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Assessment of Healthcare Facilities Readiness to offer Diabetic Care in Rural and Urban Areas

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ABSTRACT

The capacity to offer diabetic care in healthcare facilities will increase the survival rate of diabetic patients and improved quality of life. The study assesses the preparedness of health care facilities both in rural and urban areas to offer diabetic care. The study was a cross-sectional descriptive survey of rural and urban healthcare facilities. Data collection was done using a self-developed check-list from literature review and modified WHO facility indicators list. The proportions of health facilities with laboratory equipment, basic equipment, diabetic medications and trained healthcare professionals on diabetes care were estimated. One health care facility each from rural and urban areas was selected in the study. 50% and 66.7% of the rural and urban health care facilities have the diagnostic capacities for blood glucose. The least available laboratory equipment was Electrocardiogram and Ionograph. Half (50%) and 40% of the laboratory equipment's in the rural health facility for blood glucose and cholesterol test were functional. Only metformin and glibenclamide among the OHA were available in GH Abudu. Simvastatin was the only lipid regulating agent prescribed and available in rural health facility. Only 35% and 75% of the medications are available in GH Abudu and CH Benin City. The Doctor and the Pharmacists in the rural health facility were not satisfied with the kind of diabetic care being offered. 60% and 65.2% of the doctors and the Pharmacists in the urban health facility were satisfied with the type of diabetic care offered. Half (50%) of the Nurses in GH Abudu were satisfied, while 14.3% were very satisfied with service rendered. The study showed some variances between availability of medications, basic medical equipment and their functionality across the studied healthcare facilities.

KEYWORDS: Diabetes mellitus, access to healthcare, readiness, facility indicator and diabetic care

INTRODUCTION

There is global increase in prevalence of diabetes mellitus; more than 220 million people are diagnosed to have diabetes mellitus (DM). It is postulated that without interventions, the rate of people with DM is likely to increase to twice the number by 2030. Diabetes is associated with high mortality and comorbidity and majority of the death occur in low and middle income countries (WHO, 2010). Diabetes mellitus (DM) is a metabolic disorder typified by abnormally high glucose levels in the blood, excessive urination and persistent thirst (MoPHS, 2008). Cases of DM globally are estimated to be 347 million, of which more than 90% are Type 2. In Nigeria the prevalence is between 2 - 7% (Nyenwe *et al*., 2003; Oyegbade *et al.*, 2007; Wild *et al*., 2004). Nigeria is one of the sub-Saharan African countries where diabetes mellitus ranks among the top ten health issues accounting to burden of disease among the top 15 in-patient causes of death. In addition, in 2010 there were 625 deaths attributable to diabetes in females between the ages of 20 to 69 years in Nigeria (Roglic and Unwin, 2010).

Universal health coverage (UHC) in the post-2015 development agendas reemphasizes equitable and efficient healthcare service delivery, through provision of technical and financial supports to healthcare facilities at all levels of administering services (Norheim, 2015; Sengupta, 2013).

The provision of sound and effective healthcare delivery system as part of human capital development in Nigeria is perceived as the main factors for economic growth and development (George *et al.*, 2013; NBS, 2009). To promote healthcare delivery of services in an efficient, effective and timely manner, adequate infrastructure is required by any health care system. This will help to improve the quality of services rendered (Ademiluyi and Aluko-Arowolo, 2009). The availability of essential drugs in Primary Health Care (PHC) facilities as results of the Bamako Initiatives (BI) was meant to promote operations of PHC in securing quality delivery of healthcare services in many African countries, due to uninterrupted poor funding and inefficiency of many PHC delivery centers (Uzochukwu *et al*., 2002; Paganini, 2004). However, healthcare facilities in many developing countries presently do not have such requirements. Lack of proper maintenance of healthcare facilities and equipment's and insufficient funds to replace old structures significantly contributes to the observed declension.

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Service delivery state in Nigeria's healthcare sector has come under persistent criticisms. Previous studies have postulated that there are some gaps between accesses to healthcare facilities across Nigeria's different geopolitical zones, as it pertains to readiness of various healthcare centers in providing efficient service delivery (Ogundele and Olafimihan, 2009; Eboreime *et al*., 2015).

These disparities have been reported as the main supply-side factor militating against utilization of healthcare services. In both rural and urban health care facilities, poor readiness to services can increase the mortality rate. Hence, it is important to carry out study in this area in order to know the readiness or preparedness of health care facilities both in rural and urban areas to offer diabetic care and ultimately preventing the reports of undiagnosed diabetes mellitus and its associated risk factors (obesity, physical inactivity, hypertension, family history, increasing age, gestational diabetes and ethnicity). Readiness of health care facilities to offer diabetic care would be enhanced, thereby leading to increased quality of life.

METHODS

Study design

A cross-sectional descriptive community-based study was conducted in two healthcare facilities in rural and urban centers to assess the readiness to offer diabetic care.

Settings, population and sampling

The study was carried out at the General Hospital (GH) Abudu, off Abudu-Ogada Road in Orhionmwon Local Government Area and Central Hospital (CH), Benin City, both in Edo State. Abudu is the headquarters of Orhionmwon Local Government Area of Edo State, Nigeria. It is about 42 km from the state headquarter and a population of over 9500. The majority of the population lives in rural area and engaged in farming activities. General Hospital Abudu is a secondary healthcare facility which offers healthcare services to the people of the community and other nearby villages as well as to the neighbouring communities in Delta State. It has about 50 bed spaces for inpatients and also runs general outpatient clinic for patients with different ailment. It has only one Pharmacy outlet and is surrounded with several patent medicine stores located within the community. CH offers comprehensive patient care services for majority of Edo State indigenes and other neighbouring States. The facility has over 250-bed with different wards and specialties. Medicines prescribed in this hospital are usually dispensed in the hospital pharmacy, and in instances where the medicines are not available, patients are advised by the pharmacists to purchase their medicines from community pharmacies.

The study targeted rural and urban health care facilities and healthcare workers. A total of two districts present in the Edo State that is rural and urban districts were selected for the study. One health facility each was randomly selected from each health district and was allocated proportionally for sampling.

Data collection and analysis

Data were collected using a checklist which was filled with the help of the Head of a health facility or his/her representative to assess the availability of laboratory equipment's, basic equipment, medications, and trained personnel on diabetes management. The checklist was modified from WHO facility indicators lists of assessment of health care facilities for diabetic care and Access to Medicines and Supplies for People with Diabetes (IDF, 2016), and reviewed by the research team. Healthcare professionals satisfaction with diabetic care offered at both health facilities was assessed with questionnaire. Data collected were cross-checked and differences corrected using paper grids, thereafter entered into excel for analysis. Analysis was mainly descriptive.

Outcome measures

The study measured the following outcomes; laboratory capacity, availability of basic equipment's for diabetic care, medications, work force and satisfaction of healthcare professionals to offering diabetes care.

Ethical consideration

Administrative approval for this study was sought and obtained from the Central Hospital Benin City, Edo State and General Hospital Abudu Edo State. Each Head of the health facility was well informed and consented before information collected.

RESULTS

Urban healthcare facility has more equipment compare to the rural hospital. 50% and 66.7% of the rural and urban health care facilities have the diagnostic capacities for blood glucose, while less than half (40%) of the rural health facility have the capacity to check for blood cholesterol. The least available laboratory equipment in CH Benin City was Electrocardiogram and Ionograph. This was however not available in GH Abudu. The availability of basic diagnostic test is as shown in table 1 below. Half (50%) and 40% of the laboratory equipment's in the rural health facility for blood glucose and cholesterol test were functional. In both health facilities, 87.6% and 91.6% respectively of available laboratory equipment's are functional. Electricity was a major challenge in GH Abudu (see table 2).

The study assessed the availability of Medications (Insulin of any categories, Insulin syringes, oral

antidiabetic drug (OHA) of any class, lipid lowering agents e.g.; Atorvastatin, Simvastatin, Rosuvastatin, Fluvastatin, drugs used in management of complicated diabetes e.g. Aldomet, Propranolol, Hydrochlorothiazide, Frusemide, Digoxin). Only metformin and glibenclamide among the OHA were available in GH Abudu (table 3). Simvastatin was the only lipid regulating agent prescribed and available when compared to the urban health facility. Generally, in the rural hospital, only 35% of the medications were available while CH Benin City, 75% of the drugs were available. Healthcare workers, trained staff, any health personnel who have received training, seminar/workshop or short course on diabetes management after graduating from school and average number of healthcare workers (doctors, endocrinologists, pharmacists, nurses, lab technicians etc.) were also assessed. In the rural facility, there was only one doctor and one lab technician and no endocrinologists compare to urban health facility that have quite an encouraging numbers of the health care professionals. On the level of satisfaction with diabetes care offered in the studied health facilities, the Doctor and the Pharmacists in the rural health facility at Abudu were however not satisfied. 60% and 65.2% of the doctors and the Pharmacists in the urban health facility were satisfied with the type of diabetic care offered. Half (50%) of the Nurses in GH Abudu were satisfied, while 14.3% were very satisfied with service rendered. The only laboratory Technician was satisfied with the types of care rendered in rural health facility (See table 4 and 5).

Table 1; Availability of basic diagnostic test and functionality in both health facilities

	Rural HF		Urban HF	
Laboratory equipment	Numbers available	Numbers functional N (%)	Numbers available	Numbers functional N (%)
Blood glucose	10	5(50)	20	18(90)
Creatinine	5	3(60)	15	10(66.7)
Cholesterol	5	2(40)	15	10(66.7)
Uric acid	5	3(60)	50	40(80)
Ionography	0	0(0)	10	5(50)
Urine dip stick-glucose	50	50(100)	100	100(100)
Full blood count	10	9(90)	18	18(100)
Electrocardiogram	0	0(0)	5	4(80)
Insulin syringes	20	20(100)	100	100(100)
Total	105	92(87.6)	333	305(91.6)

Table 2; Basic equipment availability and functionality in both health facilities

	Rural HF		Urban HF	
Basic equipment's	Numbers available	Numbers functional N (%)	Numbers available	Numbers functional N (%)
Meter tape	1	1(100)	10	5(50)
Reflex harmer	4	4(100)	15	8(53.3)
Adult scale	5	3(60)	10	5(50)
Stethoscope	5	5(100)	15	15(100)
Height gauge	1	1(100)	5	5(100)
Diabetes treatment guidelines	2	2(100)	10	10(100)
Register	1	1(100)	1	1(100)
Educative materials	15	15(10)	30	30(100)
Refrigerators	3	3(100)	10	7(70)
Fans	10	7(70)	27	20(74.1)
Air conditioners	2	0(0)	25	10(40)
Electricity	0	0(0)	1	1(100)
Batteries as second power	0	0(0)	0	0(0)
Generator as second power	1	1(100)	2	1(50)
Solar panel as second power	0	0(0)	0	0(0)
Total	50	43(86)	161	118(73.3)

Table 3; Medications available in both health facilities

Medications	GH Abudu (YES/NO)	CH Benin (YES/NO)
Rapid/short acting insulin's	No	Yes
Intermediate/long acting insulin's	Yes	Yes
Metformin	Yes	Yes
Glibenclamide	Yes	Yes
Glimperide	No	Yes
Gliclazide	No	Yes
Chlorpropamide	No	Yes
Rosiliglitazone	No	No
Pioglitazone	No	Yes
Rapaglinide	No	No
Acarbose	No	Yes
Atorvastatin	No	No
Simvastatin	Yes	Yes
Rosuvastatin	No	Yes
Fluvastatin	No	No
Aldomet	Yes	Yes
Propranolol	Yes	Yes
Hydrochlorothiazide	Yes	Yes
Frusemide	No	Yes
Digoxin	No	No
Availability N (%)	7 (35)	15 (75)

Table 4; Numbers of health care workers in both health facilities

Health care workers	Rural HF numbers	Urban HF numbers
Doctors	1	10
Endocrinologists	0	4
Pharmacists	2	28
Nurses	14	15
Laboratory technicians	1	24
Total	19	71

Table 5; Health workers' satisfaction towards to offering diabetic care

How satisfied are you with the management of diabetes in the facility	Very satisfied		Moderately satisfied		Satisfied		Not satisfied	
	RHF	UHF	RHF	UHF	RHF	UHF	RHF	UHF
Doctors	0(0)	0(0)	0(0)	1(10)	0(0)	5(50)	1(100)	4(40)
Pharmacists	0(0)	0(0)	0(0)	2(7.1)	0(0)	16(57.1)	2(100)	10(35.7)
Nurses	2(14.3)	3(20)	5(35.7)	7(46.7)	7(50)	5(33.3)	0(0)	0(0)
Lab technicians	0(0)	0(0)	0(0)	4(16.6)	1(100)	16(66.7)	0(0)	4(16.6)

DISCUSSION

The study revealed that the general diabetes service readiness and availability is inadequate to provide a minimum care for patients suffering from diabetes in rural area. Most of the essential drugs, laboratory and basic equipment's in rural healthcare facility were not available when compared to urban health care facility and it is worrisome. It was observed that there are low possessions of some essential drugs, laboratory and basic equipment's in rural healthcare facility compare to urban health care facility. Specifically, lack of electricity in rural healthcare facility raises some serious concerns; this can be very unsafe due to higher likelihood of improper storage of insulin or can be linked to lack of regular sources of power supply, which are required for proper usage of refrigerators. Although urban healthcare facility indicated generator as other sources of power, the magnitude of usage was not probed into in this study. Therefore, regular usage of generator may be prevented due to its high running cost. The quality of services rendered at healthcare facilities can be perfectly quantified from availability of basic medical equipment and drugs. Therefore, high cost of running generator may limit its regular usage. The study take into recognition the minimum standard required of healthcare facility in Nigeria (National Primary Health Care Development Agency, 2016). It was however observed that some laboratory and basic equipment's though available, were no longer functioning at both facilities. This may obviously be attributed to insufficient funding by the government or relevant agencies or inability of the healthcare facilities to prioritize the need for functionality of some medical equipment. Poor availability of medical and basic equipment in Nigerian HC facilities had been previously reported by other studies (Abdulraheem *et al*., 2012; Ohuabunwa, 2010; Omoluabi, 2014). Most of the essential drugs for the management of DM and its complications were however not available in rural health facility. This can be attributed to incessant stock out and inexistence of these medications in

the healthcare facilities. Early detection and initiation of treatment can prevent or delay the onset of diabetes and hence reduce diabetes-related complications such as chronic kidney disease, heart failure, retinopathy and neuropathy (Sambo *et al*., 2008; Gavin *et al*., 2011). Health facilities need to be well equipped with laboratory equipment to permit early diagnosis and monitoring of diabetes and its related complications. Only Glibenclamide and metformin at the time of this study were the available anti-diabetic medications in both health facilities. Some other drugs for treating patients with diabetes co-morbidities were however available in few options and this make it impossible for treatment decisions to be individualised.This insinuate that patients who are prescribed such medications would have to source for them elsewhere, often forced into the private sector where medicines are more available but also more expensive, indeed unaffordable for some. It also hampered the ability to quickly respond in cases of diabetes emergencies. Working condition, availability of basic medical equipment, essential medications and some incentives would among others influence ability to retain a qualified medical staff in Nigeria. The Diabetes Control and Complications Trial (DCCT, 1993) Research Group have previously reported poor availability of drugs in the health facilities.

The diabetic care rendered particularly in rural health facility was sub-optimal, and may be attributed to disruption of medicinal and laboratory supplies and lack of trained staff to offer diabetes care services. The shortage of staff, especially physicians, offers the opportunity to adopt "nurse-led" diabetes care in rural areas which have been shown to improve quality of care (Strine *et al*., 2005; Labhardt *et al*., 2011; Kengne *et al*., 2009). In the assessment of the health workers satisfaction, the doctors and pharmacists from both health care facilities were not satisfied due to reasons like poor availability of some essential drugs, electricity problems in the rural sector and poor working environment. The nurses and the laboratory technician however reported being satisfied with the types of diabetic care services offered.

CONCLUSION

The findings of the study revealed the state of medical equipment and availability of drugs in the healthcare facilities. It also had shown some variances between availability of basic medical equipment and their functionality across the studied healthcare facilities. It was also noted that essential drugs are not readily available at the rural health facility, thereby compounding healthcare facilities preparedness to offer diabetes care. It was also noted that some health care practitioners are not satisfied with their services rendered.

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Conflict of Interest

The authors declare no conflict of interest

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