

Impact of a mini-clinic on diabetic care at a Primary Health Care Center in southern Saudi Arabia

Yahia M. Al-Khaldi, MBBS, CABFM, Mohd Y. Khan, MD, MNAMS.

ABSTRACT

Objectives: The aim of this study was to assess the impact of a mini-clinic on the quality of diabetic care at a Primary Health Care Center in Aseer region, Kingdom of Saudi Arabia.

Methods: All the files of diabetics in Wasat Abha Primary Health Care Center were reviewed at the end of 1997 for diabetic process based on a scoring system of 11 items. Diabetic outcomes were evaluated in accordance with Quality Assurance Protocol. Data of all the files was entered into and analyzed by Statistical Package for Social Sciences. Relevant statistical tests were used.

Results: Files of 198 patients were evaluated, 61.6% were male, 90.4% were married, and 50% were educated. The mean duration of diabetes was 7.1 years. All the 11 items of diabetic process improved significantly except for measuring blood pressure, weight and cholesterol.

However, the mean of the total score increased significantly from 5.7 points to 8.2 points ($P=0.00$). The measured diabetic outcomes improved significantly for the provision of diabetic card, health education pamphlets, diabetic control and obesity. Ten percent of the diabetics were found to have at least one complication. Diabetic retinopathy (8.4%), impotence (8.2%), and cardiovascular (3.6) were the most prevalent recorded complications.

Conclusion: Establishment of diabetic mini-clinic at Wasat Abha Primary Health Care Center improved the process and the outcomes of diabetic care. Further large and countrywide studies are suggested to evaluate the cost-effectiveness of such types of clinics on diabetic care.

Keywords: Diabetes, mini-clinic, impact, quality, primary health care.

Saudi Med J 2002; Vol. 23 (1): 51-55

Since 1970s, general practitioners (GPs) have started assuming the increasing responsibility for the care of diabetes.¹ Their important and necessary involvement is well-recognized²⁻⁶ and is based on the fact that metabolic control could be as good as that found in hospital clinics.⁷⁻⁹ In order to increase their involvement in the proper management of diabetic care, schemes were first developed in Birmingham,¹⁰ Wolverhampton¹¹ and in Poole, United Kingdom.¹² The term mini-clinic and the concept of protected time¹³ for the general practice care of diabetes were coined and used. In the Kingdom of Saudi Arabia (KSA), primary health care physicians began to play

an important role and take increasing responsibility for the care of diabetes. In order to help the primary health care physicians to manage diabetics, the Ministry of Health (MOH) in the KSA approved the guidelines and standards of diabetic care at primary health care levels through a Scientific Quality Assurance Committee in 1994.¹⁴ Many studies from the central and southern regions of KSA showed that diabetic care could be run at primary health care settings in the presence of adequate structures and by removing some obstacles.¹⁵⁻¹⁷ To our recent knowledge there has been no studies carried out at Primary Health Care Centers (PHCC) to evaluate the

From the College of Health Sciences (Al-Khaldi), College of Medicine and Medical Sciences (Khan), King Khalid University, Abha, Kingdom of Saudi Arabia.

Received 28th April 2001. Accepted for publication in final form 29th August 2001.

Address correspondence and reprint request to: Dr. Y. M. Al-Khaldi, Family Physician, Family Medicine Joint Program, Aseer Region, College of Health Sciences, PO Box 2653, Abha, Kingdom of Saudi Arabia. Fax. +966 (7) 2271666.

impact of a diabetic mini-clinic on the diabetic care in Aseer region except a mini report from Riyadh.¹⁸ The objective of this study is to evaluate the impact of a mini-clinic on the process and outcome of diabetes at a PHCC in Aseer region, southwest of KSA.

Methods. Wasat Abha Primary Health Care Center (WAPHCC), where this study was carried out is one of the 6 urban PHCCs in Abha City, Aseer region. This PHCC serves to approximately 15,000 inhabitants. One of the 6 clinics in this PHCC was designated to be a chronic disease clinic, which started working in January 1996. This mini-clinic cared for diabetics, hypertensives and asthmatic patients. The National Quality Assurance guidelines for the management of diabetes mellitus were used.¹⁴ There were 6 GPs and one family physician practicing in this PHCC. The family physician and one of the GPs ran this clinic every morning without an appointment system. Each diabetic file was designed using the approach of problem oriented medical records (POMR).¹⁹ The file had 5 papers, each marked with a specific purpose of recording demographic data, list of problems of patient, monthly follow-up, annual check-ups, check list for health education and drugs while the 5th paper contained the check list on the diabetic complications. All the files of diabetic patients who were seen during 1996 and 1997 were reviewed and evaluated by one of the investigators for: demographic data, process of care, degree of control and prevalence of complications. The indicators for the process of diabetic care were assessed by using the Chesover modified scoring system.²⁰ This scoring system depended on the extent of fulfillment of 11 items for good diabetic care by the GPs in the past year. These 11 items were: blood pressure, weight, peripheral pulses, peripheral sensation, examination of foot, estimation of blood glucose, urea and creatinine, test for proteinuria, cholesterol, referral for ophthalmic examination and electrocardiogram (ECG). The indicators of outcome were used in accordance with the Quality Assurance protocol.¹⁴ These indicators were based on the degree of diabetic control, the degree of compliance with appointments to a diabetic mini-clinic, prevalence of obesity among the diabetic patients who attended during the past 2 years. The degree of diabetic control was assessed in accordance with the Quality Assurance Protocol (good control (fasting blood sugar (FBS)<125 mg/dl), moderate control (FBS 125-180 mg/dl), and poor control (FBS>180 mg/dl). Compliance to appointment was categorized as: good (patient attended mini-clinic, once at least during the past 3 months), fair (patient attended once at least during the last 6 months), and poor (patient did not attend at all during the last 6 months). Overweight

and obesity were assessed as per recommendations of Khattab et al.¹⁵ All the files of diabetic patients who were seen before and after the establishment of a mini-clinic were evaluated accordingly. Data was entered and analyzed by Statistical package for social sciences (SPSS). Relevant and appropriate tests, chi-square and student t-test were used.

Results. Table 1 shows the characteristics of diabetic patients attending WAPHCC. Table 2 shows the impact of a diabetic mini-clinic on the process of diabetic care. All items of care process showed an improvement. Table 3 shows the impact of establishment of mini-clinic on the parameters of outcome of diabetic card. After the establishment of mini-clinic, good diabetic control became almost double while poor control decreased by about 13%. Table 4 shows the prevalence of diabetic related complications. Approximately 10% of the diabetic patients had at least one reported complication. The most commonly recorded complication was diabetic retinopathy.

Table 1 - Characteristics of diabetic patients at Wasat Abha PHCC in 1997 (n = 198).

Characteristics	N (%)
Age (Mean ± SD)	55.3 ± 12.2 years
Male	122 (61.6)
Female	76 (38.4)
Marital Status	
Married	179 (90.4)
Single	5 (2.5)
Widow	14 (7.1)
Educational Status	
Illiterate	77 (39.0)
Educated	100 (50.5)
Missing Information	21 (10.6)
Employment	
Employed	156 (78.8)
Unemployed	42 (21.2)
Type of Diabetes	
Type 1	10 (5.0)
Type 2	188 (95.0)
Family history of Dm	
Positive	100 (50.5)
Negative	77 (38.9)
Missing Information	21 (10.6)
Smoking	
Smoker	9 (4.6)
Non-Smoker	185 (93.4)
Missing Information	4 (2.0)
Duration of diabetes	7.1 ± 6 years
Type of Therapy	
Diet only	17 (8.6)
Diet and drug	181 (91.4)

PHCC - Primary Health Care Center; N - number; SD - standard deviation; DM - Diabetes mellitus

Table 2 - Impact of diabetic mini-clinic on the process of diabetic care at Wasat Abha PHCC.

Items	Before N (%)	After N (%)	P - Value
General			
Blood pressure	144 (72.7)	167 (84.3)	0.30
Weight	133 (67.2)	161 (81.3)	0.08
Clinical			
Peripheral sensation	111 (56.1)	160 (81.0)	0.00
Peripheral pulses	111 (56.1)	160 (81.0)	0.00
Foot examination	111 (56.1)	160 (81.0)	0.00
Investigations			
Blood sugar	135 (68.2)	187 (94.4)	0.00
Protein in urine	135 (68.2)	187 (94.4)	0.00
Cholesterol	62 (31.3)	87 (44.0)	0.07
Urea and Creatinine	52 (26.3)	87 (44.0)	0.85
ECG	50 (25.3)	90 (45.5)	0.00
Referral for Fundoscopy	88 (44.4)	140 (70.7)	0.00
Total Score (Mean±SD)	5.7 ± 4.9	8.2 ± 2.8	0.00
N - number; ECG - electrocardiogram; SD - Standtard deviation; PHCC - Primary Health Care Center			

Table 3 - Impact of diabetic mini-clinic on the outcome of diabetic care at Wasat Abha PHCC.

Items	Before N (%)	After N (%)	P - Value
Provision of Diabetic card	53 (26.1)	133 (65.5)	0.000
Provision of health education pamphlet	65 (32.8)	90 (44.3)	0.000
Compliance to appointment			
Good	93 (45.8)	122 (60.1)	0.718
Fair	6 (3.0)	21 (10.3)	
Poor	104 (51.2)	60 (29.5)	
Control			
Good	14/135 (10.4)	39/187 (20.8)	0.000
Fair	43/135 (31.9)	64/187 (34.2)	
Poor	78/135 (57.8)	84/187 (45.0)	
Obesity			
Overweight	65/133 (48.9)	104/161 (65.0)	0.000
Obese	37/133 (52.9)	18/161 (11.2)	
N - number; PHCC - Primary Health Care Center			

Table 4 - Distribution of diabetic complications in diabetic patients attending mini-clinic at Wasat Abha PHCC.

Type of Complication	N (%)
Ophthalmological	9/107 (8.4)
Impotence	10/122 (8.2)
Cardiovascular	6/169 (3.6)
Neurological	4/169 (2.3)
Diabetic foot	2/60 (1.3)
Nephrological	1/87 (1.2)
N - number; PHCC - Primary Health Care Center	

Discussion. Diabetes mellitus is a chronic metabolic disease and a major factor for coronary heart disease. Its complications may lead to blindness in adults, end stage renal disease and non-traumatic amputations of foot or its appendages thus, putting diabetics at special risk needing continuous surveillance, comprehensive and coordinated care. This holistic approach in diabetic care is not feasible in a hospital setting because of the time constraints, accessibility to the patients and cost of hospital care as compared to mini-clinics at primary health care level which are cheaper, accessible and at a low cost.²¹ In order to overcome these problems in diabetic care, mini-clinics were established on an experimental basis in western countries.¹⁰⁻¹³ Until 1990, most of the diabetic patients in the KSA were commonly treated at hospital level. It was only in 1994, that the Quality Assurance Manual¹⁴ was developed, distributed and the primary health care physicians and nurses of Aseer region were trained to offer good diabetic care based on the above quoted manual. Khattab et al conducted 2 audit studies in Aseer region in 1996 and 1998, which confirmed that the process and outcome of the diabetics might be improved by well structured ordinary clinics at the PHCC, with community participation.^{22,23}

Impact of diabetic mini-clinic on database recording. The recording of database information namely, demographic and diabetes related data pertaining to diabetic patients is essentially needed to classify the disease, to determine the line of management and follow-up and also to evaluate the impact of the clinic. In all the diabetic files, demographic data included the details of age, sex, marital, occupational and educational status while diabetes related data contained the information on duration and type of diseases, family history of diabetes, type of therapy and habit of smoking. As shown in **Table 1**, the recording of most of the data in 95% (range from 90%-100% of individual items) of diabetic files was available. The completeness of data recording in the present study was much higher as compared to earlier studies, carried out in Southern and central regions of KSA.^{16,22,23} Not only the recording of database information was improved but the number of diabetic patients registered with the mini-clinic at PHCC also increased to 198 during the post-establishment phase of the clinic as against 144 diabetic patients prior to the functioning of the mini-clinic. Mean visits of each patient increased from (3.4 ± 1.9) visits to (3.8 ± 2.5) visits. This progressive increase in number and visits of the diabetic patients maybe attributed to the availability of treating physician, accessibility of the clinic and its attraction to diabetics, which are added advantages of mini-clinics at PHCC level.²⁴

Impact of diabetic mini-clinic on the process of diabetic care. Well organized clinics together with the availability of diabetic registers, management protocols and diagnostic instruments would result in good diabetic care.²³ Our study revealed that all the

11 items of process of diabetic care showed some improvement which was also reflected by the increase in the average total score before and after the establishment of the mini-clinic (5.7 points \pm 4.9 points to 8.2 points \pm 2.8 points). There were many items of process of diabetic care that improved dramatically. These items included estimation of fasting blood sugar, protein in urine and physical examination of foot, peripheral pulses and sensations. The results of the investigations were comparatively higher than other studies.^{16,22,25} Recording of weight and blood pressure showed slight improvement in comparison to the pre and post establishment of the mini-clinic but was lower than the national target and other studies^{14,16,25} but higher than the study of Khattab et al.²² Since other process of care like estimation of lipids and urea and creatinine, needed cooperation and participation of hospital services, the results of investigations showed some improvement after establishment of the mini-clinic. Comparatively these results were still below the national target¹⁴ and Riyadh studies^{16,17} but higher than Aseer studies.^{22,23} The findings were similar to the study of Roger et al.²⁵ The process of diabetic care at a referral hospital were less satisfactory than compared to the process of care at PHCC level. Solutions to the above problems have already been suggested by Khattab et al.¹⁵ Referral of all diabetic patients to Eye clinic for fundoscopy is mandatory.¹⁴ This is an easy procedure which may diagnose diabetic retinopathy early and maybe of help in averting blindness. In this study, referral for fundoscopy increased from 44% to 70% after the establishment of the mini-clinic. However, the diabetic patients whose fundoscopy was actually performed rose from 33% to 54% which was comparable to the observations of another study conducted in Riyadh in 1995¹⁶ but higher than the studies of Khattab et al.^{22,23} The difference in the number of referrals and of actual fundoscopy may be attributed to poor coordination between referral hospital and PHCC and also to a poor referral system in the region, as also mentioned elsewhere.¹⁵ The local health authority is urged to look into the problem and its solutions seriously and urgently.

Impact of diabetic mini-clinic on the outcome of diabetic care. There was a definite improvement in the supply of diabetic card to the patients, which have shown a rise up to 65% as against 26% prior to the establishment of the mini-clinic. Similarly the provision of health education pamphlets to diabetic patients also increased from 33% to 44%. However, all these improvements in figures remained below the national targets.¹⁴ The reasons for such low provisions of diabetic card and health education pamphlets could be either due to irregular supply by Ministry of Health or due to inadequate recording of these items by the medical staff. Whatever maybe the reasons, careful action needs to be designed to

cover the shortage or find a solution. Compliance to appointment significantly increased after the establishment of the mini-clinic and consequently the defaulter rate decreased from 51% to 30%. The factors affecting defaulter rate were many but establishment of the mini-clinic at PHCC level had been a contributing factor to increase the compliance to appointment by making it accessible to the patients. Although the defaulter rate in this study was lower than the observations of Khattab et al.,²² it was still not corresponding to national targets (<20%). To overcome the problem of default in diabetes management, the recall and appointment system as used in immunization clinics can be made applicable. Good diabetic control is the main objective of care. Our study had shown that good diabetic control doubled after the establishment of the mini-clinic and the poor control decreased from 58% to 45% but still these figures were below the national standards (>40% should have good control).¹⁴ In comparison, the good glycemic control of diabetes was higher than Aseer study (1996)²² but lower than the studies conducted in Riyadh (1995, 1997)^{16,17} and Aseer (1998).²³ The reasons for such a difference could be either due to different methods of assessment of control or due to difference in demographic profile of the study patients. Diabetic control could be improved by intensive health education of diabetics on the importance of diet, drug, and compliance to appointment and exercise.

Obesity, known to be one of the most prevalent nutritional disorder in the KSA, the occurrence of which could lead a normal person more liable to develop diabetes mellitus.²⁶ The impact of the mini-clinic was obvious from **Table 3** which revealed that the total number of obese patients decreased and changed to overweight. Despite this improvement, diabetic patients should be educated on the role of weight reduction and the role of exercise as important determinants of well being and of good diabetic control. Allocation of time or protected time is a cornerstone in the organization of the mini-clinic, which might enable the PHCC physician to early detect and to manage the complications effectively. Approximately 10% of diabetic patients at least had one reported complication. However, diabetic retinopathy was the most common complication observed in these diabetics, which was comparatively lower than the figures (17.9%) reported by Alowayyad et al.¹⁷ but similar to the observations of Khattab et al.²² The reasons for this low prevalence in the present study could be due to low rate of performance of fundoscopy in only 55% of the diabetics. Neuropathy and cardio-vascular complications were found to be less than 6%, which were lower than the observations of Alowayyad et al.,¹⁷ but higher than the figures reported by Khattab et al.²² Two out of 160 (1.3%) diabetics had foot

complications which was nearly similar to Aseer study²² but higher than Riyadh study.¹⁷ Nephropathy was the least common complication (1.2%) in the present study as compared to Riyadh study where the prevalence of diabetic nephropathy was approximately 13%. In our study, 44% of patients had urea and creatinine test carried out as compared to 84% of diabetic patients, who had this test carried out in the Riyadh study.¹⁷ Mean duration of diabetes among our patients was less than 7 years as compared to more than one 3rd of Riyadh patients who had diabetes for more than 10 years.¹⁷ These factors could explain the differences in the prevalence of diabetic nephropathy in both the practices. Impotence was observed in 8.2% of diabetic patients which was comparatively lower than the Riyadh study conducted by Kattan in 1996 where he observed that diabetes mellitus was the main risk factor of impotence in Saudi patients, who were admitted to the University Hospital for evaluation of impotence.²⁷ The reason for low prevalence of impotence in the present study could be attributed to the social stigma attached with this condition, feeling of shame or inhibition on the part of patient and lack of knowledge pertaining to impotence and its relation with diabetes.

In conclusion, the establishment of a diabetic mini-clinic at PHCC will improve the process and outcome of diabetic care and will help in the reduction of rate of default and early detection and prevention of diabetic complications. Further countrywide studies to evaluate the diabetic mini-clinics and their cost effectiveness at PHCC level are suggested.

References

1. Thorn PA, Russell RG. Diabetic clinics today and tomorrow: Mini-clinics in general practice. *Br Med J* 1973; 2: 534-536.
2. Wilks JM. Diabetes - a disease for general practice. *J R Coll Gen Pract* 1973; 23: 46-54.
3. Tasker PRW. Is diabetes a disease for general practice? *Practical Diabetes* 1984; 1: 21-24.
4. Greenhalgh PM. Shared care for diabetes: a systemic review. London: Royal College of General Practitioners; 1994: Occasional paper 67.
5. Starfield B. Primary Care. Participants or gate keepers? *Diabetes Care* 1994; 17: 12-17.
6. Nabarro JDN. Diabetes and the general practitioner. *J R Coll Gen Pract* 1987; 37: 389.
7. Singh BM, Holland MR, Thorn PA. Metabolic control of diabetes in general practice clinics: comparison with a hospital clinic. *Br Med J* 1984; 289: 726-728.
8. Williams DRR, Munroe C, Hospedals CJ, Greenwood RH. A three year evaluation of the quality of diabetes care in the Norwich Community Care Scheme. *Diabetes Medicine* 1990; 7: 74-79.
9. Wood J. A review of diabetes care initiatives in primary care settings. *Health Trends* 1990; 22: 39-43.
10. Malins JM, Stuart JM. Diabetic clinic in a general practice. *Br Med J* 1971; 4: 161.
11. Thorn PA. On looking after diabetic patient - hospital clinic or practice mini clinic. *Midland Medical Review* 1971; 7: 151-154.
12. Hill RD. Community care services for diabetics in the poole area. *Br Med J* 1976; 1: 1137-1139.
13. Tasker PRW, editor. Diabetes [information folder]. London: Royal College of General Practitioners; 1986. p. 7-8.
14. The Scientific Committee of Quality Assurance in Primary Health Care. Quality Assurance in Primary Health Care Manual. WHO-EM/PHC/8 I -A/G/93. 1994; 199-233.
15. Khattab M, Alakija W, Abolfotouh M, Humaidi M, Al-Tokhy M, Al-Khalidi Y. Obstacles to and solutions for the optimal implementation of primary care for diabetes in Abha, Asir Region, Saudi Arabia. *Saudi Med J* 1997; 18: 236-239.
16. Qureshi RH, Al-Owayyed A. An audit of the process of diabetic care in a large Family practice in Riyadh. *Saudi Med J* 1995; 16: 394-397.
17. AL-Owayyed A, AL-Sheikh A, Taha S. A survey and audit of diabetic care in a large family practice in Riyadh. *Saudi Med J* 1997; 18: 175-179.
18. Al-Sahli SN. Diabetes mellitus, hypertension distribution and effect of mini clinic. *Saudi Epidemiology Bulletin* 1999; 6: 20.
19. Rakel RE, editor. Essentials of Family Practice. 2nd ed. Philadelphia: WB Saunders Company; 1978. p. 91-107.
20. Chesover D, Tudor Miles P, Hilton S. Survey and audit of diabetic care in general practice in south London. *Br J Gen Pract* 1991; 41: 282-285.
21. Collier JAB, Longmore JM, Hodgetts TJ. Oxford handbook of clinical specialities. 4th ed. Oxford: Oxford University Press; 1997. p. 432.
22. Khattab M, Abolfotouh M, Alakija W, Humaidi M, Al-Tokhy M, Al-Khalidi Y. Audit of diabetic care in an Academic Family Practice Center in Asir Region Saudi Arabia. *Diabetes Res* 1996; 31: 243-254.
23. Khattab MS, Al-Khalidi YM, Abolfotouh MA, Khan MY, Humaidi MA, Alakija W, Al-Tokhy M. Impact of a diabetic program in a family practice setting in Asir Region, Saudi Arabia. *Diabetes Res* 1998; 33: 115-127.
24. Khoja TA. Caring for your asthmatic patients. The asthma mini clinic. 1st ed. KSA: General Directorate Health Centres, Ministry of Health; 1996. p. 1-4.
25. Zoorob RJ, Mainou III AG. Practice patterns of rural family physicians based on the American Diabetes Association standards of care. *J Community Health* 1996; 21: 175-182.
26. Al-Nuaim AR, Al-Mazrou Y, Al-Attas O, Al-Rubean K, Khoja T, Al-dhaghari N. National chronic metabolic disease survey part I. Prevalence of Diabetes Mellitus, Obesity, and hypercholesterolemia in Saudi Arabia. Riyadh (KSA): Ministry of Health and King Saud University; 1995. p. 1-68.
27. Kattan SA. Impotence in Saudi males-etiology and risk factors. *Saudi Med J* 1996; 17: 350-356.