

Barriers to Adherence to Diet and Exercise Recommendation amongst Type 2 Diabetes Mellitus Patients

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Abstract

Diet modification and exercise require commitment to long term established behavioural change and are often very difficult. The study aimed at assessing the barriers to adherence to diet and exercise recommendations among Type 2 Diabetes Mellitus (DM) patients seeking healthcare at Agogo Presbyterian Hospital, Ghana. A sample size of 212 respondents aged ≥ 30 years who have been diagnosed of Type 2 DM for at least one year were sampled using stratified and simple random sampling techniques. The data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. The study revealed that rates of non-adherence were 34.9% and 19.3% for diet and exercise respectively. Reasons for exercise non-adherence included inadequate understanding about exercise (66.0%), perception that exercise could potentially exacerbate their illness (46.4%), being far away from home (16.5%) and busy schedule (15.5%), while the main reasons for non-adherence to diet were inadequate understanding about dietary recommendations (52.3%), eating outside home (32.4%), poor self-control (17.6%), financial constraints (14.9) and situation at home (12.1%). The study also found a strong positive correlation ($r=0.984^*$, $p<0.05$) between respondents' age and adherence to exercise recommendation. It is recommended that education on the type of exercise, time and duration of the exercise and the different food combinations for the Type 2 DM should be intensified in diabetic clinics.

Keywords: Aerobic, Barriers, Diabetes, Diet and Exercise, Adherence.

1. Introduction

Diabetes mellitus (DM) is one of the leading health problems among the non-communicable diseases, particularly in developing countries (International Diabetes Foundation ([IDF], 2014; Kep, Kritpracha & Thaniwattananon, 2013). Globally, IDF (2015) indicated that diabetes prevalence in 2014 stood at 387 million with about 77 percent of the people living in low income countries. In Africa, Piero, Nzaro and Njagi (2015), found that 22 million people are living with DM.

It was reported that in 2012, every 10 seconds, DM caused one death and an estimated 1.5 million deaths worldwide while 561,600 people were permanently disabled, and 6,458,400 experienced temporary disabilities (Singh *et al.*, 2015; World Health Organization [WHO], 2014). In addition, more than 80 percent of diabetes mellitus deaths occur in low and middle income countries (IDF, 2015; Zhu, Li & Fu, 2015).

Healthy dietary habits, regular physical activity and aerobic exercise help prevent or delay the onset of type 2 DM since such interventions improve and maintain glycaemic control (Wadden *et al.* 2004; WHO, 2011). Besides, Adherence to lifestyle modification recommendations can lessen the disease burden and reduce the morbidity and mortality associated with Type 2 DM complications.

More Ghanaians are becoming Diabetic as a result of eating more sugary and fatty foods with less exercise (Darkwa, 2011). Up to 80% of Type 2 DM is preventable by adapting to a healthy diet and increasing physical activity (Viswanathan, 2010). However, an estimated 60 percent of patients with Type 2 DM attending Agogo Presbyterian Hospital, reports with poor glycaemic control, despite regular education at the diabetic clinic (Agogo Presbyterian Hospital, 2016). Poor dietary habits and lack of exercise seem to be the major reasons for this state of poorly controlled glycaemia. This study was to assess the barriers to adherence to diet and exercise recommendations (DER) among Type 2 DM patients seeking healthcare at Presbyterian Hospital, Agogo, Ghana.

1.1 Materials and Methods

This study was a descriptive cross-sectional study aimed at assessing the barriers to adherence towards diet and exercise recommendations among Type 2 DM patients seeking healthcare at the Agogo Presbyterian Hospital and using a structured self-administered questionnaire. All individuals aged 30 years and above who have been diagnosed of Type 2 DM and on clinical care for at least one year seeking healthcare at the Agogo Presbyterian Hospital formed the study population. This targeted time limit was based on the assumption that after one year of being diagnosed of Type 2 DM, clients would have tried DER and encountered some barriers to adherence.

The Hospital was selected because it is a referral hospital. Besides, the population of people who seek

healthcare there belongs to different socio-economic status. The study employed stratified sampling technique in selecting the respondents using their gender. Separate lists of females and males were generated in each data collection session. Then random sampling was applied within the male and female subgroups to select each patient until a desired number was reached.

The total study population of type 2 DM reporting at the hospital was 475. Using Epi Info Version 7.1.5, StatCal, using an expected frequency of 50% and a worst acceptable rate of 5% at a confidence level of 95%, a sample size of 212 was used for the study. The number was recruited over a period of 4 successive weeks. This sample size of 212 is large enough to generalise the findings of this research to the entire type 2 DM population under study at the Hospital.

A structured questionnaire was used in this study because it could be administered to larger numbers of respondents concurrently, with uniform instructions and explanations. The respondents were able to complete the questionnaire in a confidential setting, thereby diminishing possible bias connected to researcher presence, and devoid of instant time constraints.

1.1.1 Statistical Analysis

The data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 and presented using descriptive and inferential statistics such as chi-square for association, Pearson's correlation coefficient and binomial logistic regression to indicate the relationship between socio-demographic variables of the respondents and their level of adherence to any form of diet and aerobic exercise recommendations, at a level of significance set at 5%.

1.1.2 Results and Discussion

Non-Adherence to Lifestyle

Association between socio-demographic variables and dietary adherence is shown in Table1. The study showed that, 34.9 percent (n=74) and almost half 45.8 percent (n=97) of the respondents were not adhering to diet and exercise recommendations, respectively. Non-adherence to exercise recommendation seems far more prevalent than diet non-adherence among the respondents sampled.

Table 1: Association between socio-demographic variables and dietary adherence

Demographics	Adhered to any form of dietary habit recommendation		P-value
	Yes (N=138) Frequency	No (N=74) Frequency	
Sex			
Female	75 (35.4%)	46 (21.7%)	0.137
Male	63 (29.7%)	28 (13.2%)	
Age			
30-39	6 (2.8%)	1 (0.5%)	0.184
40-49	24 (11.3%)	7 (3.3%)	
50-59	33 (15.6%)	16 (7.5%)	
60-69	31 (14.6%)	23 (10.8%)	
70-79	30 (14.2%)	17 (8.0%)	
≥80	14 (6.6%)	10 (4.7%)	
Income (GH¢)			
<150	69 (32.5%)	28 (13.2%)	0.043
151-300	23 (10.8%)	24 (11.3%)	
301-600	22 (10.4%)	12 (5.7%)	
601-900	16 (7.5%)	5 (2.4%)	
≥901	8 (3.8%)	5 (2.4%)	
Educational level			
Never	17 (8.0%)	29 (13.7%)	0.000
Basic	39 (18.4%)	22 (10.4%)	
Secondary	53 (25.0%)	14 (6.6%)	
Tertiary	29 (13.7%)	9 (4.2%)	

Source: Field Survey (2017)

Furthermore, the rates of non-adherence to diet and exercise in this study corroborate with studies by Cawood (2007) and Ganiyu, Mabuza, Malette, Govender and Ogunbanjo (2013) who found that rates of non-adherence to both diet and exercise recommendations were 40-50 percent and 37-52 percent respectively. However, rates of non-adherence of 34.9 percent in this study is lower than the 66 percent reported by Thomas *et al.* (2004); 52 percent found by Wanko *et al.* (2004); and the 63.5 percent found by Serour *et al.* (2007).

Using Pearson chi-square test to find the association between socio-demographic variables and dietary adherence, the study revealed that income level (p=0.043) and educational level (p=0.000) were statistically

significant to adherence to healthy dietary habits (Table 1), as those with higher income and educational levels tend to adhere better to healthy dietary habits. However, age ($p=0.184$) and sex ($p=0.137$) of the respondents were not statistically significant regarding adherence to dietary intake (Table 1). This finding is however parallel to the study by Kapor *et al.* (2008) which indicated that old age has significant association with compliance to lifestyle modification. Moreover, descriptively this study is contrary to the study by Crandall *et al.* (2006) which found that adherence to DER may vary significantly with age and could affect the effectiveness of diabetes prevention and management in older individuals.

Table 2 shows that adherence to exercise is significantly associated with the age of the respondents ($p=0.000$). There was however a decrease from 15.1 percent for the age groups of 60-69 years to 10.8 percent for 70-79 years and to 5.7 percent for those 80 years and above. Crandall *et al.* (2006) also reported that a programme of modest weight loss through moderate aerobic exercises and diet should be recommended for older individuals diagnosed with the disease. This study also agrees with the study by Cawood (2007) that adherence to DER is harder to maintain among elderly patients.

Table 2: Association between socio-demographics and exercise recommendations

Demographics	Adhered to any form of aerobic exercise recommendation		P-value
	Yes (N=115)	No (N=97)	
Age			
30-39	5 (2.4%)	2 (0.9%)	0.000
40-49	18 (8.5%)	13 (6.1%)	
50-59	25 (11.8%)	24 (11.3%)	
60-69	32 (15.1%)	22 (10.4%)	
70-79	23 (10.8%)	24 (11.3%)	
≥80	12 (5.7%)	12 (5.7%)	
Income (GH¢)			
<150	59 (27.8%)	38 (17.9%)	0.112
151-300	21 (9.9%)	26 (12.3%)	
301-600	16 (7.5%)	18 (8.5%)	
601-900	10 (4.7%)	11 (5.2%)	
≥901	9 (4.2%)	4 (1.9%)	
Educational level			
Never	3 (1.4%)	43 (20.3%)	0.395
Basic	32 (15.1%)	29 (13.7%)	
Secondary	54 (25.5%)	13 (6.1%)	
Tertiary	26 (12.3%)	12 (5.7%)	

Source: Field Survey (2017)

The finding also shows that only the educational level of the respondents and adherence to aerobic exercise was statistically significant ($p=0.000$). However, the educational level of the respondents did not translate into level of adherence as most respondents (25.5%) who had secondary education adhered to aerobic exercise than those who had basic education (15.1%), tertiary education (12.3%) and those who had no formal education (4.1%).

Pearson's correlation coefficient indicating the relationship between age of the respondents and their level of adherence to any form of aerobic exercise, $r = 0.984^*$, $p < 0.05$ is shown in Table 3. It shows that there was a strong positive correlation between respondents' age and adherence to exercise recommendation.

Table 3: Correlation of age of the respondent and level of adherence to exercise

Variable	Age
	1.000
Adherence to exercise recommendation	0.984

Source: Field Survey (2017)

Table 4 represents regression analysis of relationship between level of adherence and age of the respondents. The regression coefficient was 0.968 which means that an increase in age of the respondent will increase adherence to aerobic recommendation by 96.8 percent.

Table 4: Regression analysis between adherence to exercise recommendation and age

Variable	B	SEB	BETA
Adherence to any form of exercise recommendation	114	0.013	0.984
Constant	3.201	0.117	
R-squared=0.968		F=2.742	

Source: Field Survey (2017)

Reasons for Non-adherence to Lifestyle Modification Recommendations

The study revealed that rates of non-adherence were 34.9% and 19.3% for diet and exercise respectively (Table 5). Besides, findings showed that 85.4% and 57.5% of the respondents respectively perceived diet and exercise as important to achieve and maintain good glycaemic control (Table 5). This study showed a higher level of positive self-perception of diet (85.4%). This figure is higher when compared with that (66.0%) reported by Thomas *et al.* (2004) and the 69.1% reported by Serour *et al.* (2007) but lower than the 95.2% found by Ganiyu *et al.* (2013) as the number of respondents who have positive self-perception of adherence to diet and exercise recommendation. The variations probably might be due to variation in sample size and differences in geographical location.

Table 5: Patient's Perception towards Exercise and Diet Recommendations

Perception towards diet and exercise	Frequency (N=212)	Percent (%)
Lifestyle modification		
Diet only	74	34.9
Exercise only	41	19.3
Both diet and exercise	97	45.8
Diet controls blood sugar level		
Yes	181	85.4
No	31	14.6
Exercise controls blood sugar level		
Yes	122	57.5
No	90	42.5

Source: Field Survey (2017)

Those not adhering to DER reported a range of reasons for non-adherence. The study revealed that, 45.8 percent of the respondents were not adhering to exercise and the reasons for non-adherence to recommended exercise include the following; inadequate understanding of exercise recommendations (66.0%), perception that exercise could potentially exacerbate their illness (46.4%), distance far away from home (farm, funeral, market) (16.5%), too busy schedule (15.5%), very cold weather (11.3%), and lack of exercise partner (10.3%). The main reasons given by the respondents for non-adherence to diet were inadequate understanding about dietary recommendations (52.3%), eating outside home (restaurants, funerals) (32.4%), inability to control oneself (17.6%), financial constraints (14.9) and situation at home (12.1%) . Participants always shared the same family food which is not a recommended diet. Again in this study, among non-adherents to DER, reasons that interfered with adherence also included lack of support from the spouse / partner (46.2%), family members (73.4%), and friends (69.3%).

These findings are congruent to those of Thomas, Alder and Leese (2004) likewise Serour, Alqhenaei, Al-Saqabi, Mustafa and Ben-Nakhi (2009), which revealed that individuals' self-perceptions and belief about lifestyle measures greatly influence adherence to a prescribed diet and exercise regimens in people with diagnosed Type 2 DM. The mentioned reasons for non-adherence to DER in this study are also consistent with studies by Ganiyu *et al.* (2013); Kratzer (2012); Serour *et al.* (2007); and Uchenna, Ijeoma, Ezenduka and Ogbu (2010), who also found that people with perception that exercise could potentially exacerbate their illness do not exercise, others such as busy schedule, lack of exercise partner, far away from home and very cold weather were also reasons for non-adherence to exercise recommendations. They also indicated that good spousal support and support from family members and friends positively predict adherence to DER.

Table 6: Employment status and some selected barriers

Response	Employment status			p-value
	Unemployed	Employed	Pensioner	
Too busy schedule	6 (11.3%)	10 (8.6%)	0 (0.0%)	0.002
Eating out	7 (13.2%)	14 (12.1%)	3 (7.0%)	0.128
Financial constraints	2 (3.8%)	9 (7.8%)	0 (0.0%)	0.335
Poor self-control	0 (0.0%)	3 (2.6%)	4 (9.3%)	0.023

Source: Field Survey (2017)

Findings on Table 6 shows Pearson chi-square test result which depicts association between employment status of the respondents and some selected barriers to adherence to dietary and exercise recommendation. It shows that most respondents, who did not adhere to DER were those who were unemployed (11.3%). The result also indicates that about (13.2%) who ate from outside home were those who were unemployed. Furthermore, respondents (7.8%) who did not adhere to exercise and dietary intake as a result of financial constraints were those who were employed whereas the employed did not adhere because of poor self-control. This study found that employment status of the respondents and their busy schedule were as statistically significant (p=0.002) as poor self-control (p=0.023). However, that of employment status and eating outside

($p=0.128$) and financial constraints ($p=0.335$) were not statistically significant reasons for non-adherence.

In this study, inadequate understanding about DER appeared to be the most frequently reported reason for non-adherence amongst others, and is more prevalent for exercise non-adherence (66.0%) than diet non-adherence (52.3%). This finding agrees with studies by Ganiyu *et al.* (2013) and Wens, Vermeire, Royen, Sabbe and Denekens (2005) who revealed that the perception that exercise exacerbates one's illness seems also to be a major contributory factor to non-adherence to exercise recommendation. However, this study found a lower percentage of people with this misconception (46.4%) as compared to the 57.6 percent of the respondents reported by Ganiyu *et al.* (2013) who had this erroneous perception of exercise exacerbating one's illness.

The present study demonstrated that, being far away from home was one of the reasons responsible for DER non-adherence. This finding is consistent with cultural norms in Ghana, especially in the research setting, where people travel to funerals and other ceremonies at places far from their homes, as well as visit to aged parents and relatives during weekends and may also have more than one home, such as a city home and a village home. This finding is also congruent with the studies by Ary, Toobert, Wilson and Glasgow (2006); and Ganiyu *et al.* (2013) who noted that having a home of usual abode and having another away from home is part of frequently reported reasons for non-adherence to DER.

This study also revealed that a busy schedule, very cold weather and lack of exercise partner significantly contributed to non-adherence to exercise recommendation. More than half of the respondents in this research were employed and might have schedules that do not allow for regular exercise. Also, the research setting is located in a mountainous area with cold weather in the early hours of the day as well as in the evenings. This may coincide with times for exercise and thus explains why extremely cold weather is a contributory factor to non-adherence to exercise. Therefore, it is important to examine and address such misconceptions and challenges that hinder DER during diabetes education.

Diet and Exercise Preference among Respondents

Table 7 shows the types of diets and exercises respondents adhered to. Findings show that 66.7 percent ($n=92$) of the respondents ate diet low in saturated fats and calories, 56.5% ($n=78$) ate high starchy and fibre diets, 47.1 percent ($n=65$) limited alcohol intake and stopped smoking, 44.2 percent ($n=61$) ate vegetable and fruits, and 14.4 percent ($n=20$) took herbal preparations. Also there was a range of exercise preference amongst respondents who indicated that they exercised. Brisk walking was the most frequently selected option (90.4%), followed by jogging (18.3%), sport activities (7.0%) and cycling (6.1%). Moreover, 66.1 percent of the adherers stated that they engaged in exercise for at least 3 times per week and 70.4 percent reported engaging in each session of exercise for 30 minutes or more.

Table 7: Types of diets and exercises adhered to by respondents

Demographics	Frequency (N=120)	Percent (%)
Dietary habits		
High starch and fibre diets	78	56.5
Low saturated fats and calorie	92	67.7
Fruits and vegetables	61	44.2
Limited alcohol intake and ceased smoking	65	47.1
Other(herbal preparations)	20	14.4
Exercise preference		
Brisk Walking	104	90.4
Sport activities	8	7.0
Cycling	7	6.1
Jogging	30	8.3
Frequency preference		
≥3 times/week	76	66.1
<3times/week	39	33.9
Duration of exercise		
≥30 minutes	81	70.4
<30 minutes	34	29.6

Source: Field Survey (2017)

1.1.3 Conclusion

Although the general rates of non-adherence to diet and exercise recommendations is relatively high, exercise non-adherence is far more prevalent amongst the studied population. The main reasons for non-adherence to diet were inadequate understanding about dietary recommendations, eating outside home (restaurants, funerals etc.), and inability to control oneself, financial constraints and situation at home.

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