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Managing type 2 diabetes in Soweto—The South African Chronic Disease Outreach Program experience☆

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ABSTRACT

Diabetes (DM) and its resultant complications are a problem worldwide, and especially in developing countries like South Africa (SA). Risk factors associated with DM are potentially modifiable, but DM control is poor. Problems in SA include high prevalence of morbidity from DM and hypertension (HTN), lack of recognition of the importance of chronic kidney disease (CKD), late presentation to health care services, lack of education of health providers and patients, and poor quality of care in primary health care settings (PHC). In response, there has been growing advocacy for prevention strategies and improved support and education for primary health care nurses (PHCNs). A Chronic Disease Outreach Program (CDOP), based on the chronic care model was used to follow patients with DM and HTN, support PHCN, and improve health systems for management in Soweto. A group of 257 DM patients and 186 PHCN were followed over 2 years, with the study including the evaluation of 'functional' and clinical outcomes, diary recordings outlining program challenges, and a questionnaire assessing PHCNs' knowledge and education support, and the value of CDOP. CDOP was successful in supporting PHCNs, detecting patients with advanced disease, and ensuring early referral to a specialist center. It improved early detection and referral of high risk, poorly controlled patients and had an impact on PHCNs' knowledge. Its weaknesses include poor follow up due to poor existing health systems and the programs' inability to integrate into existing chronic disease services. The study also revealed an overworked, poorly supported, poorly educated and frustrated primary health care team.

Abbreviations: CD, CDOP nurses; CDOP, Chronic Disease Outreach Program; CKD, chronic kidney disease; CVD, cardiovascular disease; DM, diabetes; HTN, hypertension; NC, non-CDOP nurses; PHCN, primary health care nurse; SA, South Africa.

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1. Introduction

The prevalence of diabetes (DM) is rising, with concomitant increases in the prevalence of cardiovascular disease (CVD) and chronic kidney disease (CKD) [1–3]. In sub-Saharan Africa, DM must compete for resources with communicable diseases like HIV, and as a result of limited resources, patients with end stage renal failure (ESRD) and signficant cardiovascular disease related to DM are excluded from dialysis and transplant programs [4,5]. Control of DM in South Africa (SA) is poor. In one study, acceptable glycemic control was present in only 49.4% [6]. Problems included high prevalence of morbidity from DM, the late presentation to health care services, lack of education, and poor quality of care at primary health care level [7,8]. In an unpublished review of DM and HTN control in Soweto, the control of DM was dismal at primary care clinics [9], with less than 7% having blood glucose levels <8 mmol/L. In Soweto, 50% of the mortality in a type 1 DM cohort was due to kidney failure [10]. It is possible, given its greater prevalence, that type 2 DM contributes even more to the CVD and CKD burden. Incipient DM nephropathy was reported in 32–57% of patients followed for between 5 and 10 years in a hospital based study [11]. Overt proteinuria was reported in between 5 and 28% and increased with duration of diabetes. More recently, with long term follow up of type 2 DM patients [12], 28.8% of patients died from ESRD and the rate of deterioration was affected by poor control of BP, a serum glucose level of >14 mmol/L, heavy proteinuria, a high retinopathy score, a body mass index (BMI) >28 kg/m^2, and the number of pack years of smoking. CKD in developing countries in patients with type 2 DM is likely to be a major cause of death.

In light of these facts, a Chronic Disease Outreach Program (CDOP) commenced in 1999 in Soweto (acronym for South Western Township, located southwest of Johannesburg). As elsewhere in sub-Saharan Africa, Soweto residents have high risk factors for and experience the multiple burdens of CVD and CKD, non-communicable disease such as obesity, HTN and DM, and chronic infections like HIV and tuberculosis (TB) [3,7,13]. The control of modifiable risk factors in SA, certainly for people in Soweto, remains a problem and highlights the need for greater focus on primary health care nurses (PHCNs) to improve DM control [14]. Although a method and system of deciding where patients can best be managed is not well understood, health system managers need to improve health care system design to utilize primary care clinicians for the improved management of chronic illnesses. To explore questions related to the management of DM and HTN, in this article we investigate the role of PHCNs in a dedicated chronic illness program for the primary care management of chronic diseases in Soweto and South West Gauteng region of Gauteng Province.

2. Methods

This study on which we draw in this article was conducted from February 2003 to February 2006. Patients were enrolled at 20 clinics and health centers (11 in Soweto and 9 other regional clinics) in the South West Gauteng region, and were followed for 2 years. All clinics were from the same health region, controlled by the province, and had registered PHCN as staff. All patients at risk of kidney disease were referred to a single specialist nephrology clinic at Chris Hani Baragwanath Hospital. All clinics were incorporated into a program modeled on the Chronic Illness Care Model (CICM), which utilized PHCNs to link primary care and specialist care [15]. The PHCNs were provided with decision support, escalated scaling up of medication, and prompt access to specialist care. The study aimed to determine if the program was an effective method for the early detection and management of patients with DM and HTN/or proteinuria, particularly those who were at high risk for complications of CVD and CKD. The program evaluation included an assessment of challenges facing the current health system in the region.

Two program nurse coordinators collected patient visit forms (generated by the PHCNs), and together with a nephrologist, they evaluated and analyzed the information and provided feedback and decision support to the PHCN (Fig. 1). Clinical data evaluation included assessment of modifiable CVD and CKD risk factors, body mass index (BMI) and waist circumference, systolic blood pressure (SBP), diastolic blood pressure (DBP), random serum glucose, HbA1c, serum cholesterol, proteinuria and an estimated glomerular filtration rate (eGFR), using the Cockcroft–Gault (CG) [16] and the abbreviated Modification of Diet in Renal Disease (MDRD) formulas [17].

PHCNs in the clinic were encouraged to sequentially enroll adult males and females, ≥18 and ≤80 years old, who met the criteria for high risk or established CKD or CVD; women who were pregnant were excluded, as were patients not willing to participate. Participants included patients with uncontrolled DM with HTN (≥140/90 mmHg) and/or proteinuria or uncontrolled DM (random glucose ≥8 mmol/L), or with HTN and/or proteinuria. Proteinuria was measured by albumin creatinine ratio (ACR) on a spot urine sample, and was defined as microalbuminuria (ACR 2.2–33.9 mg/mmol) or macroalbuminuria (ACR ≥34 mg/mol), or nephrotic if ≥200 mg/mmol.

PHCNs were encouraged to start early treatment with insulin if DM was uncontrolled and angiotensin converting enzyme inhibitors (ACEi) for HTN or proteinuria, but no specific treatment regimen was enforced. If uncontrolled, then PHCNs were instructed to add other classes of DM or HTN medication and increase them to the maximum acceptable levels. Care was free in the primary care clinics and ranged from zero to $8 at the specialist center, depending on a patient's employment status or age. Only 'essential drug list' medication for HTN and DM (an ACEi, calcium channel blocker, thiazide diuretic, beta blocker and aldomet, insulin and oral hypoglycemic agents) were available in the clinics. CDOP authorized the initiation or scaling up of medication, where no doctor existed, and ensured medicines were up-scaled faster than was normal practice. Most clinical targets were determined by national and international society guidelines. For cholesterol management, simvastatin, only available at the specialist clinic, was used.

Due to resource constraints, referral occurred only if cholesterol was >7 mmol/L, despite existing guidelines advising referral at ≥6.5 mmol/L. All medications were available at the specialist center to manage HTN and DM, including angiotensin receptor blocking agents. Indications for specialist referral included uncontrolled HTN or DM despite at least 1