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ORIGINAL ARTICLE

Assessment of Adherence of Type 2 Diabetic patients to oral antihyperglycemic Agents atel-Mahsama family Practice Center, Ismailia Governorate, Egypt

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ABSTRACT

Diabetes Mellitus, especially (T2DM) is a major global health problem covering approximately 347 million persons worldwide. Medication Adherence usually refers to whether patients take their medications as prescribed, as well as whether they continue to take a prescribed medication. Medication non adherence is a common, pervasive medical problem among patients with chronic disease generally and type 2 diabetics in particular.Improvement of quality of care provided to type 2 diabetic patients, and their quality of life. Cross sectional analytic study conducted on 96 type2 diabetics, aged 40-65 years old. The study population was selected randomly by systematic random technique. The tool for the study is a semi-structured questionnaire for socio-demographic and medical history developed by the researcher and Moriskey 8-item Medication Adherence Scale. The current study showed that 47.9% of participants were high adherent to oral anti-hyperglycemic agents, 18.8% were medium adherent and 33.3% were low adherent.There was statistically significant difference in adherence to treatment according to categories of gender (p=0.000), employment status (p=0.008), regular glucose monitoring using glucometer (p=0.000), Lack of continuity of care (p=0.000), stress during doctor visit (p=0.005), Lack of communication skills, empathy and reinforcement (p<0.05), patient believes or understandings (p=0.001), Patient forgetfulness or carelessness about treatment (p=0.000), stressful life events (p=0.001), Frequent changes in regimen (p=0.001), Lack of immediate benefit of therapy (p=0.000).Linear regression analysis model to assess predictors of poor adherence showed that lack of doctor-patient communication, low patient's belief or understanding and forgetfulness are main indicators.
Keywords: Type 2 DM, oral hyperglycemic agents, Adherence and self-management.

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INTRODUCTION

Diabetes defined as a syndrome of disturbed energy homeostasis caused by a deficiency of insulin secretion or of its action [1]. According to the last figures released by the international diabetes federation (IDF), a rising trend of incidence and prevalence is seen in every country around the world. However, the Arab region appears to have a higher prevalence of diabetes than the global average.

The prevalence of Diabetes mellitus in Egypt is around 9%. It is also estimated that by the year 2030, Egypt will have at least 8.6 million adults with diabetes [2].

The optimal management of DM occurs when the multidisciplinary diabetes care team actively involves the person with diabetes as an equal partner in their care [3].

Medication non-adherence is a pervasive medical problem that is common among patients with chronic disease generally and type two diabetics in particular [4]. Problems with poor self-management of drug therapy may exacerbate the burden of diabetes [5].

Barriers to the effective use of medicines specifically include poor provider-patient communication, inadequate knowledge about a drug and its use, not being convinced of the need for treatment, fear of adverse effects of the drug, long term drug regimens, complex regimens that require numerous

medications with varying dosing schedules [6] cost and access barriers [7]. To improve patient adherence, it is important to understand why non-adherence occurs.

PATIENTS AND METHODS
The current study was a cross-sectional study conducted on type 2diabetes attended to the El-Mahsama Family Practice center in Al-Ismailia governorate, Egypt from January 2014 to April 2015 to assess adherence of type 2 diabetics to oral anti-hyperglycemic agents and define common factors that might affect adherence.
The patients were subjected to a semi-structured questionnaire consists of four parts:
Part 1: SOCIO-DEMOGRAPHIC DATA: Patient profile; name, age, gender, level of education (Illiterate, Read and write, Primary school, preparatory school, Secondary school, High education), residence, marital status (single, married, divorced, widow), address (rural, urban), employment status, Income sufficiency (sufficient income or insufficient income).
Part 2: MEDICAL HISTORY**:** Including duration of diabetes, history of complications (micro-vascular and macro-vascular), and co-morbid conditions as (hypertension, heart disease, kidney disease, etc.)
Therapeutic regimen including: (diet, oral hypoglycemic agents)
Part 3: ASSESSMENT OF PATIENT ADHERENCE TO MEDICATION USING MORISKY 8-ITEM MEDICATION ADHERENCE QUESTIONNAIRE: [31]
This method was used before more frequently to measure patient adherence to drug treatment, and it consists of questions assessing reasons of bad adherence to medications as: forgetting to take medication, stop taking medication due to unpleasant side effects or when symptoms become under control, travelling or frequent leaving home, and feeling hassled about sticking to treatment plan.
Part 4**:** ASSESSMENT OF FACTORS THAT RESPONSIBLE OF NON-ADHERENCE
Center of Disease Prevention and Control and World Health Organization have addressed 5 domains summarizing factors affecting non-adherence, including: health care system factors, health care team factors, patient related factors, condition and therapy related factors, socio economic factors [8].
An ethical approval was obtained from the research and the Ethical Committee of the Faculty of Medicine, Suez Canal University.

RESULTS
The mean age of the patients in the present study was 52 years ± 6.718, 70% of study population was females, 68% of the patients in this study were illiterate, and 77 % of study population was not employed. 47.9% of participants were high adherent to oral anti-hyperglycemic agents, 18.8% were medium adherent and 33.3% were low adherent. There was statistically significant difference in adherence to treatment according to categories of gender (p=0.000), employment status (p=0.008), regular glucose monitoring using glucometer (p=0.000), Lack of continuity of care (p=0.000), stress during doctor visit (p=0.005), Lack of communication skills, empathy and reinforcement (p<0.05), patient believes or understandings (p=0.001), Patient forgetfulness or carelessness about treatment (p=0.000), stressful life events (p=0.001), Frequent changes in regimen (p=0.001), Lack of immediate benefit of therapy (p=0.000).
Linear regression analysis model to assess predictors of poor adherence showed that lack of doctor-patient communication, low patient's belief or understanding and forgetfulness are main indicators.

DISCUSSION
Chronic conditions can act cumulatively and synergistically to adversely affect health outcomes, caregiver burden, and treatment costs [9]. Problems with poor self-management of drug therapy may exacerbate the burden of diabetes.
The results of current study showed that, 47.9% of participants were high adherent to oral anti-hyperglycemic agents, 18.8 % were medium adherent and 33.3% were low adherent. These results were in accordance with Nahla *et al.,* [13] who reported that about 57% of patients always received their medication as prescribed and on time. The results of Hiessam et al, 2015 at another rural area in El-Ismailia, Egypt reported that (47.09%) had fair adherence, (26.59%) had good adherence rate, while (26.32%) had non adherence rate. Shams and Barakat, [18] noted that only 38.9%, of all patients were belonging to the good category of adherence to drug, the same findings were as Sweileh *et al*., [21].According to Shrestha *et al.*, [10] 25% were found to have ever discontinued OHAs.

Table (1): Relation between adherence and socio-demographic characteristics:

Socio-demographic characteristics		Adherence Score						X²	P value
		High (46)		Medium (18)		Low (32)			
		n.	%	n.	%	n.	%		
Age	40-	19	41.3	11	61.1	7	21.9	18.839	0.001
	50-	20	43.5	7	38.9	10	31.2		
	≥ 60	7	15.2	ND	ND	15	46.9		
Gender	Male	11	39.3	ND	ND	17	60.7	16.917	0.000
	Female	35	51.5	18	26.5	15	22.1		
Marital status	Married	39	53.4	13	17.8	21	28.8	6.708	.152
	Divorced	1	11.1	2	22.2	6	66.7		
	Widow	6	42.9	3	21.4	5	35.7		
Educational status	Illitrate	29	44.6	15	23.1	21	32.3	17.339	.027
	read&write	5	38.5	ND	ND	8	61.5		
	1ʳʸeducation	3	100	ND	ND	ND	ND		
	Preparatory	3	50	3	50	ND	ND		
	/ 2ʳʸ education	6	66.7	ND	ND	3	33.3		
Employment status	Employed	8	36.4	1	4.5	13	59.1	9.547	.008
	Non-employed	38	51.4	17	23	19	25.7		
Income	Perceived as sufficient	26	52	7	14	17	34	1.633	.442
	Perceived as insufficient	20	43.5	11	23.9	15	32.6		

Table (2): Relation between adherence and factors that might affect adherence to management plan:

Factors affecting adherence		Adherence Score						x²	P value
		High		Medium		Low			
		n.	%	n.	%	n.	%		
Health care system	Lack of access to care	6	37.5	1	6.2	9	56.2	5.060	.080
	Lack of continuity of care	3	21.4	ND	ND	11	78.6	15.536	.000
Health care team	Lack of communication skills	ND	ND	ND	ND	4	100	8.348	.015
	Lack of empathy& reinforcement	ND	ND	1	12.5	7	87.5	12.045	.002
Patient related factors	Patient Belief or understanding	ND	ND	ND	ND	7	100	15.101	.001
	Patient forgetfulness or carelessness	3	10	4	13.3	23	76.7	38.357	.000
	Stressful life events	13	28.9	9	20	23	51.1	14.502	.001
Condition and therapy	Frequent changes in regimen	4	22.2	1	5.6	13	72.2	15.161	.001
	Side effects	15	48.4	3	9.7	13	41.9	3.028	.220
	Duration of therapy	6	26.1	6	26.1	11	47.8	5.782	.056
Socioeconomic factors	Medication cost	16	38.1	9	21.4	17	40.5	2.932	.231
	Lack of family support	4	50	ND	ND	4	50	2.372	.306

ND: No Data

Table (3): Linear regression analysis model to assess the relationship between dependent (adherence to management plan) and socio-demographic variables:

	β-regression coefficient	Std. Error	Z. test	P- value
(Constant)		0.956	0.562	0.575
Age	-0.809	0.033	-3.065	0.003*
Gender	-0.135	0.295	-0.897	0.372
Marital status	0.087	0.125	0.851	0.397
Educational status	-0.151	0.078	-1.325	0.189
Employment status	0.166	0.273	1.286	0.202
Income	0.060	0.202	0.524	0.602

Dependent Variable: adherence scale
* Statistically significance

Table (4): Linear regression analysis model to assess the relationship between dependent (adherence to management plan) and selected independent adherence barriers:

	β-regression Coefficients	Std. Error	Z. test	p- value
(Constant)		0.364	0.543	0.588
DM duration	-0.046	0.082	-0.553	0.582
Presence of comorbidities	0.153	0.146	1.990	0.050
Presence of complications	-0.004	0.176	-0.054	0.957
Number of drugs taken	-0.012	0.123	-0.141	0.888
Lack of communication between patient and doctor	-0.283	0.511	-2.443	0.017*
Patient belief or understanding	0.275	0.288	3.239	0.002*
Patient forgetfulness	-0.523	0.165	-6.103	0.000*
Unpleasant side effects	-0.123	0.152	-1.535	0.129
Medication cost	0.045	0.142	0.569	0.571
Lack of family support	0.034	0.247	0.434	0.665

Dependent Variable: adherence scale
* Statistically significance

The Discrepancy between the results of the current study and the above mentioned results could be explained in agreement side by similarity in population characteristics and culture of study population. In contrary Lau and Nau [12] reported that only 28.9 % of this study population were non-adherent to the anti-hyperglycemic drug regimen, and according to Gimenes *et al.* [11] (78.3%) of study population were adherent and 21.7% were non-adherent to drug therapy. Another study by Kravitzet *et al.* [14] in Scotland found that 91% of the diabetic patients reported that they actually took their medication as prescribed. The partial disagreement could be due to trans cultural variations among different populations and setting health priorities from their own view so this could be reflected on the degree of adherence.

The mean age of this study population was 52 years ± 6.718, 40% of them 40-60 yrs old and there were statistically significant effect of age on adherence in favor of older age that were less adherent. These results are in agreement with a study done by Lau and Nau [12] and Heissam, *et al.* [15] at Al- Ismailia, Egypt as with increasing age, the degree of adherence decreases for several reasons as memory problems related to age, dementia and Alzheimer's disease, vision and hearing problems and presence of comorbidities. Regarding to gender about 70% of study population was females with statistical significant effect on adherence (p=.000) in favor of females who were more adherent than males. This result was in accordance with Zhu*, et al*, [15], Ibrahim *et al.*, [16] and Lertmaharit *et al.*, [17] who reported that Female patients have better adherence. The results was not in accordance with Shams and Barakat, [18] who found that the effect of gender were obvious but with insignificant result (p=.07).

Regarding marital status, the results of this study show that (76%) of the study population were married and reported higher adherence but not statistically significant (p=.152). According to Cooper *et al.*, [19] marital status might influence patients' adherence with medication positively. Help and support of a spouse could be the reason why married patients were more adherent to medication than single and these findings might be due to same age groups of the studied sample .

Concerning the educational level the result showed that 68% of the patients in this study were illiterate and the educational level had a statistical significant effect on adherence to treatment. These results were in accordance with Al-Adsani A, *et al* [20] in Kuwait and Shams and Barakat, [18] who reported that most of the study sample was illiterate. Sweileh *et al.*, [21] reported that more educated people tend to appreciate and understand the consequences of non-adherence. These findings might be due to same age groups and study setting in previous studies.

This study showed that about 77 % of study population were not employed and the employment status had statistical significant effect on adherence to treatment (p=.008), these results are in accordance with Khattab M, *et al.* [22] in Jordan in 2010, in which 68.5 % of patients in this study were not employed. On the other hand, these results were not in concordance with Hiessam, *et al.* [23] which reported that only 38 % of study population not working. This difference might be because of 70% of the current study population are females (house wives).

This study showed that majority of patients had insufficient monthly income with no statistical significant effect on adherence to treatment (p=.442), these results are the same as study carried in Alexandria by Hiessam *et al* [23]and [24] in Al-Ismailia which stated that the majority of study population had

insufficient monthly income with no statistical significant effect on adherence to treatment (p=.168).These findings might be due to the same study setting as the previous studies conducted in rural areas in Egypt.

This study showed that 24% of participants have a glucometer at home and 73.9 % of them use it regularly, also the study stated that regular glucose monitoring using glucometer affect adherence significantly (P=.000). These results were in concordance with Shams and Barakat, [18] and Hiessam *et al*. [23]. The similarity of results was due to the similarity in study population characteristics and study setting. This finding was in conformity with the report of a study made by Harris *et al*. [25] in USA and Al-Kaabi J, *et al*. [26] in UAE as the majority of patients perform self-monitoring of blood glucose. The absence of established guidelines on SMBG and lack of its perceived importance by patients, as well as, the cost of the blood glucose monitoring devices especially in a developing country as in Egypt may have accounted for the low level of regular blood sugar monitoring among patients.

This study showed that 14.6% of participants reported lack of continuity of care that significantly affect patient adherence negatively.Doctor- patient relationship is based on patients' trust in prescribers and empathy from the prescribers, This study showed that 5.2% of participants reported stress of healthcare visits, 4.2% reported lack of communication skills, 5.2% lack of empathy, 8.3% lack of reinforcement, and all healthcare factors had statistical significance on adherence (p<0.05), These results were in concordance with Heissam *et al*, [23] and Lawson *et al*, [30] which showed that the patient and healthcare provider´s relationship was the dominant predictor to good adherence. The agreement between the most researches nationally and internationally showed the important role of doctor-patient relationship in improving patient adherence to management plan.

According to 46.9% of study population stressful life events and 31.2% reported forgetfulness or carelessness to take their treatment which had significant effect on their adherence to treatment. These findings were similar to Hiessam *et al*, [23] and Shams and Barakat, [18] which showed that forgetfulness is one of the common reasons behind the non-adherence to drugs. In this study 32.3% reported that unpleasant side effects of drugs like loss of appetite, nausea, diarrhea and intestinal discomfort affect their adherence to treatment, with no significant effect on adherence to treatment. These results are in concordance with Hiessam *et al*, [23] and Girered, [27] which reported that majority of diabetic patients had side effects with no statistical significant effect on adherence. But on the other hand Jayant *et al*., [29] and Adisa *et al*, [28] reported that the side effects of medication may be a significant factor that can affect diabetic patients' long-term adherence to treatment. Regarding medication cost 43.3% of study population said that medication costs had highly effect on their adherence to treatment with no statistical significance on adherence. According to Hiessam *et al*, [23] and Shams, Barakat, [18] there is significant higher rate of adherence to oral treatment in patients who exhibited adequate healthcare costs in relation to their income or full coverage health insurance compared with the others who did not have. The agreement between results is explained as all previous studies conducted in Egypt, which is a developing country.

LIMITATIONS OF THE STUDY
1. The current study cannot be generalized on all the areas as the study was carried on rural areas only.
2. The use of self-report data on medication adherence, because of a resulting tendency to overestimate adherence due to recall biases and social desirability.

CONCLUSION
This study reported that 33.3% were low adherent to their drug regimen and demonstrated a lot of factors that affect adherence which deserves more attention in management of the patients with type 2 diabetes to improve their adherence to treatment that leads to improve their glycemic control and decrease the probability of occurrence of complications which at the end leads to improve their quality of life.

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