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RURAL/URBAN VARIATIONS IN DIABETES SELF-CARE IN A SAMPLE OF GHANAIAN ADULTS WITH TYPE II DIABETES: A STUDY IN THE EAST GONJA MUNICIPALITY

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ABSTRACT: More recently, there has been a greater focus on nutrition and physical activity as key determinants of health. Available evidence suggests that community of residence drive unhealthy diets and sedentary behaviour (e.g. increased physical inactivity); unhealthy diet and sedentary behaviour are major risk factors for non-communicable diseases (NCDs). This single-site hospital-based study assessed rural/urban variations in diabetes self-care practices in a sample of Ghanaian adults with type II diabetes. The study employed a descriptive cross-sectional design. Respondents were recruited from the Diabetes/Hypertension clinic of the East Gonja Municipal Hospital in Salaga, Ghana, through systematic sampling. Structured, interviewer-administered questionnaires were used to collect data for the study. The primary data were analyzed using Statistical Package for Social Sciences (SPSS) version 25. One hundred and sixty-eight (168) type II diabetes patients participated in the study. More than half of them were residents of rural communities (50.6%). Overall, adherence to medication, diet, and physical activity were 51.8%, 41.8%, and 56.0%, respectively. Controlling for age, occupation, and monthly income, residents of urban communities were more likely to adhere to prescribed anti-diabetic medications compared to those in rural communities (AOR 3.70; 95% CI 1.02, 8.11). On the contrary, residence in a rural community was positively associated with adherence to dietary recommendations (AOR 4.21; 95% CI 1.73, 9.54). The current findings highlight the need for diabetes self-management education and support (DSMES) programmes in the East Gonja Municipality to facilitate the knowledge sharing, decision-making, and skills mastery for diabetes self-care.

Keywords: Rural, Urban, Diabetes Self-Care, Ghana, Type II Diabetes

1. INTRODUCTION

In the last few years, perhaps more so than ever before, chronic non-communicable diseases (NCDs) have gained recognition as a leading cause of death and disability in Ghana (Ministry of Health-Ghana [MoH-G, 2022); currently responsible for over 40% of all

deaths recorded in adults (Laar *et al*., 2021). Available evidence suggests that prevalence of obesity, a diet-related NCD previously described by Laar (2019) as a "man-made disaster" and a "pandemic of human wrongs", rose by 139% between 1993 and 2008 in Ghanaian women aged 15-49 years (United States Agency for International Development [USAID], 2021). Currently, between 3.3% and 6% of the Ghanaian adult population has type II diabetes (Nketia *et al*., 2022). Diabetes contributes significantly to the global burden of disease and remain a leading cause of blindness, renal failure, and limb amputation (World Health Organization [WHO], 2021).

More recently, there has been a greater focus on nutrition (Nketia *et al*., 2022; WHO, 2020) and physical activity (Bullard *et al*., 2019; Grasdalsmoen *et al*., 2019; Levy *et al*., 2019; Abate *et al*., 2020) as key determinants of health. Available evidence shows that community of residence drive unhealthy diets and sedentary behaviour (e.g. increased physical inactivity); unhealthy diet and sedentary behaviour are major risk factors for NCDs including diabetes (Laar *et al*., 2021). The growing burden of diabetes in Ghana has been linked to rapid urbanization, aging population (MoH-G, 2022), changing dietary pattern (from a traditional plant-based diet to high-energy processed foods) and a growing trend of sedentary behaviour (e.g. increased physical inactivity) in the general population (Laar *et al*., 2021). Available data suggest that less than 5% of Ghanaian adults consume adequate amount of fruits and vegetables and about 41% of them do not do physical activity (MoH-G, 2022).

Currently, the mainstay treatment for diabetes in Ghana is pharmacotherapy (MoH-G, 2022), however, empirical evidence from observational and interventional studies (American Diabetes Association [ADA], 2022) proves that physical activity and dietary recommendation play a key role in the prognosis of type II diabetes. In previous studies (Mishali *et al*., 2011; Bullard *et al*., 2019; Han *et al*., 2020; ADA, 2022), patients who adhered to physical activity and dietary recommendations were able to achieve and maintain a healthy weight status and individualized glycemic goals, leading to fewer complications. For instance, in a study among American diabetes patients, those who followed medical nutrition therapy (MNT) prescribed by a registered dietitian or nutritionist had their A1C deceased – 0.3-2.0% (ADA, 2022).

ADA (2022) recommends a minimum of two hours and 30 minutes of moderate-to vigorous-intensity aerobic activity per week, spread over at least 3 days/week, with no more than 2 consecutive days without activity, and resistance exercise on 2 to 3 sessions per week on non-consecutive days for adult diabetes patients. To date, there is still a paucity of accurate data on diabetes self-care practices among type II diabetes patients in the East Gonja Municipality, masking a growing phenomenon to the extent that it is as though a neglected health issue (MoH-G, 2022). This study sought to assess and promoted institutional and community-level actions that support self-care practices (e.g. dietary adherence, medication adherence, adherence to physical activity) among type II diabetes patients to prevent or delay complications.

2. MATERIALS AND METHODS

Study Design

This study used a descriptive cross-sectional study design and a quantitative approach.

Study Population and Area

Type II diabetes patients attending the Diabetes/Hypertension Clinic of the East Gonja Municipal Hospital constituted the study population. The selection of this population was informed by the following considerations; (1) The recent rise in the incidence and prevalence of type II diabetes at the global, regional, and local levels, (2) the researcher's response to calls to combat diet-related NCDs as spelt out in the Global NCD Compact (2022-

2030) and articulated at the first annual gathering of Heads of States and Government Group for the Prevention of NCD, and (3) the paucity of accurate data on diabetes self-care practices in the East Gonja municipality of Ghana. This study was relevant to the local context, and there was evidence of policy-maker interest.

The East Gonja Municipality (Figure 1) is one of the seven districts/municipalities in the Savannah Region of Ghana, located in the Eastern part of the region. It shares boundaries with North East-Gonja District to the North, Central Gonja District to the West, Nanumba-North, Nanumba-South and Kpandai Districts to the East, and the Bono-East Region to the South. The municipality is divided into seven sub-municipals – Kafaba, Kayereso, Makango, Salaga North, Salaga South, Aboromase, and Buma. The population of the East Gonja Municipality, according to the 2021 Population and Housing Census, is 117,755; the third highest in the Savannah Region (Ghana Statistical Service [GSS], 2021a). Males constitute 51.1% (60,199) of the total population. Most of the residents of the municipality live in rural communities (72.4%), and about 77.3% of the working population is employed in skilled agriculture, forestry and fishery (77.3%) (GSS, 2021b). The recent Multidimensional Poverty Index Study (GSS, 2020) in Ghana revealed that the Savannah Region had the highest level of multidimensional poverty index (0.403%), poverty incidence (70.9%) and intensity (56.8%). There are 32 health facilities in the municipality: one hospital, one polyclinic, four health Centers/Clinics and 26 functional Community Health Planning and Services (CHPS) zones (MoF-G, 2021).

The East Gonja Municipal Hospital is the largest secondary-level healthcare facility in the East Gonja Municipality. Located in the administrative capital "Salaga", the hospital provides general and specialist healthcare services (including surgical services) to residents of the municipality and neighboring districts. The hospital has a special "Diabetes/Hypertension Clinic" that runs on every Tuesday. The clinic is managed by general physicians, nurses and pharmacists. Routine services provided at the unit include assessment of blood pressure and blood glucose, general assessment for common complications associated with diet-related NCDs (e.g. foot ulcers), and provision of pharmacotherapy. Following registration at the Diabetes/Hypertension Clinic, the frequency of visits to the unit is patient dependent; ranging from bi-monthly to every three months (patient without risk of imminent complications). Average monthly attendance at the unit is 230 clients. Patients who fail to visit the clinic on scheduled date are able to receive care at the general outpatient department (OPD) of the hospital which runs throughout the week. In addition, the East Gonja Municipal Hospital operates a special unit "Wellness Clinic" from Monday through to Friday. The unit provides a risk-based screening for diet-related NCDs (overweight, obesity, diabetes, etc.) and an individual-based self-management education and counselling (including diet) for clients with diet-related NCDs or risk factors for these diseases.

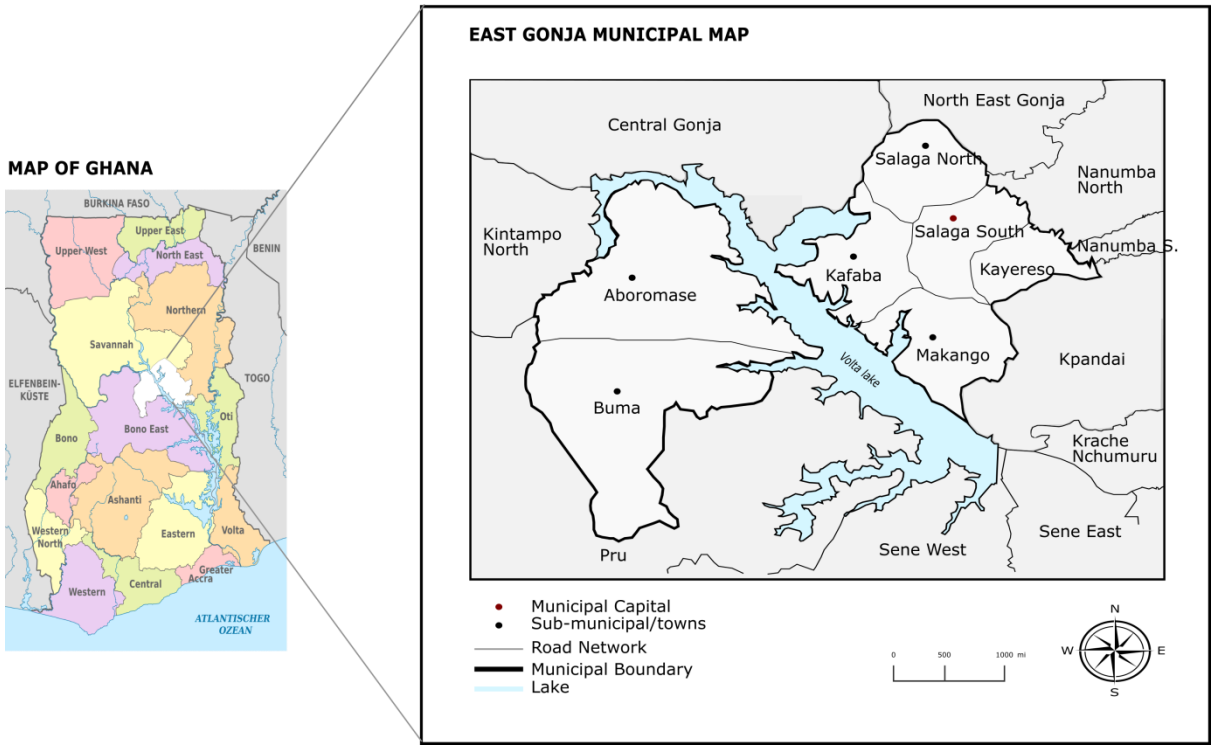

Figure 1 Map of Ghana showing the East Gonja Municipality. Source: East Gonja Municipal Health Directorate, 2022.

Sampling

The sample size for the study was calculated using the Yamane (1967) simplified formula:

$$n \geq \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the population size (230, i.e. the average monthly attendance at the Diabetes/Hypertension Clinic of the East Gonja Municipal Hospital), and e is the acceptable sampling error which is 5% (0.05). Based on this information, the sample size for study was calculated as;

$$n \geq \frac{230}{1 + 230(.05)^2}$$

$$n \geq 146.03$$

With an error margin of 15% allowed for incomplete questionnaires, the total sample size was estimated to be 168. Patients who visited the Diabetes/Hypertension Clinic on days scheduled for data collection were grouped into two based on their diagnosis during previous visits, which was verified from their medical folder; (1) those diagnosed with diabetes only, and (2) those diagnosed with diabetes and hypertension. With a sample size of 168, a minimum of 42 participants were recruited per every schedule, through systematic sampling. Average monthly attendance at the unit was 230 (approximately 58 clients per week). Therefore, we selected a random starting point of '1' and a fixed sampling interval of '1'. The first respondent was randomly chosen as the starting point followed by the next respondent. In a case where a potential participant did not meet the inclusion criteria for the study, the next participant was selected until the desired sample size for that particular schedule was attained. Eligibility criteria for the study were; (a) prior diagnosis with type II diabetes, based on Ghana Standard Treatment Guideline (STG, 2017), verified from the patient's medical

folder (b) aged 18 years and above, (c) considered to be stable, and (d) willing to participate in the study voluntarily. Patients who met the inclusion criteria but had known co-morbidities such as hypertension were excluded from the study.

Research Instrument

The study used structured, interviewer-administered questionnaires for the data collection. The instrument was structured into five components; (1) Socio-demographic characteristics, (2) medical history (3) medication adherence, (4) dietary adherence, and (5) adherence to physical activity. The instrument was adapted from literature and modified to suit the objectives of the current study. Respondents' level of adherence to prescribed anti-diabetic medication(s) was assessed using the Medication Adherence Rating Scale (MARS). This is a 10-item self-reporting scale developed from the Drug Attitude Inventory (DAI) and the Medication Adherence Questionnaire (MAQ). The total score for MARS was calculated by summing the relevant subscale scores. The scores ranged from 0 to 10, with 0 being the minimum possible score and 10 being the maximum possible score (Thompson *et al*., 2000). The MARS was previously used in a study among schizophrenia patients in Sunyani, Ghana, yielding a Cronbach α value of the scale of 0.81 (Nketia & Menokpor, 2022).

A set of nine questions (9) was used to assess respondents' level of dietary adherence. These questions, which were obtained from literature (Nketia *et al*., 2022), comprised various aspects of dietary recommendations for diabetes patients and respondents' specific dietary practices. The Exercise Adherence Rating Scale (EARS) was used to assess respondents' level of adherence to prescribed physical activity. EARS is a 5-point self-rating Likert scale (0 = completely agree to 4 = completely disagree), designed to measure individual's adherence to prescribed home exercise. Possible summed score for EARS range from 0 to 24 (Newman-beinart *et al*., 2017), with higher scores indicating good adherence to prescribed physical activity. Three items on the scale were inverse-scored during data analysis because they were negatively worded.

Data Collection

The primary data for the study was collected in May 2022, on days scheduled for the Diabetes/Hypertension Clinic of the East Gonja Municipal Hospital. With a sample size of 164, a minimum of 42 respondents were recruited and interviewed per every schedule. The interviews were conducted by two clinical nursing assistants who demonstrated proficiency in both the English language and the common local dialects (Gonja, Hausa, Konkomba, and Asanti Twi). A week to commencing the data collection, the principal investigator provided in-person, practice-based training for these personnel on how to perform data collection using interviewer-administered questionnaires and orientated them on the eligibility criteria of the study. The principal investigator also supervised the research assistants during the data collection to ensure that the process was carried out effectively and accurately. After assigning the patients to 'diabetes only' group and 'diabetes and hypertension' group, the principal investigator introduced the study to the 'diabetes only' group and those who were willing to participate in the study were taking through the consent procedure. Having obtained consent, the interviewers read the questions out in English language and interpreted them in the local dialect most convenient for the respondent. Answers provided by the respondent were entered on the questionnaire, against the respective question. Each question was read and interpreted twice to ensure that they were well understood by the respondent before the answers were recorded on the questionnaire. Every interview lasted between twenty five and thirty minutes.

Variables

- Independent variable of interest: community of residence, categorized as 'rural' and 'urban'. Urban community was defined as one with a population of 5,000 or more. Rural community was defined as one with a population less than 5,000.
- Outcome variable: ownership of glucometer (categorized as 'Yes' and 'No'), medication adherence, dietary adherence, and physical activity adherence; all categorized as 'adherent' and 'non-adherent'.

Data Analysis

Following the data collection, the primary data were checked for completeness, coded and entered into the Statistical Package for Social Sciences (SPSS) version 25 (IBM Corp, Armonk, New York, United States, 2017). Data cleansing was performed using frequencies and percentages. Descriptive statistics, specifically frequency and percentage were used to summarize respondents' socio-demographic data, medical history and diabetes self-care practices. Table and bar graph were used to present the data.

Level of medication adherence was measured by summing the relevant subscale scores in MARS. The scores ranged from 0 to 10, with 0 being the minimum possible score and 10 being the maximum possible score (Thompson *et al*., 2000). For the purposes of discussion, respondents were grouped into two – 'adherent' to medications and 'non-adherent' to medications, based on the total score obtained. Those whose MARS score was 5 or more were considered adherent to anti-diabetic medications and those who had less than 5 were classified as non-adherent to anti-diabetic medication.

Level of dietary adherence was measured by summing the relevant subscale scores in the dietary adherence questionnaire. The scores ranged from 0 to 9, with 0 being the minimum possible score and 9 being the maximum possible score (Nketia *et al*., 2022). For the purposes of discussion, respondents were grouped into two – 'adherent' to dietary recommendations and 'non-adherent' to dietary recommendations, based on the total score obtained. Those whose total score was 5 or more were considered adherent to dietary recommendations and those who had less than 5 were categorized as non-adherent to dietary recommendations.

Similarly, the level of adherence to prescribed exercise was measured by summing the relevant subscale scores in the EARS. The scores ranged from 0 to 24, with 0 being the minimum possible score and 24 being the maximum possible score (Newman-beinart *et al*., 2017). For the purposes of discussion, respondents were grouped into two – 'adherent' to exercise and 'non-adherent' to exercise, based on the total score obtained. Those whose EARS score was 12 more were considered adherent to prescribed exercise and those who had less than 12 were classified as non-adherent to prescribed exercise.

Logistic regression analyses were performed to determine the association between community of residence and self-care practices. First, a univariate logistic regression analysis was conducted to assess the association between respondents' socio-demographic factors and diabetes self-care practices (medication adherence, dietary adherence, exercise adherence and ownership of glucometer). A final multivariate model was selected using 'Enter' method. The model contained independent variables that were significantly associated with diabetes self-care practices in the univariate logistic regression analysis. *P*-values, odds ratio, and confidence intervals were reported. *P*-value < .05 was considered statistically significant.

Ethical Consideration

The study received approval from the East Gonja Municipal Health Directorate. An introductory letter was obtained from the Directorate and served to the Medical Superintendent of East Gonja Municipal Hospital, who gave permission for the study in the hospital. The principal investigator met the respondents to discuss the objectives and significance of the study. All questions and concerns raised by the respondents were clarified. Thereafter, verbal informed consent was obtained. Questionnaires for the study were anonymized to ensure that confidentiality was maintained.

3. RESULTS

Socio-demographic Characteristics of Respondents

Table 1 presents respondents' socio-demographic characteristics. One hundred and sixty-eight (168) type II diabetes patients participated in the study. Close to half (48.8%) of them were between 36 and 60 years of age. Females constituted 58.3% of the study sample. The largest proportion of the respondents (48.8%) was from the indigenous tribe, Gonja. More than half of the participants lived in rural communities (50.6%) and the same proportion (50.6%) attended elementary school. Close to half (45.7%) of the respondents were involved in an agriculture-related activity as their main occupation. The average monthly income of the largest proportion of the sample was between GH¢ 600.00 and GH¢ 1000.00.

Table 1 Socio-demographic characteristics

Variable	Frequency (n)	Percent (%)
Age		
18-35 years	16	9.5
36-60 years	82	48.8
> 60 years	70	41.7
Sex		
Male	70	41.7
Female	98	58.3
Marital status		
Single/separated	30	17.9
Married	132	78.6
Widow/widower	6	3.6
Ethnicity		
Gonja	82	48.8
Dagomba	26	15.5
Hausa	19	11.3
Konkomba	24	14.3
Others	17	10.1
Community of residence		
Rural	85	50.6
Urban	83	49.4
Educational status		
No formal education	51	30.4

Variable	Frequency (n)	Percent (%)
Elementary school	85	50.6
SHS	15	8.9
College/university	17	10.1
Occupation		
Agriculture-related	77	45.8
Trading	54	32.1
White-Collar Job	13	7.7
Others	24	14.3
Monthly income (GH¢)		
< 100	14	8.3
100 – 599	48	28.6
600 – 1000	72	42.9
> 1000	34	20.2

Note. N = 168. SHS, Senior High School

Medical History of Respondents

As shown in figure 1, the largest proportion of the sample (33.9%) was first diagnosed with diabetes in the five years preceding the survey. The linear line suggests a rising trend over the years.

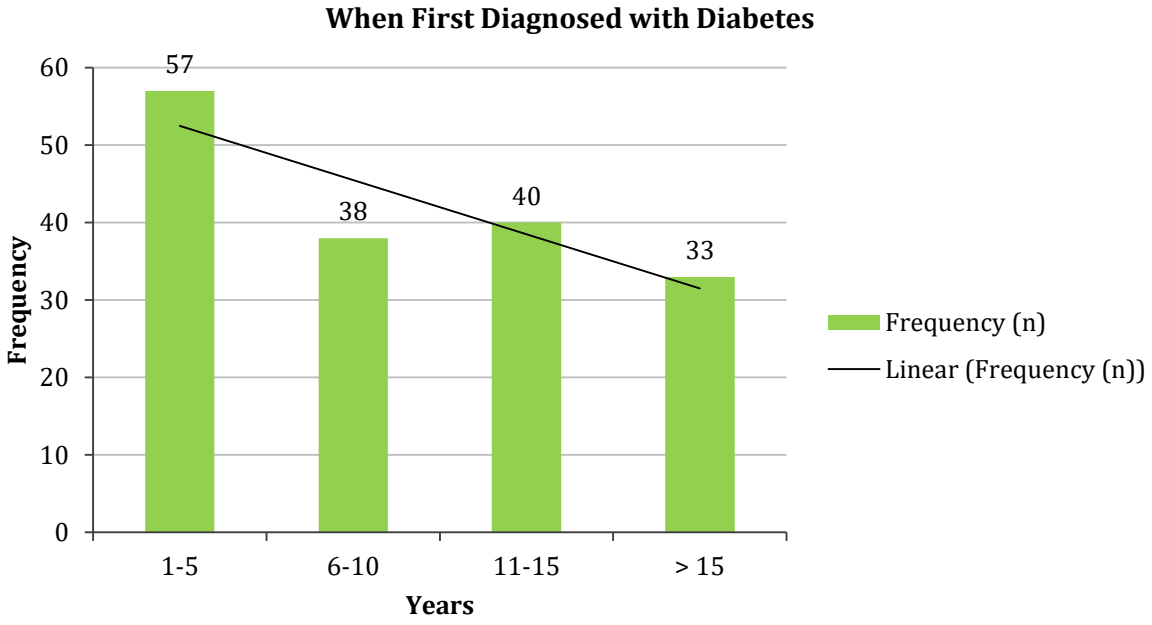

Figure 2 Bar graph illustrating when respondents were first diagnosed with diabetes.

Diabetes self-care of Respondents

Figure 3 illustrates diabetes self-care practices of respondents. Only 19 (11.3%) respondents indicated owned a glucometer. More than half of the respondents adhered to prescribed anti-diabetic medication (51.8%) and exercise (56.0%). With regards to diet, the majority (54.2%) of the respondents were non-adherent to dietary recommendations.

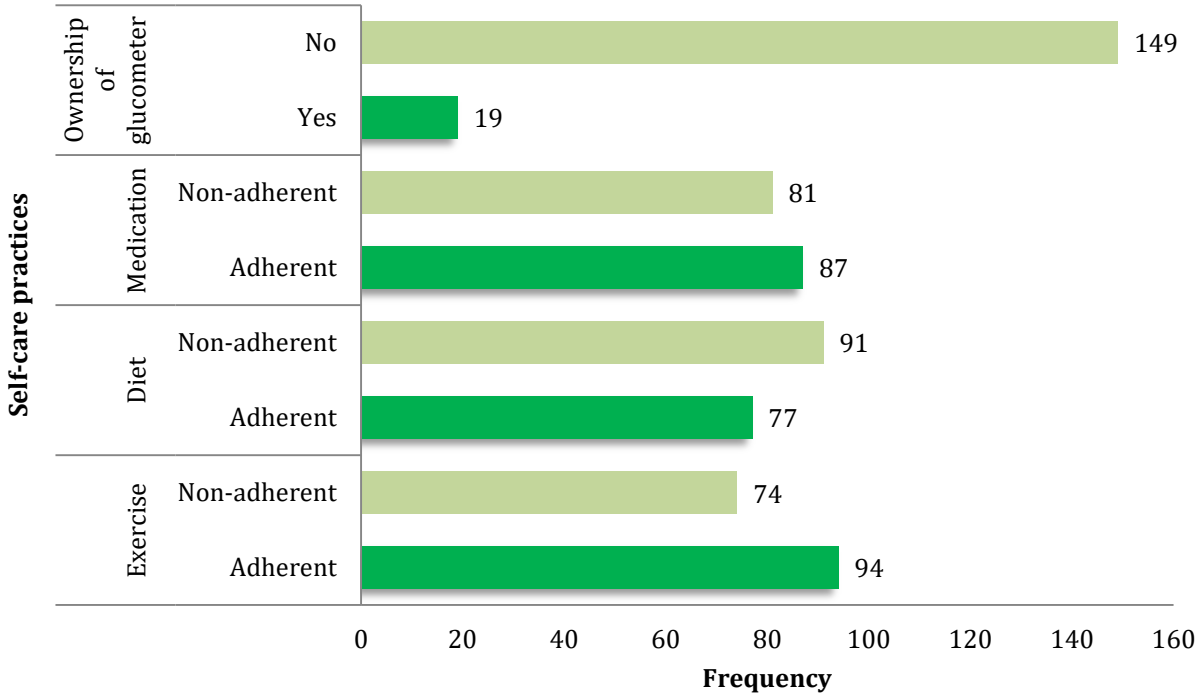

Figure 3 Bar chart illustrating diabetes self-care practices

Association between Community of Residence and Diabetes Self-Care Practices

A multiple logistic regression analysis was performed to determine the impact of community of residence on the likelihood that a respondent would report adhering to prescribed anti-diabetic medications. The full model containing all predictors (community of residence, age, occupation, and monthly income) was statistically significant, χ^2 (3, N = 82) = 50.64, p = .001, indicating that the model was able to distinguish between respondents who adhered to medications and those who did not. Hosmer-Lemeshow Goodness of Fit Test provided additional evidence that the model was reliable, χ^2 (4, N = 168) = 3.95, p < .785. The model as a whole explained between 46.1% (Cox and Snell R square) and 61.4% (Nagelkerke R squared) of the variance in medication adherence, and correctly classified 84.1% of cases. As shown in Table 2, community of residence made a statistically significant contribution to the model. Residents of urban communities were more likely to adhere to medications compared to those who lived in rural communities (AOR 3.70; 95% CI 1.02, 8.11), controlling for all other factors in the model.

To determine the impact of community of residence on dietary adherence, a multiple logistic regression analysis was performed. The full model containing all predictors (age, community of residence, and occupation) was statistically significant, χ^2 (3, N = 168) = 56.76,

p = .001, meaning the model was able to distinguish between respondents who adhered to dietary recommendations and those who did not. Further evidence from the Hosmer-Lemeshow Goodness of Fit Test confirmed the reliability of the model, χ^2 (4, N = 168) = 6.76, p < .563. Overall, the model explained between 50.0% (Cox and Snell R square) and 66.6% (Nagelkerke R squared) of the variance in dietary adherence, and correctly classified 82.9% of cases. Community of residence made a statistically significant contribution to the model. Respondents who lived in rural communities were more likely to adhere to dietary recommendations compared to those who lived urban community (AOR 4.21; 95% CI 1.73, 9.54), controlling for all other factors in the model (Table 2).

Table 2 Logistic regression of association between self-care practices and community of residence

Factor	Univariate LR			Multivariate LR		
	p	COR	[95% CI]	*p*	AOR	[95% CI]
Ownership of glucometer						
Community of residence						
Rural	.180	1.83	0.76, 4.43	-	-	-
Urban		Ref.				
Medication adherence						
Community of residence						
Rural	.001*	4.21	1.48, 9.31	.021*	3.70	1.02, 8.11
Urban		Ref.			Ref.	
Dietary adherence						
Community of residence						
Rural	.017*	3.06	1.22, 7.62	.036*	4.21	1.73, 9.54
Urban		Ref.			Ref.	
Exercise adherence						
Community of residence						
Rural	.080	2.11	0.95, 4.68	-	-	-
Urban		Ref.				

Note. N = 82. LR = logistic regression; COR = crude odds ratio; AOR = adjusted odds ratio; CI = confidence interval; LR = logistic regression. *P < .05.

4. DISCUSSION

This single-site, hospital-based study investigated the variations in diabetes self-care practices in a sample of Ghanaian adults with type II diabetes based on their community of residence. Four diabetes self-care practices were assessed: (1) medication adherence, (2) dietary adherence, (3) adherence to prescribed exercise, and (4) ownership of glucometer.

In line with previous studies in Ethiopia (Ayele *et al*., 2022), Ghana (Afaya *et al*., 2020; Osei-Yeboah *et al*., 2018), Portugal (Mendes *et al*., 2019), and Singapore (Lin *et al*., 2017), the current findings indicate that the majority of the respondents were adherent to prescribed medications. However, this finding is inconsistent with those of Araya *et al*. (2020), Aminde *et al*. (2019), and (Murwanashyaka *et al*., 2022) who reported that the majority of type II diabetes patients were non-adherent to prescribed medications. Particularly, in

Aminde *et al*. (2019) study, patients attributed their medication non-adherence to financial challenges. Although the current study did not assess whether or not the respondents had active National Health Insurance card, its coverage on anti-diabetes medications in Ghana (Afaya *et al*., 2020) could have contributed to the current finding.

In this study, more than half of the respondents were non-adherent to dietary recommendations. There seem to be similarities between the dietary adherence found in the current study and those reported in similar single-site studies in Ghana (Nketia *et al*., 2022), Greece (Katsaridis *et al*., 2020), and Nepal (Kafle *et al*., 2018). Seasonal food shortages occur in Ghana, particularly in the Northern part of the country, from March to June (Agble *et al*., 2009). Considering that the current study was conducted within this period, and that the study setting (East Gonja Municipality) is in the northern part of Ghana, it is possible that the seasonal food shortages in the northern regions affected respondents' dietary habit and consequently their adherence to dietary recommendations.

Another important finding of the current study was that the majority of the respondents were adherent to prescribed exercise (physical activity). Although, this result was consistent with those of Debalke *et al*. (2020) and Mirahmadizadeh *et al*. (2020), it differed from some published studies (Alhariri *et al*., 2017; Mendes *et al*., 2019; Abate *et al*., 2020). The observed differences in study findings could be explained in part by the variations in the population characteristics. Contrary to Alhariri *et al*. (2017) study where only 16.7% of the respondents were manual workers, close to half of the respondents in the current study were employed in the agriculture sector which often involved some form of physical activities.

The current study also found that approximately, 9 in 10 respondents did not own a glucometer, a machine used to check blood glucose level. This was consistent with other studies (Abate *et al*., 2020; Afaya *et al*., 2020; Ayele *et al*., 2022) which reported that most diabetes patients did not have a glucometer. On the contrary, studies in Saudi Arabia (Sheikh *et al*., 2021) and Iran (Mirahmadizadeh *et al*., 2020) assessing diabetes self-care practices found that most of the respondents owned a glucometer. The observed difference in the study findings could be explained in part by the significant cost of owning and using a glucometer in Ghana, and probably the lack of skills in its usage. The Savannah Region has the highest level of multidimensional poverty index (0.403%), poverty incidence (70.9%) and intensity (56.8%) in Ghana (GSS, 2020), and therefore the high rate of non-ownership of a personal glucometer (and blood glucose test strips) could have been as a result of the economic hardship in the municipality.

In the current study, community of residence was significantly associated with the level of medication adherence. Controlling for age, occupation and monthly income, residents of urban communities were more likely to adhere to medications compared to those who lived in rural communities. This finding is consistent with that of Murwanashyaka *et al*. (2022). In this hospital-based cross-sectional study, Murwanashyaka *et al*. (2022) observed that diabetes patients living in 'Kigali', the capital city of Rwanda, were more likely to adhere to prescribed medications compared to those living in rural communities. On the contrary, Bonger *et al*. (2018), Araya *et al*. (2020) and Ayele *et al*. (2022), did not find a significant association between community of residence and medication adherence in a sample of diabetes patients. The current finding could be explained in part by the recent improvement in healthcare services in the East Gonja municipality, which is concentrated in urban communities with little resources available in rural communities, probably facilitating rural community residents' accessibility and patronage of diabetes care (e.g. medications).

Community of residence also affected respondents' adherence to dietary recommendations. Controlling for age and

occupation, respondents who were residents of rural communities were more likely to adhere to dietary recommendations compared to those who lived urban communities. This result is inconsistent with some published studies (Alhariri *et al*., 2017; Parajuli *et al*., 2014). The difference in dietary adherence between rural and urban community residents could be explained in part by the fact that the majority of the respondents lived in rural communities where they could have easy access to whole grain cereal and other dietary fibre, compared to those in urban communities where, for cost and non-availability, could not patronize these essential food items. Another possible reason for the difference is that the ongoing nutrition transition in Ghana, from a traditional plant-based diet to high-energy processed foods, is more prevalent in urban areas than in rural communities (Laar *et al*., 2021), probably influencing the dietary habit of the respondents, especially those in urban communities.

Contrary to an earlier finding in Ethiopia (Parajuli *et al*., 2014; Abate *et al*., 2020), community of residence was not significantly associated with exercise adherence. The lack of significant difference in exercise adherence between rural and urban community residents could probably be due to the fact that the largest proportion of respondents were employed in the agriculture sector which often involves some level of physical activities.

5. CONCLUSION

Significant difference was observed in diabetes self-care practices between rural and urban community residents. Diabetes patients in rural communities were more likely to adhere to dietary recommendations compared to those in urban communities. On the contrary, residents of urban communities were more likely to adhere to prescribed medications than those in rural communities. The current findings highlight the need for diabetes self-management education and support (DSMES) in the East Gonja municipality to facilitate knowledge sharing, decision-making, and skills mastery for diabetes self-care. The DSMES should be patient-centered, and should employ the expertise of all relevant disciplines – clinical nutrition, public health, medicine, pharmacy, etc.

The limitation of this study was that the use of self-report method to evaluate patients' adherence to dietary recommendations could have resulted in overestimation or underestimation of the level of adherence.

6. ACKNOWLEDGEMENT

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Conflict of Interest

None declared

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