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The role of social support and self-management on glycemic control of type 2 diabetes mellitus with complications in Ghana: A cross-sectional study

Frank Amankwah Adu[1,2] | Collins Atta Poku[2] | Amanda Parko Adu[2] | Lydia Boampong Owusu[2]

[1]Medical Technology in the Xiangya School of Nursing, Central South University, Changsha, China

[2]Department of Nursing, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Correspondence
Collins Atta Poku, Department of Nursing, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
Email: attapokucollins@yahoo.com and capoku@knust.edu.gh

Abstract

Background and Aims: Diabetes mellitus (DM) can result in detrimental complications which are connected with long-term impairments and disabilities. Chronic complications are well-known consequences of type 2 diabetes mellitus (T2DM) progression, which reduce patient quality of life, place a burden on the healthcare system, and increase mortality. Measures to promote health outcomes for people with DM are scanty; the study therefore aimed at determining the effects of self-management and social support on glycemic control of T2DM with complications in Ghana.

Methods: A cross-sectional design using convenience sampling was conducted on 400 T2DM patients using Hensarling's Diabetes Family Support Scale and Summary of Diabetes Self-Care Activities scale. Data analysis was conducted using descriptive, Pearson Moment Product Correlation and Binary Logistic Regression on self-management, social support, and glycemic control in T2DM patients.

Results: Social support among participants was high and there was a positive correlation or relationship between social support and T2DM self-management. There was a correlation between social support and self-management ($r = 0.149$, $p < 0.05$) and diet control ($r = 0.221$, $p < 0.05$). The results also showed a significant correlation between medication adherence and glycemic management ($r = 0.116$, $p < 0.05$) while female T2DM participants, individuals with at least primary education were less likely to have low self-management relative to T2DM.

Conclusion: Though the level of T2DM self-management was high it does not translate to good glycemic control. Focused health education programs should be incorporated into patients' care plans which will be particularly relevant for patients with T2DM and will contribute to positive physiological and psychological outcomes. Furthermore, a more robust monitoring and follow-up scheme should be scaled up or instituted for patients with T2DM.

KEYWORDS
glycemic control, self-management, social support, type 2 diabetes mellitus

1 | INTRODUCTION

The effect of diabetes mellitus (DM) is not limited to physical impairment; the economic cost for the diagnosis, treatment, and management of diabetic patients is estimated to be US$1.2 billion globally. The morbidity of DM is projected to be 415 million (8.8%), which is anticipated to rise to 642 million in the next 25 years. Additionally, undiagnosed DM is approximated to be 193 million globally.[1] However, the consequence of dealing with DM can be costly concerning lives lost.

In 2015, about 5.0 million mortalities were associated with DM; moreover, over 12% of worldwide health expenses were devoted to managing DM and its complications. The challenge DM poses is that the disorder is speedily growing out of proportion in both high-resourced and low-middle-income countries (LMICs).[2,3]

DM, mainly type 2 diabetes mellitus (T2DM) has become an increased concern in Africa with a whopping 19 million adults affected with 14.2 million in sub-Saharan Africa (SSA) alone.[1,4] These numbers are at a high possibility to rise to 41.6 million throughout Africa by the year 2045. The financial consequence of T2DM is additionally accelerating with the rising occurrence of US$ 9.5 billion presently spent on it only in Africa.[1,4,5] The predicted total cost of DM in SSA is 1.2% of the Gross Domestic Product (GDP), with healthcare expenditure totaling roughly $10.81 billion and out-of-pocket spending expected to exceed half of general healthcare spending in several of the countries.[6]

In Ghana, DM prevalence is over 3.9% with a high rate of undiagnosed adult cases not accounted for. The cost of treating DM is $106.5 per person with more DM-related fatalities also reported, and the costs of treatment continue to be a challenge.[7,8] According to Danquah et al., 6% of the people in Kumasi have T2DM,[9] 35.3% microvascular and 31.8% macrovascular complications prevalence with neuropathy being the most common microvascular complication.[10]

DM which is not managed well results in damaging complications which are associated with long-term impairment and disabilities of vital organs in the body.[2,11] People with T2DM are however at a higher risk of developing both micro- and macrovascular disorders.[12–14] It is been reported that at the time of most T2DM diagnosis, approximately half of patients had significant micro- or macrovascular abnormalities.[14]

Chronic complications are a well-known consequence of T2DM progression, which reduces patient quality of life, and places a burden on the healthcare system while increasing mortalities associated with T2DM.[15,16] T2DM is a common cause of permanent disability, with late complications being significant determinants of disability. Complications from DM kill 50%–80% of all T2DM, with cerebrovascular disease and kidney disorders being among the principal causes of death.[17] Diabetic eye disease has become a leading cause of blindness worldwide.[18] Furthermore, clinical epidemiologic findings show that in diabetics, foot ulcers are associated with more than 85% of nontraumatic lower extremity amputations.[19]

To attain ideal blood glucose levels, managing T2DM with self-management activities is a crucial part of diabetic treatment.[20] This is because this population administers more than 95% of self-management therapies alone. DM patients actively communicate and work with healthcare professionals as part of the diabetes self-management process to control their medication schedule and associated symptoms.[21,22] According to Shrivastava et al.,[23] self-management activities include healthy eating, physical activity, blood sugar monitoring, medication compliance, skillful problem-solving, healthy coping mechanisms, and risk-reducing behavior, which are all examples of healthy behaviors. The capabilities of people with DM and the social support they receive from their families and significant others are key factors in the success of self-administered self-management therapies.[24]

Self-management is essential to the proper management of DM, as it is with all chronic diseases, and there is strong evidence that these behaviors can reduce the risk of complications related to the disease.[25] Self-management in DM patients has been proven to be cost-effective in the sense that it decreases hospital readmissions and also anticipated quality and length of lifetime healthcare costs.[26] According to Mohebi et al., the implementation of self-management measures by diabetic patients leads to a drop in the possibility of cardiovascular complications to about 80%.[27] Despite these numerous advantages, many patients have difficulties conducting the complicated routine of self-management behavior.[28,29] Tong et al. identified challenging daily hassles, frustration, emotional distress, and low self-commitment as some of the factors that mitigate self-management activities.[30] Furthermore, low knowledge levels, reduced self-efficacy to complete an action, and inadequate family support have been linked with poor diabetes self-management.[31] The effort of the patient to uphold and follow proper diabetes management advice usually takes place in social settings [32–34] and as such the role of the family is very critical.

Social support refers to the help a family member receives from the family, a network of friends, neighbors, or others and comprises different areas, including informational support, emotional comfort, and practical help.[35] The family performs certain functions such as communication, problem-solving, task performance, and mutual support for its members.[36] The whole process of social support occurs throughout a lifetime and the strength may vary in each stage of the family life cycle and a specific family. In Africa, family members are very important in both physical and emotional or psychological support, especially to those facing stressful situations. Physical support may involve scheduling appointments with service providers or assisting patients with food and exercise, whereas psychological support may entail offering comfort and encouragement to patients

who are upset or frustrated by the protracted nature of their diabetes treatment.[37,38]

Social support in managing people with T2DM has been extensively assessed concerning supportive and harmful behaviors and the complexity of how they influence the family system. An increased amount of social support enhances how the patient accepts the disease condition and may ease the perceived difficulty in self-care behaviors which eventually leads to a better quality of life for patients.[39–41] Social support for the management of DM has been generally supported to offset the weakening adherence to medication and glycemic control.[33,42,43] Social support influences how and why patients manage diseases; helps them consider that they can put into effect endorsed self-management behaviors, and discloses options for coping with obstacles impeding cost-effective DM management. Adults with DM who state that they acquired help with taking medicine, engaging in adequate physical activity, and seeking health care from health providers have been revealed to have better health after 7 years.[44] Perceived social support can prevent the emergence of physiological issues that are suboptimal in a person, boost self-confidence, improve self-care, and positively impact physical, mental, and social circumstances. As a result, it improves the quality of life of such patients.[45]

Even though there is unsurmountable evidence that positive social support increases diabetes self-management and health outcomes, the literature reveals significant gaps in our understanding of how social support is currently involved in the self-management of DM in SSA, especially in Ghana. Therefore, this study aims to determine the role of social support and self-management on glycemic control of T2DM with complications.

2 | METHODS

2.1 | Study design

The study used a cross-sectional research design and was conducted from February to June 2021 at the Diabetic Center of a Komfo Anokye Teaching Hospital (KATH) in Ghana.

2.2 | Study setting

The Diabetic Center of the KATH was conveniently selected for the study. KATH, 1000-bed capacity is the second largest teaching hospital in Ghana and is situated in Kumasi, Ashanti region. It has many specialized facilities, medical equipment, and healthcare professionals experienced in diabetes care and research. KATH Diabetic Center serves as the referral facility for most hospitals in the middle and northern belts of Ghana and bordering countries such as Burkina Faso and Cote D'Ivoire for diabetes complications. The facility was selected on the basis that it was deemed to have the characteristics considered appropriate for the study and from which the needed data could be obtained.

2.3 | Participants

The target population was made up of clients with T2DM with complications in a healthcare facility. Participation included people living with T2DM with complications (retinopathy, nephropathy, foot ulceration, myocardial infarction, and stroke); aged 30–75 years old, who had available last HbA1c reading within 1 month before data collection and gave informed written consent for the study. The T2DM patients with complications who were not mentally fit to comprehend questions and those with serious complications unfit to answer the questionnaire were excluded from the study.

2.4 | Sample size

The Cochran formula was used to sample 399 participants from a sample frame of diabetes clients of the KATH. The sample size was rounded off to 440 to account for some individuals who were unresponsive and potential bias during data collection.

2.5 | Sampling method

The participants were sampled using a convenience sampling technique.

2.6 | Measure

A structured scale was used for the data collection. The validated scale was adapted and modified to suit the setting of the study after it was pretested on similar participants in another setting. The scale reported a Cronbach α of 0.85 after the pretest.

2.6.1 | Sociodemographic data

The participant's gender, age, marital status, educational background, religion, number of people in the household and occupation.

2.6.2 | HbA1c value

The state of health of participants was measured by the HbA1c value from participants' medical records in the health facility in the past 3-months. The HbA1c values were categorized as good glycemic control if HbA1c < 7% and poor glycemic control if HbA1c ≥ 7%.[46] The duration of the T2DM, diabetic complications, and health education were all assessed from the participant's medical record.

2.6.3 | Social support

Social support was measured with the Hensarling's Diabetes Family Support Scale (HDFSS).[47] The HDFSS is a 29-item scale and measures five dimensions: (a) participative support (2 items), (b) empathetic support (9 items) (c) encouragement (8 items), (d) facilitative support (5 items) and (e) others (5 items) and has a CVI of 1.00 and Cronbach's α of 0.96. Each item is rated on a 5-point scale: 0 = *Never*, 1 = *Hardly ever*, 2 = *Sometimes*, 3 = *Most of the time*, and 4 = *All the time*. Five items which were negatively worded were reverse-coded. The lowest total score possible for the HDFSS tested is zero (0) and the highest total score possible is 116. The closer the total HDFSS score is to the possible maximum score of 116, the greater the individual's social support is perceived to be satisfactory.[47] For the subscales, the mean score of participative support (>4.0), empathetic support (>18), encouragement (>16), facilitative support (>10), and others (>10) are considered to be satisfactory.

2.6.4 | Self-management

The participant's self-management was measured with the revised version of the Summary of Diabetes Self-Care Activities (SDSCA).[48] The SDSCA scale is made of 5 subscales [diet (5 items), exercise (2 items), blood glucose (2 items), foot care (5 items), and medication (2 items)] with a total of 16 items. Items were scored on a Likert scale of 0 to 7 and the sum scale score was derived as the overall measure of self-management (112) and higher scores represent better self-management among T2DM patients. Using a continuous scale ranging from 0 to 7, the numerical scoring of items was based on the number of days of the week that the behavior was performed; the item scores were averaged resulting in an overall score for each self-care activity with higher scores indicating the better performance of self-care activities. The CVI of this scale was 0.98 and had a Cronbach's α of 0.735.[49]

2.7 | Data collection

Permission was sought from the Hospital management to use the facility for the study. The researchers ensured that participation in the study was voluntary and they could withdraw from participation at any time without negative consequences. All information was kept confidential as there was no place on the actual instruments for persons to identify themselves. There was no hazard to participating in this research.

2.8 | Data analysis

The analysis was conducted using SPSS (version 25.0). Data were analyzed using both descriptive (frequencies, percentages, means, and standard deviations) and inferential statistics (Pearson moment product correlations, and binary logistic regression) for both demographic variables and dependent outcomes. The binary logistic regression was conducted using the forced entry method. The variable was formed after the summation of all the individual SDSCA scores, hence an overall mean SDSCA score was determined. The variable was then categorized into low or high self-management. Low self-management was considered if the mean score was less than the average SDSCA score and high self-management if the mean score was equal to or greater than the average SDSCA score. The variable was then coded using a 0 or 1 for the new categories and dummy coding was also done for the sociodemographic variables. The normality of the total scores for the HDFSS subscales and SDSCA was checked using Kolmogorov–Smirnov (K-S) and revealed a no-significant K-S which signifies normal distribution for all the scales ($p = 0.097$ and $p = 0.065$ respectively). The significance level was set at a p value of 0.05.

2.9 | Ethical considerations

To ensure the protection of participants, ethical clearance was obtained from the Committee on Human Research, KATH (*KATH IRB/AP/151/20*). The data collection procedure was explained to the participants and written informed consent was obtained from participants.

3 | RESULTS

3.1 | Sociodemographic characteristics data

A total of 440 participants with T2DM answered the questionnaire, however, only 400 participants fully answered the items accounting for a response rate of 90.9%. As shown in Table 1, the sociodemographic characteristics of the study showed that most participants ($n = 235$, 58.8%) were between the ages of 61 and 75 years. The majority of the participants were females (56.5%), married (50.2%), and had primary education (37.2%). Out of 400 T2DM participants with complications, 77.7% did not have good glycemic control as per the recommended cut-off. Also, many of the participants (40%) had lived with DM for about 5–10 years. The major complication experienced by participants was nephropathy (34.8%) while 71.3% indicated that health education on DM was received during their routine checkups with their service providers.

3.2 | Status of social support among participants with T2DM with complications

From Table 2, the overall mean social support score was 63.59 ± 9.023. There was a satisfactory mean score for the various subscales of empathetic (20.73 ± 4.422), encouragement (16.84 ± 3.258), and facilitative support (13.97 ± 2.976). The mean

TABLE 1 Sociodemographic characteristics of the study participants.

Variable	Frequency	Percentage
Age		
30–45 years	33	8.2
46–60 years	132	33.0
61–75 years	235	58.8
Gender		
Male	174	43.5
Female	226	56.5
Marital status		
Never married	45	11.3
Married	201	50.2
Separated/divorced	77	19.3
Widowed	77	19.3
Educational status		
No formal education	70	17.5
Primary education	149	37.2
Junior high school	51	12.8
Senior high school	72	18.0
College and above education	58	14.5
No. of people living with		
Lives alone	35	8.8
1 person	54	13.5
2 people	50	12.5
3 people	86	21.5
4 people	84	21.0
5 and above people	91	22.8
Occupation of participant		
Unemployed	69	17.3
Employed	194	48.5
Retired	80	20.0
Disabled, not able to work	57	14.2
HbA1c score		
<7% HbA1c	89	22.3
≥7% HbA1c	311	77.8
No. of years living with DM		
<5 years	105	26.3
5–10 years	160	40.0
>10 years	135	33.8
Complication of DM		
Retinopathy	96	24.0
Nephropathy	139	34.8
Foot ulceration	53	13.3
Myocardial infarction	54	13.5
Stroke	55	13.8
2 or more complications	3	0.8
Education on DM		
Yes	285	71.3
No	42	10.5
Not sure	73	18.3

TABLE 2 Mean scores of the subscales and overall social support scale ($n = 400$).

Subscales	Minimum	Maximum	Mean	SD
Participative	0	8	3.76	1.704
Empathetic	0	36	20.73	4.422
Encouragement	0	32	16.84	3.258
Facilitative	0	20	13.97	2.976
Others (n)	0	20	9.29	3.244
Social support score	0	116	63.59	9.023

TABLE 3 The mean score of the self-management scale ($N = 400$).

Instrument	Minimum	Maximum	Mean	SD
Diet control subscale	11	34	20.28	4.49
Exercise subscale	1	14	6.44	3.39
Blood sugar testing subscale	0	14	9.12	3.00
Foot care subscale	0	35	22.87	7.08
Medication adherence subscale	0	14	9.54	2.95
Self-management sum	24	102	72.81	14.55

score for participative support (3.76 ± 1.704) and other supports (9.29 ± 3.244) were however unsatisfactorily.

3.3 | Status of self-management of DM among participants

The overall mean self-management score was 72.81 ± 14.55 indicating good self-management practice. The status of self-management of DM is detailed in Table 3. All the subscales scored above the average mean

TABLE 4 Association between sociodemographic variable and glycemic control or management ($n = 400$).

Variable	Glycemic control		χ^2	p Value
	<7% HbA1c (%) 89 (22.3)	≥7% HbA1c (%) 311 (77.8)		
Age			21.465	**0.001****
30–45 years	15 (3.8)	18 (4.5)		
46–60 years	28 (7.0)	104 (26.0)		
61–75 years	46 (11.5)	189 (47.2)		
Gender			0.433	0.510
Male	36 (9)	138 (34.5)		
Female	53 (13.3)	173 (43.3)		
Marital status			11.705	**0.008****
Never married	15 (3.8)	30 (7.5)		
Married	50 (12.5)	151 (37.8)		
Separated/ divorced	17 (4.3)	60 (15.0)		
Widowed	7 (1.8)	70 (17.5)		
Educational status			11.609	0.201
No formal education	17 (4.3)	121 (30.3)		
Primary	20 (5.0)	39 (9.8)		
Junior high school	12 (3.0)	63 (15.8)		
Senior high school	9 (2.3)	88 (22.0)		
College and above	31 (7.8)	88 (22.0)		
No. of people living			35.877	**0.001****
alone	9 (2.3)	26 (6.5)		
With 1 person	21 (5.3)	33 (8.3)		
With 2 people	22 (5.5)	28 (7.0)		
With 3 people	18 (4.5)	68 (17.0)		
With 4 people	10 (2.5)	74 (18.5)		
With more than 5 people	9 (2.3)	82 (20.5)		
Occupation			10.889	**0.012****
Unemployed	23 (5.8)	46 (11.5)		
Employed	43 (10.8)	151 (37.8)		
Retired	18 (4.5)	62 (15.5)		
Disabled, no work	5 (1.3)	52 (13.0)		
No. of years living with DM			24.433	**0.001****
<5 years	38 (9.5)	67 (16.8)		
5–10 years	38 (9.5)	122 (30.5)		
>10 years	13 (3.3)	122 (30.5)		
Education on DM			0.897	0.638
Yes	60 (15.0)	225 (56.3)		
No	10 (2.5)	32 (8.0)		
Not sure	19 (4.8)	54 (13.5)		

Note: <7% HbA1c is good glycemic control, ≥7% HbA1c is poor glycemic control. ** significant at $p < 0.05$, figures in brackets are percentages and n denotes frequency.

Abbreviation: Hba1c, hemoglobin A1c/glycated hemoglobin.

score except "Exercise" which scored the lowest among the five subscales of SDSCA (6.44 ± 3.39).

3.4 | Association between sociodemographic variables and glycemic control of diabetes

χ^2 analysis as presented in Table 4 showed six sociodemographic variables; age ($\chi^2 = 21.465$, $p < 0.05$), marital status ($\chi^2 = 11.705$, $p < 0.05$), number of people living with ($\chi^2 = 35.877$, $p < 0.05$), education status ($\chi^2 = 11.609$, $p < 0.05$), occupation ($\chi^2 = 10.889$, $p = 0.05$), and number of years living with DM ($\chi^2 = 24.433$, $p < 0.05$) statistically associated with glycemic management (HbA1c) as detailed in Table 4. The majority of the participants with poor glycemic control are found within the age range of 61–75 years (47.2%) compared with patients aged 60 years and below (30.5%). Married individuals (12.5%, $p < 0.05$) had better glycemic control as compared with single (3.8%), separated (4.3%), and widowed (1.8%). Equally, participants who were employed (10.8%, $p < 0.05$) controlled their glycemic level better compared with those unemployed (5.8%, $p < 0.05$) and retired (4.5%, $p < 0.05$). Individuals who had lived with DM for <10 years (19.0%, $p < 0.001$) had better glycemic control than those above 10 years (3.3%, $p < 0.001$). Patients living with at least significant others (20.1%, $p < 0.05$) had better glycemic control as compared with those living alone (2.3%, $p < 0.05$).

3.5 | Correlation analysis between glycemic control (HbA1c), self-management, and social support

The bivariate analysis as detailed in Table 5 was used to determine the relationship between glycemic control, social support, and

TABLE 5 Association between HbA1c status and predictor variables (self-management variables and social support).

Scale	1	2	3	4	5	6	7	8
1. HbA1c	1							
2. Diet control	−0.010	1						
3. Exercise	−0.032	0.533**	1					
4. Blood sugar test	−0.010	0.496**	0.228**	1				
5. Foot care	0.058	−0.054	−0.151**	0.282**	1			
6. Medication	0.116*	0.429**	−0.001	0.501**	0.395**	1		
7. Social support	0.042	0.221**	0.034	0.180**	0.049	0.187**	0.149**	1

Note: Correlation is significant at the 0.05 level* and 0.01 level** (two-tailed). Good glycemic control (Hba1c < 7), $n = 89$, poor glycemic control (Hba1c ≥ 7), $n = 311$.

Abbreviation: Hba1c, hemoglobin A1c/glycated hemoglobin.

self-management among diabetic patients. Pearson correlation coefficient indicated a statistically significant weak positive correlation between social support and self-management ($r = 0.149$, $p < 0.05$). Furthermore, there was a weak positive correlation between social support and diet control ($r = 0.221$, $p < 0.05$), blood sugar testing ($r = 0.180$, $p < 0.05$), and medication adherence ($r = 0.187$, $p < 0.05$) subscales. The analysis further showed a significant correlation between medication adherence and glycemic control (r = 0.116, $p < 0.05$). There was no significant correlation between HbAc1 and other self-management subscales and the social support scale.

3.6 | Relationship between sociodemographic factors and self-management variables

The analysis as presented in Table 6 revealed that female DM participants were less likely to have low DM self-management concerning T2DM compared with their male counterparts [OR = 0.601, 95% CI: (0.373–0.968), $p < 0.05$]. Also, participants with primary education [OR = 0.36, 95% CI: (= 0.16–0.809), $p < 0.05$] and college and above education [OR = 0.3, 95% CI: (0.148–0.608), $p < 0.05$] were likely to have DM self-management compared with those with no formal education. Similarly, participants who were living with DM for 5–10 years [OR = 0.499, 95% CI: (0.261–0.955), $p < 0.05$] were likely to have DM self-management compared with those living with the disease for less than 5 years. However, participants living with at least three persons (OR = 3.344, $p < 0.05$), were more likely to have low DM self-management compared with participants who are living alone.

4 | DISCUSSION

Globally, the prevalence of chronic and noncommunicable diseases is on the rise at an alarming rate and T2DM is becoming a common public health problem globally. The study aimed to provide insight into self-management practices among T2DM patients in Ghana and their relationship with glycemic control and social support. To reduce morbidity and mortality associated with DM and its consequences, it is important to practice good self-management techniques such as diet, exercise, medication adherence, and foot care. This can be assessed by looking at how well patients follow the treatment plan and deal with the behavioral change. All DM patients want to achieve optimal glycemic control, as does every healthcare professional.

Unsatisfactory HbA1c levels among participants as observed in the study are in contrast to the findings of Tekalegn et al.[50] which reported a high proportion of 80%. However, similar findings were observed in Jordan,[51] Ethiopia,[52,53] and Malaysia.[54] Poor glycemic control could be attributed to a lot of factors such as no adherence to medication, poor dietary control, inadequate exercise, poor blood glucose monitoring, and having additional comorbidities. Numerous studies have shown that poor self-management may be the leading cause of poor glycemic control.[54,55] Mere adherence to medication may not prevent comorbidities associated with diabetes hence a holistic approach is required to better control the glucose level.[56,57]

Moreover, good glycemic control among DM patients is seen in high-resourced countries like Japan[58] and Germany[59] which is suggestive of the high literacy rate and better knowledge about the disease. This trend is worrisome judging by the fact that T2DM is on the increase in Ghana as more people are becoming affluent coupled with the rapid change of lifestyle. Without adequate glycemic control, more money will be used on drugs/medications which may, in turn, lead to a high economic burden for the government and the populace at large.

According to Ahmad et al.,[54] Rothenbacher et al.,[60] and Yeung et al.,[61] younger aged patients are associated with poor glycemic control. This is similar to the study findings which revealed that older T2DM patients can achieve better glycemic control comparatively. Conversely, the finding is inconsistent with other previous findings.[50,62] The explanation for this could be adherence to medication, diet and the fact that after years of living with the disease, there is a high chance of mastering all the recommendations required to maintain good glycemic control.[63]

TABLE 6 Relationship between sociodemographic factors and self-management.

Variable	Category	B	S.E.	Wald	Sig.	OR	95% CI	
							Lower	Upper
Gender	Male	Ref						
	Female	−0.509	0.243	4.378	***0.036***	0.601	0.373	0.968
HbA1c	<7HbA1c	Ref						
	≥7 HbA1c	−0.321	0.301	1.132	0.287	0.726	0.402	1.31
Health education	No Ref							
	Yes	0.051	0.405	0.016	0.900	1.053	0.476	2.329
	Not sure	−0.413	0.309	1.779	0.182	0.662	0.361	1.214
Age	30–45 years	Ref						
	46–60 years	−0.369	0.318	1.341	0.247	0.692	0.371	1.291
	61–75 years	0.01	0.47	0	0.983	1.01	0.402	2.538
Marital status	Single	Ref						
	Married	0.704	0.451	2.435	0.119	2.022	0.835	4.897
	Divorced	−0.211	0.507	0.174	0.677	0.81	0.3	2.186
	Widowed	−0.927	0.615	2.271	0.132	0.396	0.119	1.321
Educational status	No education	Ref						
	Primary	−1.023	0.414	6.118	***0.013***	0.36	0.16	0.809
	Junior Education	−0.722	0.428	2.842	0.092	0.486	0.21	1.125
	Senior Education	−1.029	0.393	6.849	0.009	0.357	0.165	0.772
	Tertiary education	−1.203	0.36	11.181	***0.001***	0.3	0.148	0.608
Occupational status	Unemployed	Ref						
	Employed	−0.085	0.355	0.058	0.81	0.918	0.458	1.841
	Retired	0.709	0.497	2.034	0.154	2.031	0.767	5.38
	Disabled	−0.431	0.455	0.899	0.343	0.65	0.266	1.584
Years of living with diabetes	<5 years	Ref						
	5–10 years	−0.695	0.331	4.399	***0.036***	0.499	0.261	0.955
	>10 years	−0.249	0.402	0.383	0.536	0.78	0.354	1.716
No. people living	Alone	Ref						
	With one person	0.974	0.514	3.59	0.058	2.649	0.967	7.259
	With two people	0.486	0.539	0.813	0.367	1.627	0.565	4.682
	With three people	1.207	0.515	5.504	***0.019***	3.344	1.22	9.167
	With four people	1.18	0.511	5.331	***0.021***	3.255	1.195	8.863
	With five people	2.016	0.536	14.152	***0.001***	7.507	2.626	21.459
	Constant	0.921	0.617	2.231	0.135	2.512		

Appreciating the important role of social support can help in the incorporation of significant others as an integral part of the T2DM patient's care plan. By doing so, health education programs that focus solely on the patient or individual could be mitigated or limited. In this study, there was a positive relationship between social support and self-management practices among T2DM patients. The finding was in line with several studies that have shown that social support has a relationship with the self-management of T2DM patients.[64] This finding is supported by other studies which have also demonstrated that social support for T2DM patients influences their willingness to engage in self-management practices.[65,66]

It's been noted that T2DM patients who received support from family members showed better medication adherence compared with the control group.[67] Therefore, social support is

an integral approach to sustaining self-management behaviors and overcoming obstacles among T2DM patients. In the African context where families live together, the implementation of the approach will be very feasible and achievable. The family bond is very strong where families share and help those underprivileged to fulfill their daily needs or tasks, especially when in a distressful situation like an ailment as supported by Lee et al.[12] and Mohebi et al.[27] The importance of family involvement in T2DM self-management has been shown across patients from different cultural and ethnic minority groups.[68]

It is widely acknowledged that proper management of T2DM serves as the cornerstone of averting long-term complications and also improving the quality of life among people with type 2 diabetes. However, effective T2DM management is also widely acknowledged as a challenge for both patients and their health service providers.[69] This assertion is supported by studies on T2DM self-management and glycemic control among individuals with T2DM in China that less than 40% of Chinese patients with T2DM have achieved the target goal, and only 9.2%–16.7% of them perform self-management behaviors adequately.[70,71] The results of the present study demonstrated good self-management on T2DM similar to the findings in Solomons Island[72] and the USA.[73] There was, however contrary finding of similar studies globally.[74,75] This reason for the high level of self-management in this study could be attributed to the level of adherence to recommendations issued by health care providers and the potential au fait with the condition and the management required by participants who had lived with the condition for 5 years or more.[76]

Furthermore, it is been established that participants who are given routine health education engaged in higher self-management of DM compared with those who did not. This finding was supported by Chrvala et al., who recognized knowledge as an essential ingredient or factor for successful self-management of diabetes.[77] Van der Heide et al.[78] likewise discovered that inadequate health literacy was linked with less diabetes knowledge, higher glycated hemoglobin levels, reduced glucose self-control, and less physical activity. One of the fundamental objectives of T2DM self-management is to improve well-being or health status; Emery et al.[79] observed the presence of comorbidities was seen as a factor that can influence self-management. The stress associated with coping with double conditions can affect T2DM self-management. Emotional issues can disrupt daily management and metabolic control which may result in inadequate T2DM self-management and poor outcome of glycemic control. The finding of this study was congruent with this observation.

Glycemic control is noted to be influenced by medication adherence. Similarly, it is been recommended that strict medication adherence, regular blood monitoring, and quitting smoking help in achieving good glycemic control.[54] Glycemic control which is not influenced in any way by social support could be related to the manner and time information on glycemic control was extracted for the individual patients.

5 | LIMITATIONS

The use of the cross-sectional study approach limited the ability to make a causal inference, future research will consider a longitudinal research approach to ascertain the role of social support and self-management in the control of T2DM. The use of a self-administered questionnaire or self-report to assess activities related to T2DM care or management and adherence to recommendations by healthcare providers make the findings liable to bias and recall bias. Although, it is a standard practice to use patients' HbA1c within the past 3 months as an indicator of glycemic control, ideally, glycemic control should have been taken during the data collection process to align with time and uniformity across the study participants. The use of the convenience sampling technique undermines the ability of the researchers to generalize the findings, however, the approach was simple to implement and efficient in recruiting the participants.

6 | CONCLUSION

Focused health education programs should be incorporated into patients' care plans which may be particularly relevant for patients with T2DM and will contribute to positive physiological and psychological outcomes. Furthermore, a more robust monitoring and follow-up scheme should be scaled up or instituted for patients with diabetes. Healthcare professionals should continue to encourage diabetes education and promote counseling on self-monitoring as recommended. Also, the program on physical activities should be strengthened or incorporated into the routine care issued at the facility. Healthcare workers should encourage patients to involve family members and significant others in their diabetes management plan.

AUTHOR CONTRIBUTIONS

Frank Amankwah Adu: Conceptualization; data curation; formal analysis; writing—original draft; writing—review and editing. **Collins Atta Poku**: Conceptualization; data curation; formal analysis; writing—original draft; writing—review and editing. **Amanda Parko Adu**: Conceptualization; formal analysis; writing—review and editing. **Lydia Boampong Owusu**: Data curation; writing—original draft; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

All data generated during the study are included in the article and can also be requested from the corresponding author.

TRANSPARENCY STATEMENT

The corresponding author Collins Atta Poku affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

ORCID

Collins Atta Poku http://orcid.org/0000-0002-5065-3048

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