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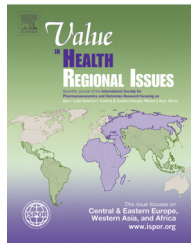

Analysis of the Financial Cost of Diabetes Mellitus in Four Cocoa Clinics of Ghana

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ABSTRACT

Objective: To estimate the financial cost of managing diabetes mellitus in four Cocoa clinics of Ghana. **Methods:** A descriptive cross-sectional study of diabetes management was carried out in the four Cocoa clinics of Ghana from January to December 2009. The "cost-of-illness" approach from the institutional perspective was used. A pretested data extraction form was used to review the medical records of 304 randomly selected diabetic patients. **Results:** The patients' mean age was 55.4 ± 9.4 years. The mean annual financial cost of managing one diabetic case at the clinics was estimated to be Ghana cedi (GHS) 540.35 (US $372.65). Service cost constituted 22% of the cost, whereas direct medical cost constituted 78% of the cost. Drug cost was 71% of the financial cost. The cost of hospitalization per patient-day at Cocoa clinics was estimated at GHS 32.78 (US $22.61). The total financial cost of diabetes management was estimated at GHS 420,087.67 (US $289,715.63). This accounted for 8% of the total expenditure for the clinics in the year 2009. The study showed that facility type, type of diabetes, and presence of complication are associated with the cost of diabetes management to Cocoa clinics. **Conclusions:** The mean age of detection suggests delay in diagnosis of diabetes mellitus and accompanying complications, which has cost implications. Policy that enhances early detection of diabetes in clinical practice would therefore improve management and reduce costs. The financial cost of managing diabetes can be used to forecast the economic burden of the disease in the area.

Keywords: Cocoa clinics, complication, cost-of-illness, diabetes, financial cost, Ghana.

Introduction

Diabetes mellitus is one of the most common chronic diseases. The number of diabetes cases has been increasing worldwide with a corresponding increase in health care budgets. It has thus become a growing public health burden for patients, health care providers, and society [1–4].

Complications resulting from late diagnosis and late presentation, lack of access to essential medication and services, and poor management of diabetes have created a heavy socioeconomic burden for Africa. Financing health care is one of the building blocks of health systems [5]. External financial assistance is required in the average low-income country to improve access to quality basic health service. More than 75% of the health expenditure, however, comes from domestic sources [6]. Financing of public sector service has gone through several reforms, ranging from out-of-pocket (before independence) expenses to national health insurance (currently) in Ghana. The National Health Insurance Scheme is based on District Mutual Health Insurance Schemes operating in all 145 districts of the country. The National Health Insurance Scheme covers both the formal and informal sectors of the economy with the goal of providing universal health coverage for all Ghanaians. The national coverage as at December 31, 2009, stood at 62% at the time of this study [7–10].

The benefit package consists of basic health care and covers about 95% of the diseases in Ghana. Provider payment methods used by the District Mutual Health Insurance Schemes are the Diagnosis Related Groups for services only and Itemized Fee for Service to pay for medicines on the National Health Insurance Scheme drug list.

Cost-of-illness evaluation of diabetes has been conducted over the past three decades in many countries [11]. The cost-of-illness study has been used for different purposes. It provides estimates of possible health care costs that can be avoided by institutions and society. It is therefore of interest to economists, policymakers, and health service researchers. These estimates have also been used in identifying the burden of disease, possible areas for future intervention, and establishing priorities in health care and research [12]. Although there is no standard method of estimating cost of illness, a novel method has been made the standard: the direct cost and the indirect cost [13]. The resources

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used in managing diabetes, such as expenditure for medical care and treatment of diabetes, are the direct economic costs. The potential resources that could be lost and represent the impact, present or future, and the opportunities lost to the individual and the society as a result of diabetes are the indirect economic costs. These are not easily measured or calculated and include morbidity, disability, and premature mortality [11].

Cost-of-illness studies have rarely been conducted in Ghana. According to a report based on Korle Bu Teaching Hospital statistics and patients' accounts, the cost of managing one case of diabetes in Ghana ranged between Ghana cedi (GHS) 167 and GHS 392 in 2001 to between GHS 1200 and GHS 7200 in 2007 [14]. In Mali, it cost approximately US $21.24 and in Zambia US $52 per month for diabetes care [15].

Ghana Cocoa Board has a workplace policy of conducting pre-employment medical examination for its newly employed staff. The medical examination covers screening for diabetes, hypertension, and other disease conditions through diagnostic services and physical examination. The dependents of the newly employed, who are covered by the institution, are, however, excluded from this pre-employment medical examination. Staff and their dependents who suffer from diabetes might have been diagnosed late, probably with complications. Prevention of the onset of diabetes and efficient treatment protocols will reduce cost and enhance quality of life. It is also a way to prevent diabetes from becoming the leading cause of disability and death [16]. An analysis of the cost of managing diabetes mellitus will thus serve as the basis for planning and resource allocation by Cocoa clinics in Ghana and will also provide the evidence needed for early detection and management of the disease.

Methods

Study Site and Population

The government of Ghana, the private sector, traditional non-governmental organizations, civil society, and community groups have been involved in the provision of health services in Ghana. There exist a strong collaboration and partnership with ministries, departments, and agencies whose policies and services have a major impact on health outcomes. The health services are organized in several levels from the subdistrict to the national level and include both clinical and public health services from the private and public facilities.

Ghana Cocoa Board established the Accra Cocoa clinic in 1972 to provide medical services to its staff and their dependents as well as cocoa farmers. It established itself as a provider of good services and was opened to the general public in 2002. There are four clinics currently located in Accra, Kumasi, Akim-Tafo, and Tema. The National Health Insurance Authority accreditation survey in 2006 placed the Accra and Kumasi clinics at the level of a district hospital, the Akim-Tafo clinic at the level of a polyclinic, and the Tema clinic at the level of a health center.

All medical records of diabetic cases were confirmed by a medical doctor. Diabetic cases belong to all age groups and from both sexes. Patients should have been regular for checkup and received treatment from January 1, 2009, to December 31, 2009.

Study Design

The study design was a descriptive cross-sectional survey of cost of treatment of diabetic patients. It was a retrospective quantitative study of the average annual treatment costs using the prevalence-based approach of cost-of-illness study from the institutional perspective.

Data Collection

Data were collected at the four facilities between May and July 2010 using a pretested data extraction form. The extraction form was coded to correspond to a particular medical record for the purposes of auditing and data cleaning.

Sample Size Determination

The medical records of 304 diabetic patients from the four clinics were desk reviewed. This allowed the estimation of patient cost of diabetes management to the clinics at a prevalence of 3.0%, worst acceptable power of 0.05, and confidence interval of 95%. The statcalc function of Epi Info version 3.4.1 (July 2007) was used in estimating the sample size for each clinic.

Sampling Procedure

All the four Cocoa clinics were purposively selected for convenience. Quota sampling was used to select the number of medical records to be reviewed from each facility using the outpatient department (OPD) attendance proportion of diabetic patients, which varied for each facility. A list of diabetic patients who attended the facilities in 2009 was generated by the Practice Manager (version 2, Browse.com) software used at the clinics. Systematic sampling was then used to select each medical record for estimating patient cost. The sample interval was determined, and simple random sampling was used to select the first number in the sample interval.

Cost-of-Illness Analysis

The mean financial cost was the sum of the mean service cost and the mean direct medical cost. The mean service cost was obtained by estimating the unit service cost per patient per OPD visit. The records obtained for the year 2009 from the accountant on expenses made at the cost centers were entered on a spreadsheet. The expenses were categorized into cost on personnel, administrative cost, material and supplies cost, and maintenance cost for each facility. The unit service cost for each facility was estimated using the total service cost at each facility divided by the total OPD attendance for each facility. The total service cost for each diabetic patient was obtained by multiplying the unit service cost for the facility by the number of OPD visits within the year 2009 by the diabetic patient. The direct medical cost for each diabetic patient whose medical record was reviewed was obtained by summing the laboratory cost, drug cost for diabetes and diabetes complications, specialist cost for diabetes care, emergency/ambulance cost related to diabetes services, diabetes-related hospitalization cost, and surgical cost for diabetes complications in the year 2009.

Statistical Analysis

STATA version 10 was used to determine the descriptive statistics of the patients as well as the mean financial cost of diabetes management.

Independent *t* test was used to analyze association between sexes, type of diabetes, and number of complications. Analysis of variance on means was also conducted to analyze the association between financial cost (dependent variable) and some independent variables such as the age group, type of client, and facility type.

Sensitivity Analysis

In analyzing the uncertainty of the results, one-way simple sensitivity analysis was conducted. The pharmaceutical component of the mean financial cost of diabetes was used because