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Self-Care Practices and Drivers of Anti-Diabetic Type 2 Medication Non-Compliance among Patients Accessing Healthcare at a Health Facility in Ghana

Maxwell Owusu Peprah [a*], Wisdom Djange Ogbordjor [b], Mark Danquah [c], Hopeson Nimo Yeboah [b], Barbara Kuusangna Irenchebe Anchirinah [d] and Emmanuel Kwadwo Adomako [e]

[a] Presbyterian Nursing and Mid-wifery Training College, Dormaa Ahenkro, Ghana.
[b] Laboratory Department, Volta River Authority Hospital, Ghana.
[c] Sunyani Technical University, Ghana.
[d] Kwatire Polyclinic, Sunyani, Ghana.
[e] Laboratory Department, Dormaa Presbyterian Hospital, Ghana.

Authors' contributions

This work was carried out in collaboration among all authors. Authors MOP and WDO developed the idea for the study and collected data. Authors MOP and MD analysed the data. Author MOP drafted the manuscripts. Authors HNY, BKIA and EKA reviewed the manuscripts. All authors read and approved the final manuscript.

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**Corresponding author: E-mail: maxop1985@yahoo.com;*

ABSTRACT

Background: Diabetes mellitus is a metabolic chronic disease affecting a majority of adults with associated complications. The non-compliance to the anti-diabetic medication has become a global challenge to achieving optimal glucose control among Diabetes Type 2 patients. This study, therefore, sought to determine the self-care practices and drivers of anti-diabetic type 2 medication non-compliance among patients accessing health care at Volta River Authority Hospital in Akosombo of Ghana.

Methods: A quantitative study and descriptive cross-sectional design employed a simple random sampling technique to recruit 220 diabetes type 2 patients by administering a structured questionnaire face to face to gather data. Data were analysed with the help of Stata 16. A descriptive and inferential statistic was conducted to determine the relationship between the dependent and independent variables at a 95% confidence interval and a p-value of less than 0.05 was considered statically significant.

Results: The study found that non-adherence to anti-diabetic medication was 45.5%. Most of the participants had inadequate (52.3%) self-care practices. Age of participants (40-49) years [p=0.0001], Female [p=0.004] significantly influenced non-compliance. Being Single [p=0.001] and presence of comorbidity [p=0.001] also associated with medication non-compliance.

Conclusion: The study concluded that a significant proportion of diabetes type 2 patients do not comply with anti-diabetic medication and this was influenced by inadequate self-care practices, age, female, comorbidity and being single. The study recommended the intensification of awareness creation on complications of non-complying to anti-diabetic medication and education on self-care practices through mass media. Further studies are required to identify the possible predictors of inadequate self-care practices that influence anti-diabetic medication non-compliance.

Keywords: Self-care; diabetes type 2; medication; non-compliance; volta river authority hospital; Ghana.

1. INTRODUCTION

Diabetes mellitus comes into several forms, each with its own set of symptoms [1–3], which affects a sizable portion of the global population [4]. The two major forms of diabetes that are most commonly known are type 1 diabetes (insulin-dependent diabetes mellitus) and type 2 diabetes (non-insulin-dependent diabetes mellitus). Type 1 diabetes is caused by the loss of beta cells in the pancreatic islets of Langerhans, while Type 2 diabetes is brought on by insulin resistance owing to a lack of insulin receptors [2,5]. Diabetes type 2 is linked to the emergence of insulin resistance and hyperglycemia, which together affect the ability of numerous body organs and physiological systems to operate abnormally [6]. Diabetes has been one of the top four non-communicable diseases on the United Nations' list of chronic metabolic illnesses [2]. Contributing factors such as ageing, fast urbanization, and a growing obesogenic environment, among other genetic and lifestyle-related factors have all contributed to an increase in diabetes type 2 prevalence over decades [7,8]. As life expectancy increased, so has the prevalence of non-communicable illnesses including diabetes also on the rise [9].

By 2045, it is projected that about 700 million individuals will develop diabetes worldwide and a 51% rise from today's 463 million cases as a result of anti-diabetic medication non-compliance [10]. As a result, an estimated 4.6 million people die yearly from diabetes, contributing to the top ten causes of disability and mortality globally [5]. Diabetes affects sixteen million people in Sub-Saharan Africa and by 2045, about 41 million people are projected to also develop diabetes which could affect the rate of non-compliance to anti-diabetic medication hence a majority of diabetics experience severe complications which affect daily economic activities [11]. The most prevalent and possibly acute complication of diabetes, diabetic ketoacidosis, is quickly turning into a life-threatening illness. Diabetic ketoacidosis has been linked to uncontrolled diabetes, which increases the risk of neurological morbidity and death. This association is mostly explained by hyperglycemia, ketonemia, dehydration, weight loss, polyuria, polydipsia, vomiting, weakness, and changes in mental state are among the symptoms that patients with diabetic ketoacidosis experience [12]. Therefore diabetes as a chronic illness requires long-term management which defines medication compliance as the degree of conformity between

a conduct and a medical prescription [13,14], while medication non-compliance is common internationally, making diabetes management problematic [13].

To manage and control type 2 diabetes it is required that, lifestyle changes, such as increasing physical activity, losing weight, controlling one's diet, quitting smoking, and adhering to pharmaceutical medications to improve metabolism are necessary [15]. Again, behaviour changes are a critical step in the prevention and treatment of disease. The commitments to changing behaviour to prevent the development of complications requires self-care practices [16]. These care practices are viewed as evolutionary process of growing knowledge and awareness as a result of learning to survive the complex nature of type 2 diabetes in a social environment [17]. Therefore self-care practices which is seen as a corner stone of diabetes care is highly important especially during diabetes treatment [17]. However, it is unquestionably that, the way patients adapt their lifestyle to new circumstances by adhering to medication is a determinant of whether or not treatment will be successful in reducing complications that lead to increased morbidity and mortality associated with diabetes [15].

In Ghana, diabetes accounts for 2.5% of all Ghanaian fatalities as a result of poor glycemic control [18], contributing to a significant cause of diabetic foot ulcers which has affected most economic activities of diabetic patients [19]. In addition, about 66.5% of diabetic patients in Ghana do not comply with their medication prescription as prescribed making it difficult for glycemic control [30]. A critical look of literature reviewed have established several predictors of anti-diabetic medication non-compliance, however, no study has been found to hypothesized self-care practices and medication non-compliance. Besides this there is paucity of data on factors that influences anti-diabetic medication non-compliance in the Akosombo Volta River Authority Hospital, making Physicians and other healthcare practitioners encounter considerable hurdles in managing patients with diabetes type 2. This study therefore aimed at determining the self-care practices and drivers of anti-diabetic type 2 medication non-compliance among patients accessing healthcare in the Volta River Authority Hospital of Ghana.

2. MATERIALS AND METHODS

2.1 Study Design

This was a quantitative study that employed a descriptive cross-sectional survey (Health facility-based) to assess the self-care practices and the factors that influences anti-diabetic type 2 medication non-compliance among patients at Volta River Authority Hospital in Ghana.

2.2 Study Population

The study included diabetes type 2 patients who were certified by a qualified clinician to be type 2 diabetic in their health record and received anti-diabetic medications at the hospital and also residents of the district. The study included diabetic patients who had been diagnosed with diabetes type 2, above 18 years and had consented to receive medication at the facility. The study excluded participants who were critically ill, unconscious, mentally challenged and unwilling to participate in the study.

2.3 Sample Size

The study employed Yamane formula $n = \frac{N}{1+N(e)^2}$ in estimating the required sample size of 220 taking into consideration a 10% unresponsive rate.

2.4 Sampling Technique

To ensure every eligible participant had an equal chance of being recruited, hence reducing selection bias a simple random sampling technique was employed in recruiting qualified participants.

2.5 Data Collection Tool and Technique

Data were gathered using a structured questionnaire. The questionnaire's design was based on the objectives of the study. The questionnaire was made up of three sections: Section (A) Sociodemographic Information This component gathered data on the demographics of the patients, such as their sex, age, marital status, and level of education, religion, employment, place of residence, family size, and history of diabetes in the family. Section (B): Comprised eleven questions that measured respondents' non-adherence to anti-diabetic medication, which was used to gauge the severity of non-adherence. Self-care habits and

anti-diabetic medication adherence, Section (C) was made up of ten questions which were used to gather information on the self-care behaviours that influence medication non-adherence. The investigator and two research assistants, who had received sufficient training in the overall study carried out and the data collection procedures. To preserve privacy and anonymity, each respondent was questioned face-to-face independently. Patients who could read were helped to self-administer, and those who couldn't be helped by having the questionnaire translated into the local dialect (Ashanti Twi and English). The data collection process was for four weeks and ended when the required sample size was met.

2.6 Data Management and Analysis

Questionnaires after being collected were thoroughly checked through to ensure all questions were accurately answered and errors corrected to ensure completion before entering them into the Stata Version 16 for rigorous data analysis. Data were coded and entered into the Stata software. Descriptive statistics were conducted at the Univariate and data was presented in frequencies using tables and graphs. Means and standard deviation were conducted for continuous variables that were normally distributed. A paired sample T-test was employed to test the hypothesis at a 95% confidence level. Inferential statistics were conducted to establish the association between the dependent and the independent variables at a 95% confidence interval and a p-value <0.05 was considered statistically significant.

3. RESULTS

The study recruited 220 participants and there was a 100% response rate. The mean age of participants was 59±9 (29-75) years. About 78 (35.5%) of the participants were between the ages 60-69 years, 73(33.2%) were between 50-59 years, and 33(15.0%) were aged 70-79 years. Most 160 (72.7%) of the participants were females whilst 60(27.3%) were males. About 139(63.2%) of the participants were married, 48(21.8%) were single whilst 33(15.0%) were widowed. About 114(51.8%) of the participants resided in rural areas whilst 106(48.2%) lived in Peri-urban settings. Concerning participants level of education, 82(37.3%), 82(37.3%) had attained basic and secondary education respectively whilst 35(15.9%) had tertiary education. With regard to participants' years of being diagnosed with diabetes, 123(55.9%) had been diagnosed with diabetes for more than six years, 66(30.0%) for four to six years, and 30(13.6%) for a period of one to three years. Most 152(69.1%) of the participants were unemployed, 55(25.0%) were employed whilst 13(5.9%) were retirees. The majority 202(91.8%) of the participants had active health insurance, 12(5.5%) were present but inactive whilst 6(2.7%) had not registered the health insurance. Most 145(66.0%) of the participants had a family history of diabetes whilst 75(34.5) had no family history of diabetes. Most 182(82.7%) of the participants indicated they had comorbidities whilst 38(17.3%) said otherwise. In addition, about 90(40.9%) of participants had diabetes complications whilst 130(59.1%) indicated the presence of no diabetic complications. Most 123(55.9%) of the participants practice home management of diabetes control whilst 97(44.1%) do not. About 118(53.6%) of participants did not know diabetes management whilst 102(46.4%) knew about diabetes management. Most 189(85.9%) of the participants do not consume alcohol whilst 31(14.1%) do take in alcoholic drinks. The majority 211(95.9%) of the participants do not smoke or use tobacco, whilst 9 (4.1%) indicated otherwise (Table 1).

About 120(54.5%) of the participants comply with anti-diabetic medication whilst 100(45.5%) do not comply with anti-diabetic medication (Fig. 1).

Table 1. Socio-demographic characteristics of participants

Variable	Category	Frequency	Percentage (%)
Age (years)	59±9		
	29-39	7	3.2
	40-49	29	13.2
	50-59	73	33.2
	60-69	78	35.5
	70-79	33	15.0
Sex			

Variable	Category	Frequency	Percentage (%)
	Male	60	27.3
	Female	160	72.7
Marital status			
	Married	139	63.2
	Single	48	21.8
	Widow	33	15.0
Residency			
	Rural	114	51.8
	Peri-urban	106	48.2
Religion			
	Christian	211	95.9
	Islamic	9	4.1
Education			
	Non-formal education	21	9.5
	Basic education	82	37.3
	Secondary education	82	37.3
	Tertiary education	35	15.9
Years of diagnosis			
	< 1year	1	0.5
	2-3 years	30	13.6
	4-6 Years	66	30.0
	>6 years	123	55.9
Employment status			
	Employed	55	25.0
	Unemployed	152	69.1
	Retiree	13	5.9
Health insurance			
	Uninsured	6	2.7
	Insured and active	202	91.8
	Insured but inactive	12	5.5
Family history			
	Yes	145	66.0
	No	75	34.0
Comorbidity			
	Yes	182	82.7
	No	38	17.3
Diabetes complication			
	Yes	90	40.1
	No	130	59.1
Home base management of diabetes			
	Yes	123	55.9
	No	97	44.1
Knowledge of diabetes management			
	Yes	102	46.4
	No	118	53.6
Alcohol consumption			
	Yes	31	14.1
	No	189	85.9
Tobacco use or smoking			
	Yes	9	4.1
	No	211	95.9

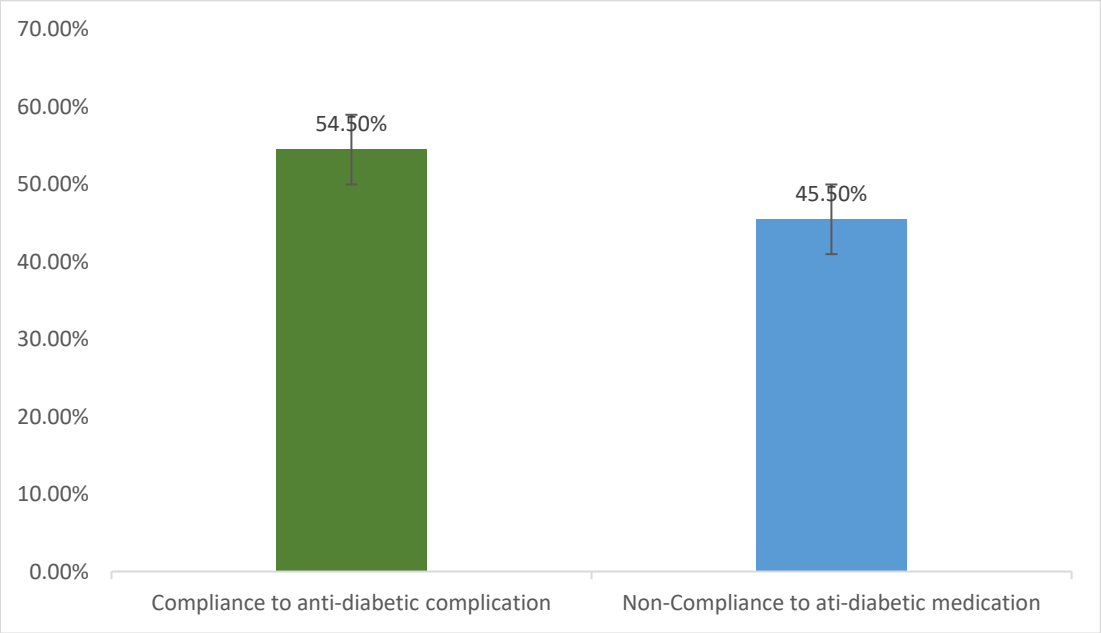

Fig. 1. Distribution of anti-diabetic medication of participants

About 140(63.6) of the participants agreed of visiting the hospital regularly per the doctor's appointment whilst 80(36.4) were uncertain. About 128(58.2%) everyday take their meals regularly whilst 92(41.8%) were uncertain. Most 137 (62.3%) of the participants were uncertain about eating a well-balanced diet whilst 83(37.7%) agreed to eat a well-balanced diet. Most 154(70.0%) of the participants were uncertain of eating foods containing fibre, fruits and vegetables whilst 83(37.7%) eat foods with fibre and vegetables. About 111(50.5%) of the participants agreed on setting the limit to sugar and processed foods whilst 107(48.6%) were undecided. Most 173(78.6%) were uncertain of doing a self-blood glucose test frequently whilst 47(21.4%) indicated engaging in self-blood glucose checks frequently. About 169(76.8%) were unsure of controlling meals and exercising to burn calories every day whilst 51(23.2%) agreed to controlling meals and exercising every day to burn calories. Most 148(67.3%) were unsure of carrying foods like sweet drinks just in case of low blood glucose whilst 71(32.3%) were sure of carrying foods such as sweet drinks in case of hypoglycemia. Most 156 (70.9%) indicated there were uncertain about maintaining weight by measuring their weight every day whilst 64(29.1%) agreed to maintain weight by their regular weight measurement. About 131(59.5%) of the participants were uncertain about acquiring information on diabetes control whilst 89(40.5%) agreed to solicit information on diabetes control (Table 2).

About 116(52.7%) of the participants were not engaged in practising diabetic self-care practices whilst 104 (47.3%) were involved in practising diabetes self-care aside from their medication (Fig. 2).

3.1 Hypothesis Testing

A Paired sample T-Test failed to reveal a statistically reliable relationship between non-compliance to anti-diabetic medication [Mean=1.9014, Standard deviation=0.47] and [Diabetes Self –Care Practices =2.385, standard Deviation=0.261], T (219) =13.577, P=0.0001 at alpha level=0.05]. This means that the study failed to reject the alternate hypothesis that diabetes self-care practices do not influence medication non-compliance and reject the null hypothesis, that diabetes self-care practices influence anti-diabetic medication non-compliance.

Pearson Chi-square set at 95%confidence interval was applied to determine the association between the dependent variable and the socio-demographic characteristics of participants. Participants' age was 10.58 times associated with anti-diabetic medication non-compliance (X^2 =10.58, P=0.032) and association was statistically significant. Also, participants' sex was

10.63 times associated with medication non-compliance and such as significant statistically (X^2 =10.63, P=0.001). The marital status of participants was 34.66 times associated with medication non-compliance (X^2 =34.66, P=0.0001) and was significant. Statistically, the insurance status of participants established an 8.46 times association with medication non-compliance (X^2 =8.46, P=0.015). In addition, participants' history of diabetes was 5.10 times significantly associated with medication non-compliance (X^2 =5.10, P=0.024), whilst diabetes with comorbidity was found to be 7.66 times associated with medication non-compliance (X^2 =7.66, P=0.006). The participants with diabetic complications were also found to be statistically associated with medication non-compliance. More so, a significant statistical association was established between participants' consumption of alcohol and medication non-compliance, however, the education of participants was 6 times associated with medication non-compliance but such was not significantly associated (Table 3).

Table 2. Distribution of diabetes self-care practices among participants

	Uncertain n(%)	Disagree n(%)	Agree n(%)	Mean SD
I visit the hospital regularly according to doctor's appointments.	80(36.4)	0(0.0)	140(63.6)	2.64±0.48
I take meals regularly every day	92(41.8)	0(0.0)	128(58.2)	2.58±0.49
I eat a well-balanced diet using a list of food exchange	137(62.3)	0(0.0)	83(37.7)	2.37±0.49
I take food containing dietary fibre like grain, vegetables, fruits	154(70.0)	0(0.0)	83(37.7)	2.30±0.46
I set a limit on taking sugar and processed foods	107(48.6)	2(0.9)	111(50.5)	2.49±0.52
I do a self-blood sugar test more frequently	173(78.6)	0(0.0)	47(21.4)	2.21±0.41
I control the size of meals and exercise to burn excess calories	169(76.8)	0(0.0)	51(23.2)	2.23±0.42
I carry food like sweet drinks just in case of hypoglycemia	148(67.3)	1(0.5)	71(32.3)	2.31±0.48
I try to maintain weight by measuring my weight regularly	156(70.9)	0(0.0)	64(29.1)	2.29±0.46
I try to acquire information on diabetes control by attending diabetes medication	131(59.5)	0(0.0)	89(40.5)	2.40±0.49

SD: Standard deviation

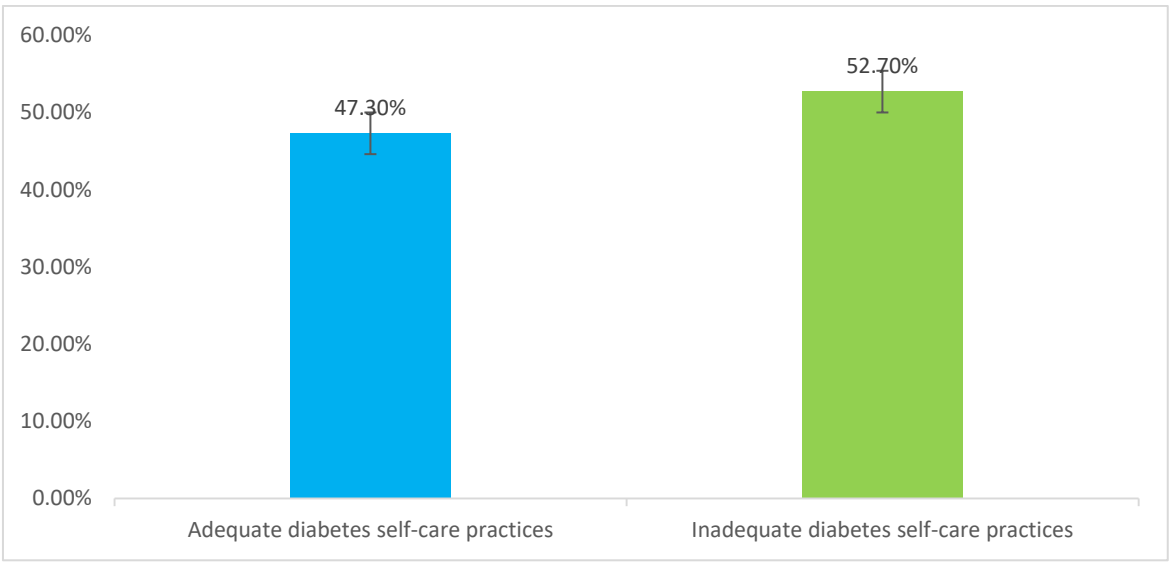

Fig. 2. Diabetes self-care practices among participants on anti-diabetic medication

Table 3. Association between socio-demographic characteristics and anti-diabetic medication

Variable	Anti-diabetic medication		X^2(P-value)
	Compliance n (%)	Non-Compliance n (%)	
Age (years)			10.58(0.032)*
29-39	3(2.5)	4(4.0)	
40-49	23(19.2)	6(6.0)	
50-59	41(34.2)	32(32.0)	
60-69	35(29.2)	43(43.0)	
70-79	18(15.0)	15(15.0)	
Sex			10.63(.0001)*
Male	22(18.3)	38(38.0)	
Female	98(81.7)	62(62.0)	
Marital status			34.66(.0001)*
Married	80(66.7)	59(59.0)	
Single	11(9.2)	37(37.0)	
Widow	29(24.2)	4(4.0)	
Residency			2.49(0.115)
Rural	52(43.3)	54(54.0)	
Peri-urban	68(56.7)	46(46.0)	
Religion			1.76(0.192)
Christian	117(97.5)	94(94.0)	
Islam	3(2.5)	6(6.0)	
Education			6.05(0.109)
Non-formal education	8(6.7)	13(13.0)	
Basic education	49(40.8)	33(33.0)	
Secondary education	40(33.3)	42(42.0)	
Tertiary education	23(19.2)	12(12.0)	
Years of diagnosis of diabetes			1.16(0.076)
<1 year	1(0.8)	0(0.0)	
1-3 years	17(14.2)	13(13.0)	
4-6 years	34(28.3)	32(32.0)	
>6 years	68(56.7)	55(55.0)	
Employment			2.61(0.271)
Employed	35(29.2)	20(20.0)	
Unemployed	79(65.8)	73(73.0)	
Retiree	6(5.0)	7(7.0)	
Health insurance			8.46(0.015)*
Not insured	0(0.0)	6(6.0)	
Insured and active	115(95.8)	87(87.0)	
Insured but inactive	5(4.2(	7(7.0)	
Family History			5.10(0.024)*
Yes	87(72.5)	58(58.0)	
No	33(27.5)	42(42.0)	
Comorbidity			7.66(0.006)*
Yes	107(89.2)	75(75.0)	
No	13(10.8)	25(25.0)	
Diabetes complications			11.08(0.001)*
Yes	37(38.0)	53(53.0)	
No	83(69.2)	47(47)	
Diabetes home management			2.76(0.097)
Yes	61(50.8)	62(62.0)	
No	59(49.2)	38(38.0)	

Variable	Anti-diabetic medication		X^2(P-value)
Knowledge of diabetes management			2.99(0.084)
Yes	62(51.7)	40(40.0)	
No	58(48.3)	60(60.0)	
Alcohol consumption			25.24(.0001)*
Yes	4(3.3)	27(27.0)	
No	116(96.7)	73(73.0)	
Tobacco use/smoking			1.4(0.095)
Yes	5(4.2)	4(4.0)	
No	115(95.8)	96(96.0)	

**(p-value<0.05), X^2 (Chi-square)*

Table 4. Relationship between sociodemographic factors and medication non-compliance

Variable	COR(95%CI)	P-Value	AOR(95%CI)	P-Value
Age (years)				
29-39	0.196(0.034-1.121)	0.067	0.332(0.030-3.664)	0.37
40-49	0.585(0.122-2.804)	0.503	0.024(0.003-0.178)	0.0001*
50-59	0.921(0.193-4.394)	0.918	1.165(0.362-3.746)	0.798
60-69	0.625(0.120-3.242)	0.576	1.883(0.559-5.920)	0.279
70-79	Reference		Reference	
Sex				
Male	Reference		Reference	
Female	0.366(0.198-0.677)	0.001*	0.224(0.082-0.612)	0.004*
Marital status				
Married	5.347(1.783-16.033)	0.003*	3.05(0.879-10.610)	0.079
Single	24.0(7.034-84.55)	0.0001*	13(6.399-16.616)	0.001*
Widow	Reference		Reference	
Family history				
Yes	0.524(0.298-0.921)	0.025*	0.434(0.183-1.029)	0.058
No	Reference		Reference	
Comorbidity present				
Yes	0.364(0.175-0.758)	0.007*	0.156(0.053-0.458)	0.001*
No	Reference		Reference	
Complications present				
Yes	2.530(1.457-4.392)	0.001*	1.230(0.565-1.18)	0.599
No	Reference		Reference	
Alcohol consumption				
Yes	10.726(3.606-31.90)	0.0001*	2.514(0.565-11.188)	0.226
No	Reference		Reference	

**: p-value <0.05, statistically significant, COR: Crude odds ratio, AOR: Adjusted odds ratio, CI: Confidence interval*

At the Pearson Chi-square (Bivariate model) set at a 95% confidence level, all significant variables were included in the multivariate model to control for confounders and to determine the odds of a relationship between the dependent and the independent variables. After controlling for confounding variables in the multivariate model, participants whose ages fell between 40-49 years were less likely to non-comply to anti-diabetic medication and such a relationship was statistically significant [AOR=0.024 (95%CI=0.003-0.178), P=0.0001]. In addition, female participants had decreased odds of complying with anti-diabetic medication non-compliance and such association was significant statistically [AOR=0.244(95%CI=0.082-0.612), P=0.004]. Moreover, single participants were more likely to non-comply with anti-diabetic medication and such relationship was statistically significant in the multivariate model [AOR=13.0(95%CI=6.399-16.616), P=0.001]. Also, participants with comorbidities were less likely to non-comply with anti-diabetic medication non-compliance and such a

relationship was statistically significant [AOR=0.156 (95%CI=0.053-0.458), P=0.001].

4. DISCUSSION

To achieve optimal control of diabetes, patients compliance with their medication is very necessary [14]. This present study found that participants' compliance with anti-diabetic medication was 54.5% while that of non-compliance was estimated to be 45.5%. In addition, it was revealed that socio-demographic factors such as age (40-49) years, being female, single and not married and the presence of comorbidity indicated a significant relationship to participants' non-compliance to medication. Moreover, the study found that about 52.7% of the participants had inadequate self-care practices for managing diabetes compared to 47.3% of adequate self-care practices.

This current study found that the prevalence of anti-diabetic medication non-adherence was 45.5%. Comparing the outcome of this present study to a cross-sectional study conducted in China, it was discovered that, about 36.9% were non-complying with their anti-diabetic medication and as such does not support the study outcome [20]. It is also found that about 20% of diabetes type 2 patients do not comply with their anti-diabetic medication and this disagrees with this current study finding [20]. Additionally, the available body of knowledge had established that, about 41.3% of diabetes type 2 patients do not adhere to their prescribed medication. Though not the same as this current study finding but closer and as such support the outcome of this new study [21]. Again, evidence had indicated that anti-diabetic medication non-compliance was found to be 33.0% and this is not in line with the outcome of this present study [22].

A cross-sectional study conducted in Ethiopia indicated that about 72.0% of type 2 diabetes patients do not adhere to their medication which is higher than the prevalence of this study and as such do not agree with [23]. Moreover, a similar cross-sectional survey conducted in Ethiopia disclosed that non-adherence to anti-diabetic medication was 58.3% and this does not support present study outcome [24]. In Cameroun, it is reported by a cross-sectional study that, about 55.4% of type 2 diabetes patients do not comply with their medication and this does not agree with current study report [25]. Moreover, in Rwanda, the available evidence has indicated that about 53.5% of diabetes patients do not comply with their medication and as such has poor diabetes medication management. This also does not correlate well with the present findings [26]. Furtherance to the above, poor medication compliance of 49% had been recorded among diabetes patients in Tunisia and this fall in line with this study's findings [27]. A study by [28] also found about 50% of type diabetics not compling with their medication, and this correlates well with the findings of this present study. A descriptive cross-sectional study had indicated that about 84.5% of diabetic type 2 patients do adhere to their anti-diabetic therapy. This is inconsistency to the outcome of present study [29]. Similarly available evidence had established that about 66.5% of diabetic patients do not comply with their prescribed medication. This finding does not agree with this current research [30]. Moreover, according to the report of a systematic review and meta-analysis conducted in Ghana, it is indicated that anti-diabetic medication non-adherence stands between 35.6%- 97%. Comparing these findings to the present study, it could be noticed that the prevalence of 45.5% non-compliance to anti-diabetic medication falls within what is established by the systematic review report and as such correlates well with this study report [31].

A meta-analysis and systematic review conducted in Ethiopia also indicated that type 2 diabetes patients in Ethiopia had inadequate (49.9%) self-care practices which is lower than the outcome established in this recent study. As such findings of these two studies do not correlate with each other. What could have accounted for the differences could be ascribed to the study designs and the different sources of data used for the study [16]. Adding to the above, available knowledge had disclosed that, approximately, about 60.7% of diabetes type 2 patients practice good self-care management. However, the finding is higher than the outcome reported in this present study and as such does not fall in line with the current outcome [32]. In Ghana, a descriptive health facility-based cross-sectional study demonstrated that the majority of people with diabetes type 2 had good self-care practices such as good meal planning, intake of an appropriate amount of foods and good healthy eating habits. This finding does not also associate well with the outcome established for this present study [33].

This present study established that, non-compliance with type 2 anti-diabetic medication

is less likely to occur within the age group of 40-49 years. A study by [34] established that non-compliance with type 2 anti-diabetic medication is predominantly found among the young age group of below 30 years and as such finding does not support the outcome of current study. Additionally, it is also found in literature that, non-compliance to anti-diabetic medication is mostly associated with old age (40+) and this agrees with the outcome of this study [28]. Again, available literature had revealed that anti-diabetic medication non-adherence is ascribed to younger patients (20-30) years and this finding does not support the outcome of the current study [35]. Similarly, in a cross-sectional study conducted in Uganda, it was found that diabetes patients above the age of sixty years had an increased likelihood of non-complying to their anti-diabetic medication and comparing these findings to the outcome generated for this study it could be noticed that, the previous findings do not correlate well with the outcome of the new study [7].

With regard to the influence of sex on anti-diabetic medication non-compliance, this current study unearths that, females were less likely to non-comply with anti-diabetic medication. The available body of knowledge indicated that female type 2 diabetic patients were more likely to miss their anti-diabetic medication than men and such findings support the outcome of this study [10]. In China, it is found that females are more likely to non-adhere to anti-diabetic medication than men and this supports the outcome of this study [10]. Available evidence had also revealed that age and sex had a significant relationship to anti-diabetic medication non-adherence and this also supports the outcome of this current study [36]. In addition, it is reported by a cross-sectional survey conducted in Poland that, adults aged 65 years and above do not comply with their medication and therefore suffer complications and as such do not relate well [37].

In Ethiopia, it is found that a cross-sectional study had established a significant relationship between the presence of diabetic comorbidity and medication non-adherence. This finding agrees well with the outcome of this current study [36]. Similarly, studies by [20,29,36] demonstrated that factors such as age, sex, education and presence of comorbidities established a significant relationship to anti-diabetic medication. It was further revealed that participants above forty years of age significantly increase their medication non-adherence and this support the outcome of this current study.

When type 2 diabetes patients do not comply with their type 2 anti-diabetic medication, they begin to experience poor glycemic control with subsequent complications [24]. Complications such as the increased risk of cardiovascular diseases and renal damage are more common, hence leading to diabetes related mortalities [38]. Moreover, non-adherence to anti-diabetic therapy compromise the safety and effectiveness of treatment which has both direct and indirect cost on the individual and the healthcare system [36]. Again, increased and prolong non-adherence to medication contributes to the risk of blindness, kidney diseases, and delayed wound healing with subsequent lower limb amputation [38,39]. Aside from all these associated complications, available evidence had indicated that non-adherence to medication significantly contributes to nervous system damage (neuropathy) leading to the cerebrovascular accident (stroke), Gangrene and peripheral neuropathy with decreased sexual function [39].

5. CONCLUSION

This recent research sought to determine self-care practices and drivers of type 2 anti-diabetic medication non-compliance among patients accessing healthcare at the Volta River Authority Hospital, Ghana. The study concluded that close to half of the participants were not complying with their type 2 anti-diabetic medication regimen at the hospital and this has an effect on glycemic control subsequent to diabetic-related complications such as renal damage, retinopathy, and neuropathy among others. Additionally, it was concluded that diabetes self-care practices were inadequate. That is more than half the participants on medication at the hospital do not practice adequate self-care to manage their condition amidst their medication. Their inability to practice adequate self-care amidst medication has serious consequences on increasing their risk of diabetic-related complications and sometimes untimely death due to multiple organ failure as a result of poor glycemic control. Moreover, it was concluded that socio-demographic factors such as age group (40-49) years and being female were protective against diabetes complications resulting from non-compliance. However, the single and not married participants had an increased risk of non-complying with anti-diabetic medication at the facility. Again, the presence of diabetic

comorbidity was found to be protective against complications arising out of type 2 anti-diabetic medication non-adherence. In line with the conclusions drawn from the study, the following recommendations were made.

Healthcare authorities at the hospital should also embark on intensive education continuously on diabetes self-care practices that would help type 2 diabetic patients manage their condition amidst the anti-diabetic medication provided to them. Effective counselling and advice coupled with regular follow-up should be rendered to diabetic patients amidst the medications provided to them. The study is also recommended for further study to identify the factors that influence diabetes self-care practices at the hospital so that, a holistic view can be drawn to better comprehend the challenges of anti-diabetic medication non-compliance at the hospital.

CONSENT AND ETHICAL APPROVAL

Permission was sought from the authorities of the Hospital. Again an informed consent form was read and explained to participants to voluntarily agree to participate in the study. Participants were assured of confidentiality, anonymity, and privacy and made to understand that participation in the study was voluntary and that they can withdraw from the study at any time without affecting any services provided to them.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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