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Knowledge of Diabetes Mellitus Complications Among Patients Attending Diabetes Clinic at Brikama District Hospital

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Abstract

Understanding the diverse complications of Diabetes Mellitus (DM) is crucial for the prevention and management of the condition. Assessing patients' comprehension of the various complications is crucial for devising interventions to manage the disease. This study aimed to evaluate the knowledge regarding the complications of diabetes among diabetic patients visiting the diabetic clinic at Brikama District Hospital in The Gambia. Data was collected using a validated interviewer-administered questionnaire, and 217 patients attending diabetic clinics at Brikama District Hospital were selected by a sequential selection method. Descriptive statistics were employed to encapsulate the demographic and knowledge data. Bivariate regression was employed to ascertain parameters correlated with the knowledge of patients with diabetes. The findings indicated a deficient understanding of diabetic complications, with the majority of patients exhibiting inadequate knowledge (n = 113; 52%) compared to those with appropriate knowledge (n = 104; 48%). The patients' educational level was significantly associated with their awareness of diabetes (p = 0.01). The participants were aware of the individual problems of diabetes mellitus, although they lacked a comprehensive grasp of these complications. The proliferation of diabetes education programs, including mass media utilization and the integration of national curricula, can augment self-regulatory awareness of diabetic problems, potentially reducing morbidity and mortality rates among diabetic patients.

Keywords*: Brikama, Complications, Diabetes Mellitus, The Gambia.*

Introduction

Diabetes (DM) has emerged as one of the most serious chronic non-communicable disease of our times, causing life threatening, disability, and costly complications, and reducing life expectancy [1]. Studies has indicates that diabetes mellitus (DM) is a worldwide epidemic and that it is becoming a significant non-communicable disease that affects both wealthy and non-affluent populations [2].

According to the International diabetes Federation 9th edition report (2019) [1], revealed a prevalence of 9% accounting to (463 million adults). The global prevalence of diabetes had reached pandemic proportions with the 9th edition of the IDF reporting a prevalence of 9% (463 million adults) in 2019. The primary cause of the increased incidence of diabetes has been identified as population aging. Higher prevalence is also influenced by declining diabetes-related mortality as a result of better medical care, as well as rising diabetes incidence in some nations as a result of rising diabetes risk factor prevalence, particularly obesity [1].

Furthermore, DM is a rising health issue in The Gambia, as seen by the rise in prevalence from 1.6% in 2021 to 6.3% in 2023 [3]. The treatment of DM patients accounts for more than 3.6% of the annual health budget [4]. Additionally, data points to a rise in lower limb

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amputations brought on by problems related to diabetic foot disease [3].

DM if not managed well is associated with lots of complications from body organs, with the heart, blood vessels, kidneys, eyes, nerves, and teeth being the most commonly affected [5]. Diabetic foot ulcers, coronary artery disease, retinopathy, chronic renal disease, and stroke are some of these consequences [6]. Adults with diabetes are two to four times more likely to die from heart disease and stroke than those without the disease [7].

A vital element of diabetic management is having sufficient knowledge about the disease [8]. Numerous research has examined how well-informed and conscious diabetic patients are of the serious consequences associated with their illness [7]. A study with 630 participants found that 26.9% of people with diabetes had insufficient awareness of diabetic complications, whereas the majority of people with diabetes (60%) did not know about them [2]. Of the 96 patients (79% of whom were illiterate) in a different study on diabetic complications, 37.5% had high knowledge, 25% had intermediate knowledge, and 37.5% had low knowledge. Patients who were male and had completed their bachelor's degree knew a little bit more [7].

In research done in Peshawar, Pakistan, 76 of the 96 diabetic patients were illiterate; of these, 36 (37.5%) had good knowledge, 24 (25%) had moderate knowledge, and 36 (37.5%) had bad knowledge [9]. Of the patients, 50–60% were aware of the many cardiac problems associated with diabetes mellitus. In terms of additional consequences, there were 70-foot ulcers (72.91%), 68 poor wound healing, 54 strokes (56.25%), 64 renal disease (66.66%), 53 eye disease (55.20%), 50 hypoglycemia (52.08%), and 47–65% symptoms of diabetic neuropathy [9].

Similarly, according to a descriptive study done among 100 diabetic out-patients at the B.P. Koirala Institute of Health Sciences, Dharan. The most common and frequent chronic diabetic complications in 2011 were neuropathy (44.4%), followed by cardiovascular (11.9%), retinopathy (19.04%), nephropathy (16.6%), and others (11.3%), [10].

One of the most important aspects of diabetic management is having adequate understanding of the disease [11]. Numerous studies have demonstrated that raising patient awareness of the illness and its consequences has a major positive impact on both treatment compliance and the reduction of disease-related complications [2]. Although several studies on the disease's management and knowledge, including health education, have been conducted, the disease's prevalence in the Gambia continues to rise [3].

There is no published data regarding the knowledge of diabetes mellitus complication among patient visiting Brikama District Hospital (BDH). It is against this background that the research is sought to determine the prevalence of diabetic mellitus complication among patient visiting Brikama district hospital diabetic clinic.

Materials and Method

Study Design and Setting

An exploratory and descriptive study design was used to determine the knowledge on the complications of diabetes mellitus among diabetic patients visiting the diabetic clinic at Brikama District Hospital. The hospital is the Brikama administrative region which accounts for more than 50% of the total population of the Gambia [12]. As found in one of the largest settlements in the country and run special diabetic clinics, thereby receiving the largest number of patients with diabetes.

Study Population

Brikama district hospital is situated in the bustling city of Brikama, Gambia. Brikama District Hospital is a vital healthcare facility committed to enhancing the health and well-being of the local populace. This hospital is dedicated to meeting the healthcare

requirements of the community it serves and plays a critical role in delivering necessary medical services ranging from outpatient, obstetrics and gynecology, eye care and laboratory.

The study population were all patients with diabetes visiting the Brikama district hospital diabetic clinics during the study period. This included those diagnosed with type 1 or type 2 DM (T2DM) as per the American Diabetes Association (ADS) 2010 diagnostic criteria, (that is glycated hemoglobin (HbA1c) ≥ 6.5%, or fasting blood glucose (FBG) ≥ 7.0 mmol/L; or postprandial blood glucose (PBG) ≥ 11.1 mmol/L in the oral glucose tolerance test (OGTT); or and typical hyperglycemia symptoms (polydipsia, polyuria, polyphagia and obvious weight loss), or random plasma glucose (RPG) ≥ 11.1 mmol/L), are 18 years and above, and consent to participate. Patients with impaired cognitive function and pregnant women were excluded.

Recruitment and Data Collection

Final-year nursing students who had received training in delivering the questionnaire in the primary local languages were responsible for recruiting participants and gathering data. For a month, the clinics was visited on each clinic day once a week to recruit participants Patients were asked to take part in the study either while they are waiting to see the diabetes clinic doctor/nurse or after they had already seen the doctor/nurse. Eligible individuals who consented to participate were led to a different room for consent and interview.

Sampling Size and Sampling

A method of sequential sampling was used to choose the participants. Based on the single population proportion formula [13]. A minimum sample size of 250 individuals was targeted to be recruited, assuming a DM complication of 20%, a 95% confidence interval (CI), and a 5% error margin. The calculation of the DM knowledge was based on related studies conducted in comparable contexts because there is a dearth of information on DM complication in the Gambia [3]. To adjust for withdrawal and incomplete information, five percent was added base on the weekly average of attendance at the diabetic clinic.

Instrument and Measurements

All study participants were provided with information using a structured questionnaire. The questionnaire was based on related studies [2, 14]. Twenty (20) diabetics participants were enrolled in the pre-test or pilot study to determine the questionnaire's content and readability. Patients were interview one-on-one to answered the questions. The full questionnaire was available in English; however, the interview was meticulously translated into local languages.

The participants' answers were translated back into English with the accurate interpretation. The questionnaire is divided in to two sections, each containing close ended questions. In Section A, participants were asked about the sociodemographic characteristics, including age, gender, educational attainment, employment history, family history of diabetes, length of time the patient had the disease, treatment, dietary habits, and the existence of any complications. The questions in Section B evaluated their understanding of the types of problems associated with diabetes mellitus.

Participant are said to have “adequate” knowledge of complication of diabetes if they responded to at least three correct answers with a percentage score of 75–100 %; “inadequate “knowledge if they responded to at most one correct answer or no answered with a percentage score of <50 %.

Data Analysis

IBM's statistical software for social science (SPSS) version 20 was used for data entry and analysis. Baseline characteristics was analyzed using descriptive statistics, with frequencies,

percentages and charts. When necessary, the statistical techniques of chi-square or Fischer's exact test was applied to examine the relationship between categorical variables. To predict characteristics related to knowledge of diabetic complications, bivariate analysis was used. A difference will be deemed statistically significant if the P value is less than 0.05.

Ethical Consideration

Permission was obtained from West Coast Region (WCR) 1 health directorate as well as Brikama District Hospital before the study commence. All recruited participants underwent the consenting procedure, which included explaining the objectives and nature of the study, benefits and risks to participants. Participation in the study is voluntary and participants have the choice to withdraw at any time during the study. All data are kept secure on a computer and access only by the investigation team.

Results

Table 1. Sociodemographic Characteristics of Patients with Diabetes (N=217)

Variable	Frequency	Percentage Mean ± SD
Gender		
Male	58	26.7
Female	159	73.3
Age (years) 55 ± 13		
0-25	4	1.8
26-40	29	13.4
41-60	103	47.5
> 60	81	37.3
Residence		
Brikama	170	78.3
WCR	39	18
Province	8	3.7
Marital Status		
Single	10	4.6
Married	191	88.0
Divorce/Widowed	16	7.4
Occupation		
Employed	59	27.2
Unemployed	158	72.8
Monthly Income (GMD)		
<1,500	84	38.7
>2000	133	61.2
TABLE 1 (Continue)		
Duration of Diabetes		
<10	158	72.9
>20	59	27.1
Education level		
None	130	60
Basic	27	12.4
Post basic	60	27.6

Abbreviations: GMD, Gambian Dalasi; WCR, West Coast Region; SD, Standard deviation; Basic described those with primary education; Post Basic described as those with secondary and tertiary education.

A sample of 250 was targeted, however, 217 participants who met the inclusion criteria agreed to participate giving an 87% response rate. Table 1 above describes the sociodemographic characteristics of patients with diabetes. Most of them were aged between 41-60 (n 103;47.5%) and above > 60 (n 81; 37.3%) and had lived with diabetes for not more than 10 years (n =158; 72.9%). A higher proportion of the participants were female (n = 159; 73.3%), married (n = 191; 88.0%). A larger proportion of the participant lived in Brikama (n =170; 78.3%), were employed (n=59; 27.2%), and earned above GMD 2000 monthly (about USD 29) (n = 133; 61.2%), and majority of the patents had no formal education (n =130;60%).

Table 2. Response of Participant on the Complication of Diabetes

Complications	Participants responses		
	Yes	No	Don't know
Hypertension	194 (89.4%)	23 (10.6%)	0 (0.0%)
Heart disease	133 (61.3%)	44 (20.3%)	40 (18.4%)
Hypo-active sexual arousal	70 (32.2%)	26 (12%)	121 (55.8%)
Diabetes foot ulcer	143 (65.9%)	12 (5.5%)	62 (28.6%)
Kidney damage	88 (40.6%)	24 (11.1%)	105 (48.4%)
Poor wound healing	148 (68.2%)	26 (12%)	43 (19.8%)
Neuropathy	64 (29.5%)	39 (18%)	114 (52.5%)
Eye diseases (Retinopathy)	60 (27.6%)	29 (13.4%)	128 (59%)

Values are presented as N (%): frequency (percentage)

Table 2 shows the proportion of participants response on the knowledge of diabetic complications. The most common complications known by diabetic patient were hypertension 89.4%, followed by heart disease 61.3%, poor wound healing 68.2%, diabetes foot ulcer 65.9%, kidney damage 40.6%, hypoactive sexual arousal 32.2%, neuropathy 29.5%, and eye disease (retinopathy) 27.6%. In general, more than half of the were knowledgeable on diabetic complications. However, out of 217 patients that were surveyed, 121 (55.8%) don't know hypoactive sexual arousal, 128 (59%) don't know eye disease (retinopathy), 114 (52.5%) don't know neuropathy, 105 (48.4%) don't know kidney damage and 62 (28.6%) don't know diabetes foot ulcer.

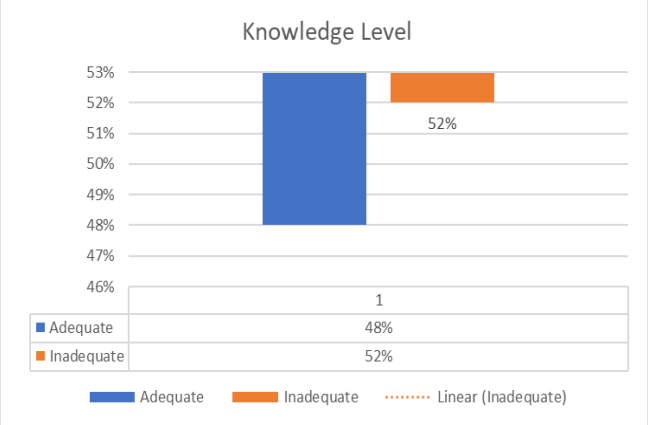

Figure 1. Level of Knowledge on Diabetic Complications among Participants

The Bar chart above Figure 1 shows the level of knowledge on diabetic complications among participants. In general majority of the participants have inadequate knowledge on diabetic complications. Out of the 217 participants 113 of them representing 52% had inadequate knowledge on diabetic complications, while 104 representing 48% had adequate knowledge on diabetic complications [Fig.1].

Table 3. Association between Age, Gender, Socioeconomic Income, Duration of Diabetes, Area of Residence and Degree of Understanding

Variable Knowledge level			
Inadequate Adequate *P-value*			
Gender			
Male	28 (24.8%)	30 (29%)	0.49
Female	85 (77%)	74 (71.1%)	
Age (years)			
0-25	3 (2.7%)	1 (1%)	0.65
26-40	17 (15%)	12 (13.3%)	
41-60	51 (45.1%)	52 (49.5%)	
> 60	42 (37.2%)	39 (35.2%)	
Residence			
Brikama	89 (78.8%)	81 (77.9%)	0.76
WCR	19 (16.8%)	20 (19.2%)	
Province	5(4.4%)	3 (2.9%)	
Marital Status			
Single	4 (3.5%)	6 (5.8%)	0.52
Married	99 (87.6%)	92(88.5%)	
Divorce/Widowed	10 (8.8%)	6 (5.8%)	
Occupation			
Employed	26 (23%)	33 (31.7%)	0.06
Unemployed	87 (77%)	71 (68.3%)	
Monthly Income (GMD)			
<1,500	45(39.8%)	39 (37.5%)	0.72
>2000	68 (60.2%)	65 (62.5%)	
(Continue)			
Duration of Diabetes			
<10	84 (74.3%)	74 (71.2%)	0.59
>20	29 (25.7%)	30 (28.8%)	
Education level			
None	75 (66.4%)	50 (48.1%)	**0.01**
Basic	17 (15.0%)	17 (16.3%)	
Post Basic	21 (18.6%)	37 (35.6%)	

Note: Significance at p < 0.05.

Discussion

This study sought to ascertain the knowledge of complications of diabetes mellitus among diabetic patients who visited the diabetic clinic at Brikama District Hospital. 52% of the 217 participants who took part in the study lacked sufficient understanding about the

consequences associated with diabetes. In the bivariate study, the only variable that was statistically substantially correlated with knowledge of diabetic complications was educational level.

In order to prevent and postpone the onset of complications, diabetes self-care management requires knowledge about diabetic complications. Due to the congested clinic, lack of a diabetic health education program, and staffing shortage, 52% of the patients in this study lacked sufficient understanding about diabetic complications. Approximately two nurses assist the one doctor who runs the clinic at Brikama District Hospital once a week, serving more than fifty patients on any given clinic day. It's possible that the heavy patient load will prevent personalized patient education.

In this study, the percentage of diabetes mellitus complications that diabetic patients were aware of included: hypertension (89.4%), poor wound healing (68.2%), diabetes foot ulcer (65.9%), heart disease (61.3%), kidney disease (40.6%), hypoactive sexual arousal (32.2%), neuropathy (29.5%), and retinopathy (2.6%). The results of studies in Ghana (60%) [2], Ethiopia less than half had knowledge [5], The Gambia (53%;52.5%) [3, 4], Sudan [15], Indonesia (47.4%) [8], and Thailand (34.1%) [16] are all in agreement with this finding. The low health literacy of these patients could be the cause of the similarities. This study, however, differs from one by Hogue [14] and colleagues that found that among Indians who visited the Khulna Diabetes Center in Bangladesh, heart disease was the most common complication among diabetes patients, accounting for 48.9% of cases. Cerebrovascular disease (15.2%), renal disease (13%), hypertension (5.4%), and eye disease (4.9%) were the next most common complications. Saudi Arabia [11] (75.3%), Pakistan (88%) [10], Kuwait (79.3%) [17], and India (60%) [18], all published findings that showed a high percentage of patients with a strong level of understanding. Patients from these countries might have more media exposure and education. The presence of health education programs that result in greater literacy levels than those in our study could be another factor. Additionally, the variation in the patients' responses about their understanding of diabetic complications in this study as opposed to previous studies conducted in other parts of the world may be due to variations in the patients' cultural, racial, and ethnic backgrounds.

Patients' awareness of hypertension as the most prevalent consequence has increased. 89.4% of the patients have either been diagnosed with hypertension or are exhibiting clinical indications of the condition, according to Table 2. These results are consistent with a study published in Ghana by Brokering [19], which found that 35.4% of participants were aware that hypertension is a serious consequence of diabetes [20]. Accordingly, endothelial dysfunction, vascular inflammation, arterial remodeling, atherosclerosis, dyslipidemia, and obesity are risk factors that are comparable for both diabetes and hypertension, making them closely related conditions. Diabetes patients had twice as many cases of hypertension as people without the disease. Patients with hypertension are also more likely to acquire diabetes than those with normotension and frequently show signs of insulin resistance [21].

This study also observed a significant association between gender and the degree of knowledge for diabetic complications. Male diabetes patients had adequate knowledge of diabetic complications compared to their female counterparts. These results are consistent with the findings of Bangladesh [22], in Sudan [15]. Another interesting finding of this study was the association between levels of education and the degree of patient’s knowledge on diabetic complications. In this study, it is observed that 48% of the patients had no formal education. This findings are consistent with several studies in Bangladesh

[22], Ghana [23], Sudan [15]. In the Gambia, no epidemiological research has been carried out to evaluate the degree of awareness and education on the problems of diabetes. Education has been shown to increase health beliefs and knowledge, improve important abilities like reading and cognitive capacity, and ultimately lead to improved lifestyle choices [24].

Additionally, this study discovered a strong correlation between socioeconomic income and the degree of knowledge regarding complications associated with diabetes. The current study found that 68.3% of the patients make less than $30 USD a month. A higher household income has been linked to having sufficient awareness about the complications of diabetes [19]. Despite the results of this study, Hoque and colleagues found no correlation between the socioeconomic income of patients and their level of knowledge about the complications of diabetes [14].

Once more, it is impossible to ignore the strong correlation between diabetes duration and knowledge of complications. The longer a patient has diabetes, the more knowledgeable they are about diabetic complications; thus, this discovery is not surprising. Numerous research has demonstrated a correlation between the onset and advancement of chronic problems in diabetes and a longer period of diabetes development [18].71.2% of the patients in this study have had diabetes over the previous ten years. According to Omotosho et al. (2024) [3], there is strong evidence that proper foot care and education programs can avoid foot problems. Diabetic foot has been successfully identified in this study as a prevalent problem among patients who visit Brikama District Hospital.

Limitation

This study's primary limitations were the sample strategy and cross-sectional design, which restrict casualty. Second, the results of this study cannot definitively represent the general diabetes patients at Brikama District Hospital due to the participants' low literacy level, which is probably quite low and possibly their incomplete comprehension of the questions. Nonetheless, some of the study's conclusions are in good agreement with those of another earlier research.

Additionally, the data collected was self-reported because there was no way to confirm their answers, which could cause our findings to be overestimated or underestimated. However, the validity and reliability of our findings were guaranteed by the instruments' prior validation and testing. Lastly, our study's power may be limited by the small sample size. At least one monthly visit to the diabetic clinic was recommended for patients with diabetes. We contacted every diabetic patient that came to the clinic on a weekly basis for a whole month in order to increase our recruitment efforts. Since participants were drawn from the public sector's sole specialist diabetic clinic, which serves as the primary source of diabetes diagnoses, our study's strengths rest in its generalizability.

Conclusion

In this study, the most frequent complications of diabetes that diabetic individuals were aware of included hypertension, poor wound healing, diabetic foot ulcer, heart disease, kidney damage, hypoactive sexual arousal, neuropathy and eye disease (retinopathy). A greater percentage of patients lacked sufficient knowledge of the complications associated with diabetes. Diabetes knowledge and educational attainment were statistically substantially correlated. Healthcare providers have a responsibility to educate patients about the causes, treatment, and prevention of complications from diabetes at an early age. The level of awareness of diabetic complications among diabetic patients will be raised by planning health education programs

and health outreach on preventive strategies such dietary and lifestyle changes.

Author Contributions

1. **Lamin Camara**: contributed to the conception of the research idea, design data analysis and interpretation, paper drafting and revision.
2. **Ousman Jammeh:** Supervision, and editing.
3. **Alieu Jaiteh; Kaddijatou Sonko; Cherno Jallow; Bambo Kanyi-** Assisted in data collection.

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Conflict of Interest

The authors declare no conflicts of interest.

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