 24 hours urine for proteins which were not included in Bahrain's diabetic sheet, all the components of annual review are covered for in the regular follow-up visits over one year period. Similarly, NHS and ADA requirements of the initial visits are nearly the same except for 24 hours' test for protein and thyroid function tests. Twenty-four hours' test for proteins is mandatory in the initial assessment in Bahrain; on the other hand, it is not done either in UK or in USA. Thyroid function test (TFT) is part of the initial assessment in UK and USA, while it is not mandatory in Bahrain[8, 10]. In a study presented recently, researchers found that diabetics may be more prone than others to hearing loss in middle age. The authors suggest that hearing testing be added to the yearly checks recommended for diabetics[31].

It was noticed also that data and record keeping on initial and follow-up visits were deficient, making audit difficult, and if data do exist, it revealed that management was incomplete or of poor quality. In UK, the audit commission encountered the same problem during the survey of diabetic structured review in nine hospitals. Six hospitals could not identify the proportion of their patients, which received complete structured reviews in the preceding 18 months[10]. In the other three hospitals, one-third to three quarters of these patients were noted to have complete structured review in their medical notes. Nevertheless, 95 percent of patients reported to have some sort of annual check-up. This may reflect poor record keeping rather than poor medical care[10].

Another and main obstacle for this study was the absence of a diabetic register in this health centre. A simple diabetic register was developed for this study, but it needs to

be improved, so it can be maintained for future use. In contrast to Bahrain, where there is not yet a plan for developing a diabetic register, in the UK a practice-based register is one of the NHS priorities over the next three years (2003-2006) to ensure systematic diabetic care[29].

Conclusion

The level of diabetic service provision in the studied health centre was below the recommended standards of Bahrain's Diabetic Committee, UK NHS, and ADA. The control of diabetes and its associated co-morbidities (hypertension and hyperlipidemia) were suboptimal. Obesity, renal disease, foot and eye lesions were rarely screened for among diabetic patients.

It is recommended that urgent efforts be made to establish diabetic clinic in this health centre.

At a national level, it is required to support continuous professional development for all staff dealing with diabetes in primary, community, and secondary care; to unify diabetic services and ensure that they are competent to support self-management in diabetic care; and improve communication channels across their boundaries[29].

Furthermore, the diabetic committee needs to review and update the diabetes clinic programme in the ministry, announce national standards and targets for diabetic care, and establish performance indicators in diabetic services that would form the basis of auditing services in all health institutes.

Developing a diabetic register to identify patients at greater risk of complications and to document new cases would be an essential step to deliver better diabetic care[29].

It is recommended to educate diabetic patients regarding diabetic care standards, self-management in diabetes; and to involve both patients and public in decision-making.

REFERENCES

1. Salman R. Screening of Diabetic Retinopathy in Primary Care. Bahrain Med Bull 2004;26:27-8.
2. Goudswaard AN, Stolk RP, de Valk HW, et al. Improving glycaemic control in patients with Type 2 diabetes mellitus without insulin therapy. Diabet Med 2003;20:540-4.
3. Zoorob RJ, Hagen MD. Guidelines on the care of diabetic nephropathy, retinopathy and foot disease. Am Fam Physician 1997;56: 2021-8, 2033-4.
4. Al-Mahroos F, McKeigue PM. High Prevalence of Diabetes in Bahrainis: Associations with Ethnicity and Raised Plasma Cholesterol. Diabetes Care 1998;2: 936-42.
5. Al-Zorba F, Latest studies Clarify state of Heath in Bahrain. Diabetes Voice 2001;46:28-31.

6. Bartol T. Endocrine and Metabolic Health. In: Meredith PV, Horan NM. Adult Primary Care. Philadelphia: WB Saunders Co, 2000: 741-58.
7. Fong DS, Gardner TW, Blankenship G, et al. Diabetic Retinopathy. Diabetes Care 2003;26:99-102
8. American Diabetes Association. Standards of Medical Care for Patients With Diabetes Mellitus. Diabetes Care 2004;27(suppl 1**):** S15-S35**.**
9. Department of Health. National Service Framework for Diabetes: Standards. London: department of health, 2001:25, 11. Website: WWW.doh.gov.uk/ nsf/diabetes.htm. Accessed on September 2003.
10. Audit Commission. Testing Times: A review of diabetes services in England and Wales. London: Audit Commission, 2000: 20-21, 66-73.
11. UK prospective diabetes study group. Cost effectiveness analysis of improved blood pressure control in hypertensive patients with type 2 diabetes: UKPDS 40. BMJ 1998;317:720-6.
12. UK prospective diabetes study group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. BMJ 1998;317:703-13.
13. Salman R. Management of Diabetes Mellitus in Local Health Centers. Bahrain Med Bull 2003;25:41-2.
14. Diabetic Committee Members. Protocols and Guidelines for Diabetic Nurse Clinic. Manama: Ministry of Health, 2001.
15. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. JAMA 2003;289:2560-71.
16. American Diabetes Association. Hypertension Management in Adults With Diabetes**.** Diabetes Care 2004;27(suppl 1)**:** S65-S67.
17. Guidelines Sub-committee 1999. World Heath Organization/ International society of Hypertension Guidelines for the Management of hypertension. J Hypertens 1999;17:151-83.
18. Mokdad AH, Ford ES, Bowman BA, et al. Prevalence of obesity, diabetes, and obesity-related health risk factors. JAMA 2003; 289:76-9.
19. Al-Mahroos F, Al-Roomi K. Overweight and Obesity in the Arabian Peninsula: an overview. J R Soc Health 1999;119: 246-8.
20. Sequeira RB, Al Khaja KAJ, Damanhori AHH. Evaluating the treatment of hypertension in diabetes Mellitus: A need for better control? J Eval Clin Pract 2004;10:107-16.
21. UK prospective diabetes study group. Intensive Blood Glucose Control With Sulphonylureas or Insulin Compared with Conventional Treatment and Risk of Complications in Patients with Type 2 Diabetes (UKPDS 33). Lancet 1998;352:837-53.
22. American Diabetes Association. Tests of Glycaemia in Diabetes: Diabetes Care 2004;27(Suppl 1): S91-S93.
23. American Diabetes Association. Hyperlipidemia Management in Adults With Diabetes. Diabetes Care 2004;27(Suppl 1):S68-S71.
24. American Diabetes Association. Nephropathy in Diabetes. Diabetes Care 2004;27(Suppl 1): S79-S83.

25. Campbell RK. Type 2 diabetes Mellitus: Disease State Management. Prim Care 1999;3:33-7.
26. Olson JA, Strachan FM, Hipwell JH, et al. A comparative evaluation of digital imaging, retinal photography and optometrist examination in screening for diabetic retinopathy. Diabet Med 2003;20:528-34.
27. NHS Scotland. Scottish Diabetes Framework. Scotland: Ministry of Health, April 2002: 44-45.WebSite: www.scotland.gov.uk. Accessed on January 2004.
28. Department of Health. National Service Framework for Diabetes: Delivery Strategy. London: department of health, 2002:12-13. Website: WWW.doh.gov.uk/ nsf/diabetes/research. Accessed on September 2003.
29. American Diabetes Association. Preventive Foot Care in Diabetes. Diabetes Care 2004;27(Suppl 1):S63-S64.
30. Hall M. Providing Diabetes Care in General Practice. 4th ed. London: Class publishing, 2002:3-29.
31. Diabetes May Lead to Early Aging of the Auditory System. URL: http://www.newswise.com/articles/view/503357/. Accessed on March 2004.

STATE OF BAHRAIN
MINISRY OF HEALTH

Diabetes Clinic Programme

Health Centre: .....

Name: ..... Sex: .....
CPR: ..... Nationality: .....
Occupation: .....
Address: Flt ..... House ..... Rd ..... Blk .....
Phone ..... Date: .....

DATE OF DIAGNOSIS		DIABETES DURATION	

MEDICAL HISTORY

PRESENT H/O DIABETES	No	Yes	Duration
Vision decline			
Ear pain			
Teeth pain			
Chest pain			
Breathlessness			
Diarrhoea			
Burning micturation			
Polyuria			
Thirst			
Leg cramps			
Numbness foot			
Parasthesia			
Impotence			
Feet infection			
Fatigue			
Itching (generalised)			
Skin boils			
Women vulval itching			
Weight loss			
Weight gain			
Loss of appetite			
Carving appetite			
PAST HISTORY	**No**	**Yes**	**Duration**
Hypertension			
Heart disease			
Feet ulceration			
Hypoglycaemia			
Coma			
Gestation diabetes			
Hepatitis cirrhosis			
Renal Diseases			
Hospital Admission			
Surgical operations			
-			
-			
WOMEN HISTORY	**No**	**Yes**	**Duration**
Menopause			
Children			No. ( )
FAMILY HISTORY	**No**	**Yes**	**Duration**
Diabetes			
Hypertension			
Stroke			
Heart disease			
Kidney Diseases			
Hyperlipidaemia			

SOCIAL / MARITAL Hx	No	Yes	Duration
Marital status			
Smoking			Cig/day
Alcohol drink			
EXERCISE HISTORY	**No**	**Yes**	**Duration**
Walking			
Jogging			
Aerobics			
Cycling			
Swimming			
DIET HISTORY	**No**	**Yes**	**Duration**
Adding sugar with tea			
Eating sweets daily			
Ice cream with sugar			
Animal fat use			
Eating dates			
Cheddar cheese			
Biscuits			
Chocolates			
Cakes			
Eat sweet fruits			
Use full cream milk			
Drink normal coke			
Eat from restaurants			
Eat salty food			
Skip any meal			
Fasting for religion			
Eat Eggs			day/wk
Eat jam			day/wk
Eat honey			day/wk
Eat lamb meet			day/wk
Eat fish			day/wk
Eat chicken			day/wk
Eat vegetable			day/wk
Eat rice			day/wk
Eat bread			day/wk
Eat pea nuts			day/wk
Eat fry potato			day/wk
Eat all in buffet			day/wk
TREATMENT HISTORY	**No**	**Yes**	**Duration**
o Diet only			
o Tablet			
o Insulin			
o Tablets & Insulin			
o Herbal medicine			
o Tablet for hypertension			

PHYSICAL ASSESSMENT

VITAL SIGNS	Right	Left
Supine Blood pressure		
Sitting Blood pressure		
Standing Blood pressure		
Radial Pulse		
Temperature		
ANTHROPOMETRIC		
Weight		
Height		
Waist		
Hip		
Waist-Hip Ratio		
Body Mass Index (BMI)		
OPHTHALMIC SIGNS	Right	Left
Vision Acuity		
Fundoscopy		
o Microaneurysm		
o Haemorrhage		
o Exudates		
OTOLARYNGOLOGY	Right	Left
Ear		
Nose		
Throat		
VASCULAR SYSTEM	Right	Left
Carotid bruit		
Dorsalis pedis		
Post tibial		
Vericose veins		

CARDIAC SYSTEM	- ive	+ ive
Gallop		
Murmur		
Arrhthmia		
DIGESTIVE SYSTEM	- ive	+ ive
Teeth		
Gum		
Stomatitis		
Hepatomegaly		
Spenomegaly		
NERVOUS SYSTEM	- ive	+ ive
Pain		
Skin temperature		
Light touch		
Vibration		
Position sense		
SKIN, FEET & FINGERS	- ive	+ ive
Tinea pedis		
Foot Ulcer		
Carbuncle		
Foot Corn		
Skin Atrophy		
Pigmented spots		
Varicose veins		
Skin rash		

LABORATORY ASSESSMENT

BLOOD	Result	Ref. Value
Fasting Blood Sugar		3.6 - 5.8
Random Blood Sugar		3.6 - 9.0
HbA1c		5-7%
Total Cholesterol		3.6 - 5.2
HDL-Cholesterol		0.8 - 1.2
LDL-Cholesterol		1.6 - 4.7
Triglyceride		0.2 - 1.8
Urate		200 - 420
Uric Acid		3.0 - 7.0
Serum Creatinine		62 - 140
Na		137 - 148
K		3.9 - 5.0
Cl		100 - 107
H_2CO_3		24 - 30
Haemoglobin		
Keton		
URINE		
Keton		Nil
Albumin		Nil
Bacteria		Nil
WBCs		0-1
24-hour Protein		Nil
24-hour urine Volume		

ECG	- ive	+ ive
Arrhythmia		Lead
T wave inversion		Lead
ST elevation		Lead
Major Q wave		Lead
CHEST X-RAY	- ive	+ ive
LVF		
Cardiomegally		
Pulmonary oedema		
Lung Lesion		

MANAGEMENT

Current Treatment:

Plan of Management:

Nurse Name	Physician Name

DIABETES SHEET
FOLLOW UP VISITS

Patient's Name

FREQUENCY			0 /Year		3 Mo.		6 Mo.		9 Mo.		Year		3 Mo.		6 Mo.		9 Mo.	
DATE																		
NURSE	Weight (Kg)																	
	B.P.																	
	Vision		Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.
	URINE	Glucose																
		Protein																
		Blood																
		Ketone																
	Microalbumin																	
	FBS																	
	PPBS																	
	HbA1c																	
	Fractasamin																	

SUBJECTIVE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Angina																
Leg pain at rest																
Paresthesia																
Impotence																
Diarrhoea																
Medications																
Smoking																
Alcohol																

OBJECTIVE		Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt
FUNDI	Cataract																													
	Mic Aneurysm																													
	Haemorrhage																													
	Exudates																													
New Vessels																														
Post Tibial																														
Dorsalis Pedis																														
Ankle Jerk																														
Vibration																														
Fine touch																														

MANAGEMENT									
	Diet & Exercise								
	MEDICATIONS 1.								
	2.								
	3.								
	4.								

✓ Enter TICK to mark the appropriate ✗ Enter ASTERISK to see Notes Shaded section is OPTIONAL