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Full Length Research Paper

Prevalence of diabetes mellitus and resources available for its management in the Cape Coast Metropolis

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Gradually, more Ghanaians are becoming diabetic as a result of eating more sugary and fatty foods and exercising less. This study explored the prevalence of *Diabetes mellitus* and resources available for managing it in the Cape Coast metropolis. University of Cape Coast Hospital (UCC), Central Regional Hospital (CRH), Cape Coast Metropolitan Hospital (CCMH), Erwim Health Centre, Adisadel Health Centre, Tantri Clinic and Baiden Ghartey Clinic in Cape Coast Metropolis were purposively selected for the study. Questionnaires were developed and administered to health professionals and diabetics. Results showed that *D. mellitus* has been increasing since 2005 yet few health professionals, drugs and equipment exist to manage it. There was a dietician and an ophthalmologist at the CRH, a nutritionist at UCC hospital and no neurologist at any of the facilities studied. With the exception of CRH, all the health facilities run diabetes clinics. As usually expected, the hospitals were better equipped and delivered better care, though inadequate for all diabetes patients. Genetics, pregnancy and life style were identified as the major risk factors predisposing people to diabetes. There is a need to provide drugs and equipment and train more health professionals to manage and care for diabetics at all health facilities.

Key words: *Diabetes mellitus*, Ghana, prevalence, resources.

INTRODUCTION

In contemporary times, *Diabetes mellitus* has been increasing worldwide with its prevalence increasing in Ghana as well. *D. mellitus* has been described by Kumar and Clark (2005) as a situation where an individuals' body is incapable of producing the hormone insulin in levels required by the body cells to take up optimal glucose. Diabetes is characterized by signs such as gross loss of weight, frequent urination, excessive thirst and slow healing of wounds. Symptoms of diabetes include chronic fatigue and changes in vision. Diabetic conditions if not well managed lead to complications such as loss of blood circulation to the heart and limbs. Diabetes is one of the common public health issues facing the world in this new millennium with its management and premature mortality affecting the total health care expenditure in several countries, especially in less developed and poor ones. Some regions in Ghana have recorded diabetes cases which are higher than the world average and calls for attention and action. The Central Region is one of such regions with high prevalence of diabetes and thus Cape Coast which is the largest city in the region is worth selecting for studies into the prevalence of diabetes and the resources available for its management.

With its numerous complications, diabetes management requires the joint effort of various health care personnel such as diabetologists, ophthalmologists, neurologist, and physician specialist nurses, among others. However, Other professionals like the nutritionist and dietitian play a vital role in the management of *D. mellitus* through planning of meals appropriate for the diabetic condition. Apart from the human resources required for proper management of diabetes, other resources such as equipment and instruments are equally important. Equipment and instruments required for treatment and management of diabetes include sphygmomanometers for blood pressure measurement; electrocardiographs for measuring heart beat, enzyme-linked immunosorbent assay (ELISA), spectrophotometers determining glucose concentration in urine, and glycometers for assessing blood sugar levels. It is expected that a hospital must have a diabetic clinic and

the required personnel and services to manage *Diabetes mellitus* properly.

Statement of the problem

With the current rise in diabetes cases observed in health facilities in Ghana, It is becoming disturbing particularly with little or no improvement in its care over the years, after past research reported that physicians, equipment, tests and drugs for diabetes supply were found to be inadequate in major health facilities in southern Ghana (Amoah et al., 1998). A review of the current prevalence of the disease, the available health professionals engaged in managing the disease and the available drugs and equipment for managing diabetes in health facilities across the country will help promote awareness, encourage government to provide more resources for diabetes care and educate people to adopt healthy lifestyles and reduce the risk of contracting the disease.

Related literature on *D. mellitus*

A press release on the elimination of trans-fatty acids from the food chain in Ghana dated 26th of December, 2009 highlighted the health hazards of consuming large quantities of trans-fatty acids. The press release was in response to the concern that has been raised in recent times about the rate of increase of lifestyle related diseases in Ghana, especially diabetes and high blood pressure (hypertension). Kyiamah (2009) stressed the need for Ghanaians to heed to the recommendations of the World Health Organization that trans-fatty acids should be completely eliminated from the food chain. This he stated will go a long way to reduce the prevalence of diseases such as diabetes, high blood pressure (hypertension), heart attacks, obesity, infertility and cancer which in recent times have become health issues in Ghana. Over the years, *D. mellitus* has been increasing worldwide with the rate for all age groups estimated to be 2.8% in 2000 and projected to be around 4.4% in 2030 (American Diabetes Association, 2002). The total number of diabetics worldwide has been estimated to rise from 171 million in 2000 to 366 million in 2030 (Wild et al., 2004). Diabetes is one of the common public health issues facing the world in this new millennium with its premature mortality accounting for at least 1% of the total health care expenditure in many countries (American Diabetes Association, 2002).

The prevalence of *D. mellitus* in some parts of Ghana has been identified as higher than the world average (2.8%), for example Greater Accra region has a prevalence rate of 6.3% (Amoah et al., 2002) and that of the Central region 6.7% (Cape Coast Regional Hospital Annual Report, 2010). Both prevalence rates are higher than that of the world average which raises concern that needs to be critically looked at. In the 1990s, Amoah et al. (1998) found that resources such as drugs, equipment and health professionals required for the proper management of diabetes in Ghana were inadequate in the health facilities in Accra. A basic routine test like High Density Lipoprotein test (HDL) was not available in these health facilities. They also reported that only Korle-Bu and one of the four other hospitals they studied had eye specialists and dieticians.

To assess the quality of professional care in 118 Nigerians (42 males + 76 females) with diabetes, Okoro et al. (2002) reported that fasting blood glucose (FBG) was tested four or more times in 92.4% of the patients. Foot care was 1.7%, referrals for eye, dental, and cardiac examination were 12.7%, while lipid profile, serum createnine, and urinary protein estimation were documented in 16.9% of the patients. In contrast, 61.9% high-risk intervention was recorded. Yeweenhareg and Fikre (2005) assessed the characteristics of the health care system for 229 diabetic patients in 21 primary health care level and 5 regional hospitals in Addis Abba. The results showed that all the regional hospitals and one of the health centres was running established diabetic referral clinics.

Similarly, lack of professionals was observed in all the health institutions in general and the health centres, in particular. Only 21% of patients had access to blood glucose monitoring at the same health institution.

Reviews on exercise in patients with diabetes have shown the value of exercise in the diabetes management plan (Ruderman and Schneider, 1990; Wasserman and Zinman, 1994). Regular exercise has been shown to improve blood glucose control and reduce cardiovascular risk factors, maintain proper weight, blood pressure, fat levels and improve well-being. Furthermore, regular exercise may prevent type 2 diabetes in high-risk individuals. Williams (2001) reported that exercise helps increase insulin sensitivity, maintain blood pressure, blood fat levels, and also maintain normal peripheral of the diabetic patient.

The Ghanaian Mirror (2009) contained an article that discussed the causes of diabetes and ways to avoid getting it. Once in a while, pieces of information on diabetes appear in the news media which help educate people. A personal communication with a doctor at the 37 Military Hospital in Accra, Ghana revealed that previously pregnant women in Ghana were screened for diabetes using the 8 h fasting blood sugar level.

Currently, the 2 h prandial sugar level test known to be more sensitive and reliable has replaced the 8 h test and so now more diabetes cases in pregnant women are picked up at the health facilities probably adding up to the

Table 1. List of professional staff in the various health facilities studied.

Staff	Clinic	Health Centre	Hospital
Diabetologist	0	0	1
Ophthalmologist	0	0	1
Neurologist	0	0	0
Nutritionist	0	0	2
Dietician	0	0	1
Pharmacist	0	1	6
Biochemist	0	0	2
Laboratory Technician	1	2	23
Medical officers with special interest in diabetes	2	1	5

Field data (2010).

present high prevalence.

Objectives

The objectives of this paper are as follows:

1. Explores the prevalence of diabetes in the Cape Coast Metropolis;
2. Determines the ratio of health professionals to patients in the care of diabetes;
3. Ascertains the equipment, services and drugs available for the care of *D. mellitus* in selected health facilities in Cape Coast.

METHODS

Data was collected through content analysis of health facility records, and a survey using a questionnaire developed and self-administered and an interview.

Study population and sampling for survey

The study population was made up of Health facilities in the Cape Coast Metropolis that care for diabetic patients. Out of these, purposive sampling was used to select the three major hospitals in the metropolis- District Hospital, Regional Hospital and University Hospital in addition to two health centres and two clinics. Ten health professionals were selected from each of the three hospitals, two health centers and two clinics totaling seventy. This was obtained by assigning numbers to all the hospitals, health centers and clinics. These numbers were written on pieces of paper and mixed together. Three of these numbers were randomly picked. Questionnaires were developed and administered to health professionals and diabetics in the selected health facilities. A questionnaire was developed and self administered to the 70 health professionals selected. Information obtained included: the facilities and resources available for the care of diabetic patients; the prevalence of diabetes in Cape Coast metropolis; and the factors that predispose people to *D. mellitus*. Permission was sought from the various Hospitals' administration before questionnaires were administered. Questions in the questionnaire were explained to respondents before the questionnaires were handed over to them. Respondents were allowed three days to respond to the questionnaires which were collected afterwards. Ten diabetic patients were each randomly selected from the Regional Hospital, University Hospital and one health centre. Pre-testing of the questionnaire was done using two health facilities in the Cape Coast metropolis and questions that were not well understood by respondents were reframed before distributing to the study sample.

Sampling for interview

Thirty diabetic patients were randomly selected from the Regional Hospital, University Hospital and the Adisadel health center and interviewed. To select the diabetic patients, the first patient who attended the clinic was selected and four other patients were counted after which the fifth patient was selected and interviewed. Subsequent patients were selected in the same manner. Questions asked included the factors that predisposed them to acquiring diabetes, their eating habits, what they think could be the cause of diabetes, their lifestyle in terms of eating habits after being diagnosed of the disease.

Records on the number of patients who were diagnosed as having diabetes in the Central Region were obtained from the Central Regional Directorate of the Ghana Health Services. The records covered the period 2005 to 2009. These records helped to estimate the prevalence of diabetes in the region, as well as help estimate the ratio or proportion of health professionals to patients. The study was conducted from January to March, 2010.

Data analysis

The data collected was analyzed using the Statistical Package for Service Solution (SPSS) version 16. Responses were coded into numerical data for further analysis using the software. Percentages were computed to describe the data and were presented in tables.

RESULTS

Distribution of health professionals in health facilities

The different health professionals working with diabetics.

Table 2. List of drugs and equipment available in the various health facilities.

Drugs	Clinic	Health Centre	Hospital
Insulin	0	0	3
Glibenclamide	1	2	3
Gliclazide	0	0	1
Bigumide	1	2	3
Pioglitozone	0	0	2
Equipment			
Glucometer	2	1	8
Spectrophotometer	0	1	2
Sphygmomanometers	0	5	2
Electrocardiograph	0	0	1

Field data (2010).

Table 3. List of laboratory tests performed in the health facilities studied.

Test	Clinic	Health centre	Hospital
Fasting random glucose test	2	2	3
Glucose tolerance test	1	0	2
Urine glucose ketone	1	1	3
Total cholesterol test	1	2	3
HDL/LDL	0	0	3
Insulin test	1	0	0

Field data (2010).

in the various health facilities listed previously is shown in Table 1. Of the different health professionals identified, there was no neurologist in any of the health facilities. The hospitals had more professional staff than both the clinics and the health centres as is always the case. The only diabetologist in the Cape Coast metropolis and two nutritionists, work at the University of Cape Coast Hospital. The only ophthalmologist works at the Cape Coast Regional Hospital. Laboratory technicians and medical officers with special interests in diabetes were found in all the clinics, health centres and hospitals studied. There was only one dietician in the Cape Coast Regional Hospital. Health professionals found in the hospitals were 41 followed by 4 in the health centres and 3 in the clinics (Table 1).

Drugs and equipment for treating diabetes

Table 2 shows the list of drugs available in the various health facilities for treating diabetes. The most common drugs found in all the health facilities were Glibenclamide and Bigumide. Insulin and Pioglitozone were diabetic drugs available in only the hospitals with Gliclazide available in only the University of Cape Coast Hospital and not the other 2 hospitals. The glucometers were used for measuring blood sugar/glucose levels. The spectrophotometers use light as a mechanism to determine the concentration of chemicals in urine. The electrocardiographs were used in measuring the heart beat and the sphygmomanometers used to determine changes in blood pressure and pulse. Although generally, resources were inadequate in the health facilities studied, the hospitals were better equipped to manage diabetes than the health centres and clinics.

As shown in Table 3, all the health facilities studied tested for fasting random glucose, urine glucose ketone and total cholesterol. Insulin test, although essential for all diabetics was performed in the clinics and not in the health centres and hospitals. Other important tests like HDL/LDL which should be readily available for diabetics and other health conditions were only available in the hospitals. Among the health facilities studied, the Cape Coast Regional Hospital was the only facility that

Table 4. Factors identified by health professionals and diabetic patients as predisposing people to *Diabetes mellitus*.

Factors	Response of health Professionals	Percent	Response of Diabetes patients	Percent
Lifestyle	70	100	20	67
Hereditary	70	100	22	73
Pregnancy	50	71	1	3
Obesity	20	29	18	60
Pancreas disorders	30	43	0	0
Autoimmune	10	14	0	0
Irregular exercise	50	71	5	17

Field data (2010).

kept a register for all diabetic patients who visited the place, rather than keeping files and folders as done in the other facilities. With the exception of the Tantri clinic, all the other health facilities attended to patients through the appointment system for diagnosis and treatment.

Factors that predispose people to diabetes

Responses in relation to factors that predispose people to diabetes obtained from both the questionnaires distributed to the health professionals and the interviews conducted are shown in Table 4. All the factors presented in the table are well established facts. However, fewer diabetics (n=30; 67%) stated that lifestyle was an important factor predisposing people to diabetes as compared to the health professionals (n=70, 100%). Rather, more diabetics selected hereditary as a factor that predisposes people to diabetes (n=22; 73%).

Trends in diabetes prevalence 2005 to 2009 in the Cape Coast Metropolis

The diabetics had no knowledge of chronic illness with the pancreas and autoimmune conditions and thus could not relate them to diabetes. Table 5 shows the total number of diabetic patients who visited the various health facilities in the Cape Coast Metropolis from 2005 to 2009. The statistics presented in Table 5 show that the ratio of diabetologist (Table 1) to patient is 1:937; nutritionist (Table 1) is 1:468; ophthalmologist (Table 1) is 1:937; dieticians (Table 1) 1:937. This finding suggests that the ratio of health professionals to patients in the care of diabetes is quite low and needs to be improved to help manage the prevalence of diabetes better. The prevalence rate as shown in Table 5 is highest for the age group of 50 to 59 years and lowest for the age group 18 to 19 years. Although there was a slight increase in the total number of people who reported at these health facilities with diabetes from 2005 to 2007, there was a general increase in the prevalence of diabetes after 2007 to 2009. The number of female diabetics is higher than that of male diabetics. Although childhood diabetes has not really been an issue in Ghana in the past, the 2007 and 2009 prevalent rates as indicated in Table 5 reported that 19 and 18 children between the ages of 15 and 17 years developed diabetes.

DISCUSSION

The prevalence of diabetes in the Cape Coast Metropolis as indicated in Table 5 shows that the number of people reporting at the various health facilities in the metropolis has been on the increase from 2008 to 2009, after slightly decreasing from 2005 to 2007. The prevalence increased from about 19.3% in 2005 to 22.3% in 2009. The prevalence in women was also higher than men for each year. People in the age group of 50 to 59 years were the most affected. This trend could probably be attributed to the changing lifestyles of most Ghanaians as noted by Kyiamah (2009). His proposal for a reduction in the consumption of trans-fatty acids by Ghanaians, could help reduce the prevalence of diabetes and other related diseases such as cancer and obesity. A two year ban on importation of trans-fatty acids into Denmark greatly reduced the rate of heart disease by 20% between 2001 and 2006 (Danish Ministry of Health, 2006). Stender and Dyerberg (2004) reported that keeping saturated fatty acids out of the food chain in Denmark was an important decision to help curb the incidence of degenerative diseases like heart disease, diabetes and cancer among others.

Findings from the study showed that equipment, services and drugs available for diabetes care and management in the Cape Coast Metropolis are highly

Table 5. Total number of diabetes patients who visited the health facilities in the Cape Coast Metropolis from 2005 to 2009.

Year	Number of diabetics	Percent diabetics (%)	Males	Females	Number of diabetics in each age group						
					15-17	18-19	20-34	35-49	50-59	60-69	70+
2009	6556	22.3	1901	3876	18	9	316	582	2088	964	1711
2008	6389	21.7	1887	4502	0	0	202	735	3217	1129	1160
2007	5313	18.0	1936	3368	19	4	472	716	1493	1599	998
2006	5479	18.6	1500	4064	0	0	66	272	2955	1711	461
2005	5665	19.3	1622	4043	0	0	44	821	1422	1872	136
Total	29412	100	8846	19853	37	13	1470	3126	8275	7274	4466

Source: Ghana Health Service, Central Regional Directorate (2010).

inadequate. It is unfortunate that 12 years or more after Amoah et al.'s (1998) findings about the limited resources for diabetes management in health facilities in Accra, little improvement has been seen in the situation, although diabetes prevalence is on the increase. Although the population of health professionals involved in the care of diabetics from the study was not encouraging, it was observed that the hospitals which were studied had better resources than the health facilities and clinics. This is a known fact though and probably it is because most hospitals in Ghana are owned by the government and are usually funded and thus better equipped with health professionals, equipment and drugs than the clinics which are often privately owned. Findings from the study were similar to that of Amoah et al. (1998).

They reported that only Korle-Bu and one of the four other hospitals they studied had eye specialists and dieticians. From the study, there was only one dietitian at the Regional Hospital. Similar findings have been reported by Winocour et al. (2001) in a postal survey, using 238 identified diabetes secondary care providers. Major deficiencies in core staffing levels were recorded with 36% of services provided by only one consultant physician. 27% of the respondents indicated that dietetic support was unavailable. With few dietitians in the country, most Ghanaians do not have access to the requisite knowledge about the types and quantities of foods to eat, in order to obtain the maximum nutritional benefit and maintain optimal health. Such knowledge will help reduce the incidence of diabetes among the Ghanaian population, as well as help manage those living with the disease.

The few who gain such knowledge may not also be able to afford foods recommended for good health. As a result, poor nutrition tends to increase the incidence of degenerative diseases like diabetes, cancer and hypertension coupled with inadequate medical services also reduce quality care for people with such diseases.To help reduce the prevalence of diabetes in Ghana, there is the need to train health professionals, such as dieticians who through nutrition assessment, good nutrition education and diet formulations may help people maintain good blood glucose levels, serum lipid levels and normal body weight. Findings showed negligible incidence of childhood and adolescent diabetes over the five year period but high prevalence for adults between 50 and 59 years. This trend implies that, type 1 diabetes which is insulin dependent and often genetic, may form a smaller proportion of all the diabetes cases and thus not as disturbing as type 2 which is acquired through unhealthy lifestyle and can be easily prevented, yet may be forming a greater percentage of all diabetics. Previously, pregnant women in Ghana were screened for diabetes using the 8 h fasting blood sugar level. Currently, the 2 h prandial sugar level test, known to be more sensitive has replaced the 8 h test. This may contribute to the increasing number of women diagnosed with diabetes. Often, most of these pregnant women who test positive may recover completely after delivery, implying that the high numbers quoted for diabetes prevalence may be slightly over estimated. Since type 2 diabetes seems to be the major type observed from the study, Ghanaians need to be educated to exercise regularly to minimize the risk of contracting type 2 diabetes as reported by Ruderman and Schneider (1990), and Wasserman and Zinman (1994).

Results indicate that there is the need to upgrade and provide resources for better management of diabetes in the health facilities. Diabetics should have frequent comprehensive eye examination by an ophthalmologist or optometrist (American Diabetes Association, 2002). With inadequate number of health professionals like the ophthalmologists, this recommendation becomes almost impossible to carry out. As stated by Winocour et al. (2002), considerable development and investment is required to ensure equitable access to specialized diabetes services, a vital component in reducing adverse diabetes outcomes. Training of health care personnel in diabetes management and education may enhance diabetes care despite the existing constraints.

Strengths and limitations of the study

As a case study, results may be more specific to the Central region and generalization of the results to cover the whole of Ghana may be inappropriate or an exaggeration. Also, using a small sample size may increase error and significance. However, highlighting the increase in prevalence of diabetes and the lack of resources to manage it would help raise awareness and help the government adopt solutions to help reduce the prevalence.

SUMMARY AND CONCLUSIONS

Findings from this study show that resources and professional staff for the management of diabetes are inadequate in the Central Region specifically and Ghana in general. This has been the trend since the late 90's. Similar drugs for treating diabetes were available in all the health facilities. The hospitals as a known fact were better equipped and had more health professionals to care for diabetics than the health centres and the clinics as has been expected. Despite the existing inadequacies, training more professionals associated with diabetes management as well as running more diabetes clinics, will help manage diabetes better and reduce prevalence. Most of the factors that lead to the development of diabetes can be avoided or controlled.

It is recommended that with the limited resources available for managing diabetes in the metropolis, there is the need to educate people about the causes of diabetes and ways of preventing it. This will help curtail the continuous increase in the incidence of diabetes in the metropolis and the management of the condition in people who live with diabetes.

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