

## ARTICLE

# Role of Family support in medication adherence in Type 2 Diabetes Mellitus patients at an outpatient setting in Nigeria: A prospective cohort study.

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**Abstract:** Background: Diabetes mellitus (DM) poses a global health challenge and its prevalence is rapidly increasing particularly in developing countries. Adherence to medication is important to prevent or delay complications. Family support is helpful in improving medication adherence. The study compared adherence to oral glucose lowering agents among type 2 diabetes mellitus patients with good and poor family support with the overall goal of improving diabetes care. Methods: A hospital based prospective cohort study was carried out at the Outpatient Department of Bingham University Teaching Hospital, Jos, between January and April 2016. Respondents were recruited by systematic random sampling (N=132), and allocated to two groups based on family support scores. Data was collected at baseline, 4 weeks and 8 weeks. All data was analysed using Epi Info 3.5.4. Results: Medication adherence scores were generally low (5.54±1.7) among the study participants. Respondents had comparable medication adherence scores at baseline ( $p=0.39$ ) and 4 weeks ( $p=0.75$ ), but the difference was significant at eight weeks ( $p=0.01$ ). Multiple logistic regression showed that good family support (OR 2.042; 95% CI 1.219-3.420;  $p=0.007$ ), age group 45 to 54 years and age group 55-64 years (OR 3.084; 95% CI 1.113-8.543;  $p=0.03$ ) were significant predictors of good medication adherence. Conclusion: Good family support is a significant predictor of good medication adherence among type 2 diabetes mellitus patients.

**Keywords:** Diabetes Mellitus, Type 2; Family Support; Medication Adherence; Outpatient; Social support.

## INTRODUCTION

Diabetes mellitus (DM) refers to a group of common metabolic disorders that often present clinically as hyperglycaemia, which result from defects in insulin secretion, insulin action, or both (Longo et al., 2012). Type 2 Diabetes Mellitus (T2DM) accounts for over 90% of all cases (García-P, 2013). The global prevalence of DM is progressively increasing and this trend will continue except drastic measures are taken to halt it (World Health Organization, 2016). Most diabetes deaths occur in low- and middle-income countries, and 43% of all diabetes related deaths occur before the age of 70 (World Health Organization, 2016; Hall et al., 2011).

The prevalence of DM in Nigeria ranges from 0-7% with significantly higher prevalence in the urban areas compared to the rural areas (Ejike et al., 2015; Erasmus et al., 2012). The primary goals in the treatment of DM is for patients to maintain proper metabolic control and reduce the risks of disease complications (García-P, 2013). In order to manage DM successfully, patients must adhere to treatment regimens that include dietary restrictions,



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physical activity goals, and self-monitoring of glucose levels (*World Health Organization, 2016*). Adherence to therapy is defined as the extent to which a person's behaviour in taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a healthcare provider (*García-P, 2013*).

Numerous factors affect patients' ability to adhere properly, e.g. self-efficacy, treatment expectations, health beliefs, and social support (*Miller & Dimatteo, 2013*). Some studies have demonstrated that strong family and social support appear to have a positive impact on glycemic control and on self-management behaviour (*Miller & Dimatteo, 2013; Adelaja, 2012*). This study's aim is to determine the influence of family support on medication adherence by comparing medication adherence among patients with good and poor family support using a prospective cohort design.

## MATERIALS AND METHODS

T2DM patients receiving care at the Outpatient Department of Bingham University Teaching Hospital Jos, were recruited by systematic random sampling and allocated to two groups based on family support scores. Both groups were followed up in a prospective cohort study design.

Ethical approval for the study was obtained from the ethics committee of the Bingham University Teaching Hospital, Jos.

A sample size of 132 was calculated to be able to determine a mean difference of 0.8 in the Morisky Medication Adherence Score with 80% power, within 95% confidence interval, and 10% attrition.

The socio demographic characteristics, family support information and medication adherence scores were collected using two standardized questionnaires (*Duke University Social Support and Stress Scale-DUSOCS and Morisky Medication Adherence Scale-MMAS 8*). In this study the stress component of DUSOCS was disregarded, only the social support component was used for the study. The responses were added up to give a raw score which was divided by 14 and multiplied by 100 to obtain the Family Support Score on a scale of 0 to 100. In this study, a score of less than 50% was interpreted to mean poor family support while greater than or equal to 50% meant good

family support. MMAS-8 is the 8-item easy to administer scale for medication adherence, with 7 yes/no items and one item with a 5-point Likert-type response ranking from never to always. The MMAS has a score range of 0–8, with higher numbers representing better adherence. The MMAS can also be categorized into 3 levels of adherence including high (*score = 8*), medium (*score range, 6–7*) and low (*score, 0–5*). In this study, adherence was dichotomized with a score of 6–8 meaning good adherence and a score of 0–5 meaning poor adherence.

Data was collected at baseline, 4 weeks and 8 weeks. All the respondents were counselled on medication adherence at each visit and those with poor family support were seen with family members who were counselled on need for more support for the patient. All data collected was processed and analyzed using Epi Info statistical software version 3.5.4 (*CDC, USA*).

## RESULTS

The study was conducted from January 2016 to April 2016. A total of 456 T2DM patients were seen during the study. Thirty-two (7.0%) did not meet the inclusion criteria (*27 on insulin and five declined consent*). Eventually, a total of 424 consenting respondents were sampled out of which 132 were recruited using systematic random sampling technique. Two patients from the group with poor family support did not attend the 8 weeks visit and were not analysed for 8 weeks.

The mean age of the study participants was  $60.6 \pm 11.3$ ,  $58.8 \pm 10.6$  years for the good family support group, and  $62.1 \pm 12.0$  years in the poor family support group. Sociodemographic characteristics are shown in Table 1.

Table 2 below shows the mean MAS in the two groups studied, at baseline, 4 weeks and 8 weeks. Wilcoxon signed rank test showed that in the good family support group, the difference in median scores from baseline to 4 weeks was significant ( $W=5.677$ ,  $p=0.017$ ), and from baseline to 8 weeks was also significant ( $W=20.00$ ,  $p<0.001$ ). In the poor family support group, the difference from baseline to 4 weeks was significant ( $W=7.771$ ,  $p=0.005$ ) but from baseline to 8 weeks was not significant ( $W=4.030$ ,  $p=0.05$ ).

Table 3 shows the Logistic regression of factors influencing good adherence to medication.

**TABLE 1.** Sociodemographic characteristics of the study respondents.

Characteristics	Total N	Good family support N (%)	Poor family support N (%)	***p-value	
<b>Age group (years)</b>					
≤44	8	5(62.5)	3(37.5)	2.92	0.57
45-54	34	19(55.9)	15(44.1)		
55-64	39	19(48.7)	20(51.3)		
65-74	38	19(50.0)	19(50.0)		
≥75	13	4(30.8)	9(69.2)		
<b>Sex</b>					
Female	80	30(37.5)	50(62.5)	12.69	<0.001
Male	52	36(69.2)	16(30.8)		
<b>Marital Status</b>					
Divorced	1	0(0.0)	1(100.0)	0.001**	
Married	100	59(59.0)	41(41.0)		
Separated	1	0(0.0)	1(100.0)		
Single	2	0(0.0)	2(100.0)		
Widow/er	28	7(25.0)	21(75.0)		
<b>Occupation</b>					
Civil servant	21	17(81.0)	4(19.0)	10.407	0.034
Employed in private	9	5(55.6)	4(44.4)		
Trading	42	18(42.9)	24(57.1)		
Unemployed	46	19(41.3)	27(58.7)		
Others*	14	7(50.0)	7(50.0)		
<b>Level of Education</b>					
Non formal	51	16(31.4)	35(68.6)	17.301	0.001
Primary	27	12(44.4)	15(55.6)		
Secondary	18	11 (61.1)	7(38.9)		
Tertiary	36	27(75.0)	9(25.0)		

\*Others include artisans, farmers and clergy.

\*\* Fisher's exact (correction of continuity when Chi-square is not valid).

\*\*\*p values are based on X2 statistics.

**TABLE 2.** Mean adherence score of the 2 study groups.

Phase of the study	Overall mean	Good family support Mean ±SD	Poor family support Mean ±SD	T-test	p-value
Baseline	5.54±1.7	5.7±1.7	5.4±1.8	0.984	0.33
4 weeks	6.31±1.4	6.4±1.3	6.3±1.4	0.425	0.665
8 weeks	6.42±1.6	6.8±1.5	6.0±1.7	3.363	<0.01

**TABLE 3.** Logistic regression of factors influencing good adherence to medication.

Factors	Odds ratio	95% confidence interval	p-value
<b>Age (years)</b>			
45-54	3.950	1.440 – 10.830	0.008
55-64	3.084	1.113 – 8.543	0.03
65-74	2.071	0.691 – 6.212	0.19
>74	3.420	0.934 – 12.514	0.06
≤44	1	-	-
<b>Family support</b>			
Good	2.042	1.219–3.420	0.007
Poor	1	-	-
<b>Level of education</b>			
Primary	1.382	0.701 – 2.724	0.350
Secondary	0.707	0.319 – 1.568	0.394
Tertiary	0.713	0.316 – 1.607	0.415
Non-formal	1	-	-
<b>Marital status</b>			
Married	0.930	0.177 – 4.886	0.932
Single	0.800	0.076 – 8.474	0.853
Widowed	0.697	0.128 – 3.808	0.677
Divorced	1	-	-
<b>Occupation</b>			
Civil servant	0.643	0.125 – 3.309	0.597
Employed in Private	0.936	0.153 – 5.733	0.943
Trading	0.594	0.136 – 2.600	0.489
Unemployed	0.852	0.195 – 3.726	0.832
Others*	0.827	0.184 – 3.715	0.804
Artisans	1	-	-
<b>Sex</b>			
Male	1.544	0.828 – 2.878	0.172
Female	1	-	-

\*Others are clergy, farmers.

## DISCUSSION

The study population was mostly middle aged and female. This finding is expected since many studies have reported that T2DM is more common in this age group (Longo *et al.*, 2012), and other studies had reported that more females are affected by diabetes (Ekpenyong *et al.*,

2012). The majority of the respondents in this study were married. This finding was similar to the reports by Okolie (2009) from South-eastern Nigeria who found over 90% of type 2 diabetics were married. The similarity in finding with these studies may be due to the preponderance of T2DM in middle aged individuals. Many of the respondents in

this study were unemployed. This was not expected as the study facility is located in an urban centre. This finding is similar to what Heissam (2015) found in Egypt among type 2 diabetics. A large proportion of the respondents in this study had no formal education. This was expected given the patient base of the study facility consisting of a large population of traders and farmers. The finding is similar to the finding of Heissam (2015) in Egypt in 2014. The high level of unemployment and low level of formal education may be due to the location of the facility which attracts clients from poorer neighbourhoods.

The overall mean medication adherence score (MMAS) was poor at baseline. This is in spite of the fact that most of these respondents were on regular clinic follow up visits which should have helped them to adhere to medication. This finding was similar to what Abdulazeez (2014) reported from Ilorin where he found a low adherence rate among regular clinic attenders. In a similar situation, Khosravizade (2014) in Iran and Sakthong (2009) in Thailand both found poor medication adherence scores among diabetics attending follow up clinics.

At 4 weeks, the two groups were comparable in their MMAS and there was no statistically significant difference between them. At 8 weeks, there was a significant difference in the MMAS between the two groups as the good family support group had a significantly higher MMAS than the poor family support group.

The mean adherence score was low in both groups at baseline. By 8 weeks, both groups had increased MMAS but the change in MMAS was much more in the good family support group compared with the poor family support group. There was a progressive increase in mean adherence score for respondents with good family support from baseline to 8 weeks. This change was more significant between 4 weeks and 8 weeks compared to the change between baseline and 4 weeks. This finding of higher mean adherence score among respondents with good family support was similar to the finding by Vaccaro and colleagues (2014) in Florida in 2014.

In this study, the likelihood of adhering to medication was two times higher in those with good family support compared with those who had poor family support. Family support was therefore found to be an important factor that

helped improve medication adherence. This finding was similar to the report by Tang et al. (2008) in the US in 2008. These findings might validate the physical, financial and psychological assistance that social support from loved ones can contribute to a patient's treatment thereby helping them adhere better to self-care and medication.

This calls for physicians managing type 2 diabetics to formally assess medication adherence as part of routine care, and also prioritize family and social support to improve medication adherence.

## CONCLUSION

Family support significantly improved medication adherence in type 2 diabetics. Age groups 45-54 years, 55-64 years and good family support scores were found to be independent predictors of good medication adherence.

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