

## Non Adherence and Contributing Factors among Ambulatory Patients with Anti Diabetic Medications in Adama Referral Hospital

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### Abstract

**Background:** The term diabetes mellitus describes metabolic disorders of multiple etiologies characterized by hyperglycemia with disturbances of carbohydrates, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. Anti-diabetic medications are integral for glycemic control in diabetes. Non adherence to drugs can alter blood glucose levels, resulting in complications. The objective of this study was to determine the magnitude of non-adherence and its contributing factors among diabetic patients attending the diabetic clinic in Adama hospital.

**Methods:** This descriptive cross-sectional study was carried out among patients with diabetes mellitus attending the diabetes mellitus clinic of Adama referral hospital. Every other patient was selected and data regarding their medication adherence was collected using a structured interview. Data analysis was carried out using SPSS-16.

**Result:** The response rate from this study was 98.3%. A total of 270 patients were interviewed; 51.5% were males. A total of 68.1% of the patients included in the study were married. 14% were younger than 40 years of age, 50% were between 40 and 60 years of age. 21.8% of the participants ascribed their non-adherence to forgetting to take their medications. Patients with duration of diabetes  $\leq$  5 years (82.07%) were more compliant to their medication than those with  $>$ 5 years 60.8%, which was found to be statistically significant ( $P=0.003$ ). Insulin 47% and glibenclamide plus meformine 43.7% were the most commonly prescribed mono and combination therapies respectively. Common co morbid conditions include, Hypertension 148(54.82%), Visual impairment 89(32.96%). The proportion of male patients adherent to their anti-diabetic medications was found to be lower 69.78% compared to the female patients (74.81%), but the difference was not statistically significant ( $p>0.05$ ).

**Conclusion:** Most diabetic patients are currently being managed with the most effective available drugs. However as the result from this study indicates the desired blood sugar level could not be controlled and maintained adequately. This was because of poor adherence with the prescribed drug regimen and poor knowledge and practice of successful self management.

**Keywords:** Diabetes mellitus; Non adherence; Anti diabetic medications; Diabetic patients

**Acronyms and Abbreviations:** DM: Diabetes Mellitus; OHA: Oral Hypoglycemic Agents; T2D: Type 2 Diabetes; SPSS: Statistical Package for Social Science; CSA: Central Statistics Agency; UAE: United Arab Emirates; ARH: Adama Referral Hospital; FPG: Fasting Plasma Glucose; HbA1C: Glycated Hemoglobin; ADA: American Diabetic Association; SD: Standard Deviation; SNNP: Southern Nations Nationalities and Peoples Region; WHO: World Health Organization; JUSH: Jimma University Specialized Hospital; GP: General Practitioner

### Introduction

#### Background

Diabetes mellitus refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. The prevalence of diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportions. It is estimated that there are currently 285 million people with diabetes worldwide and this number is set to increase to 438 million by the year 2030 [1]. Epidemiological data indicate that all nations, rich and poor, are suffering the impact of the diabetes epidemic. The impact is worse in those countries that are socially and economically disadvantaged. In Africans 80% of diabetes patients are undiagnosed. Most of them may be asymptomatic or have mild symptoms which they ignore or attribute to other myths. Some may not present in hospital out of poverty even when symptomatic [2].

Information on chronic complications of diabetes in sub-Saharan Africa is scarce; however, its incidence has gone hand in hand with the growing disease prevalence, demonstrating the importance of assessing complications [3].

Factors contributing to optimum disease management included age, complexity of treatment, duration of disease, and psychosocial issues [4].

Ethiopia is the second most populous country in Sub-Saharan Africa where more than 80% of the population lives in the country side. In Ethiopia, national data on prevalence and incidence of diabetes are lacking. However, patient attendance rates and medical admissions in major hospitals are rising. The estimated prevalence of Diabetes Mellitus (DM) in adult population of Ethiopia is 1.9% [5].

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Management of diabetes mellitus involves both pharmacological and non pharmacological approaches. Non pharmacological approaches include life style modification, dietary modification and physical exercise. The pharmacological approach is used when the non pharmacological approach fails to achieve the desired outcome. Pharmacotherapy for type 2 DM has changed dramatically in the last few years with the addition of several new drug classes and recommendations to achieve more stringent glycemic control. Recently initiation of metformine in all patients with T2D at diagnosis along with appropriate life style modification has been introduced where there is no contraindication. In addition to metformine, OHA, injectable insulin, amylin analogs and inhaled insulin are other options for treatment of T2D [6]. The choice of therapy for type 1 DM is simple: All patients need insulin. However, how that insulin is delivered to the patient is a matter of considerable practice difference among patients and clinicians [7].

Non-adherence rates are relatively high across disease states, treatment regimens, and age groups. The drop in adherence is noted to be most dramatic after the first six months of therapy among patients with chronic conditions such as diabetes mellitus. A systematic review of studies on adherence to medication among diabetes patients showed that average adherence to oral anti diabetes medications ranges from 36% to 93%, while adherence to other treatment recommendations especially dietary adherence among these patients remains poor. Medication may contribute to non-adherence secondary to its side effects and cost, while poor patient-healthcare provider relationships may also be a major determinant of non-adherence [8].

Poor adherence to medication regimens is common, contributing to substantial worsening of disease, death and increased health-care costs. Hence, practitioners should always look for poor adherence and can enhance adherence by emphasizing the value of a patient's regimen, making the regimen simple and customizing the regimen to the patient's lifestyle.

### Statement of the problem

The prevalence of diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportions. Non-adherence, poverty, lack of knowledge and poor follow ups are the main factors observed in poor glycemic control. Non adherence to prescribed medication schedule has been and continuous to be a major problem in the world. In chronic disease, it has been described as taking less than 80% of the prescribed treatment. Previous studies have found adherence to diabetes treatment generally to be sub optimal ranging (23%-77%) [9].

In Ethiopia, national data on prevalence and incidence of diabetes are lacking. However, patient attendance rates and medical admissions in major hospitals are rising. The World Health Organization (WHO) estimated the number of diabetic cases in Ethiopia to be 800,000 by the year 2000, and the number is expected to increase to 1.8 million by 2030 [10].

There is a continuing need to routinely assess the likely reasons for non adherence among patients with diabetes in clinical practice. This is especially important in developing countries such as Ethiopia where economic instability and inadequate access to health care facilities might have led to the increased incidence of medication non adherence. In resource-limited countries like Ethiopia, the preponderance of economic instability, low literacy level, and restricted access to health care facilities might have led to the increase incidence of medication non-adherence. To the best of our knowledge, evidence-based research that evaluate medication adherence among patients with diabetes in Ethiopia is scanty.

In addition to this;

1. Most of previous studies were done in developed countries, leaving the gaps in knowledge about the prevalence and factors that may be associated with adherence to diabetic patient in Ethiopia.
2. Few studies on anti-diabetic medication adherence have been reported from Ethiopia.
3. The sample size used in some of the studies is very small and the method of selection of participants in some cases has lead to highly selective samples that are not representatives of the population from which they are picked.

Therefore the purpose of this study is to fill the gap in knowledge of the adherence and contributing factors and the association between them in diabetic patients in Adama hospital.

### Structural frame work

The structural frame work is shown in Figure 1.

### Significance of the study

Determining the significance of non adherence and identification of the factors leading to non adherence to a prescribed treatment through a continued research can assist in planning interventions to overcome the barriers. Hence, this study will be carried out to;

1. Give information on patient non-adherence and related factors that may help for the health care system to whom it concerns.
2. Give information based on the respondent's responses on different aspect of the disease that may help for further study of policy makers and some concerned governmental bodies.
3. Design an interventional method that can solve problems related to non adherence.
4. Give recommendations on how to manage problems associated with non adherence in diabetic patients.
5. It can help as a base line for further study on patient's adherence and to determine various adherence and non-adherence issues.

### Objective

**General objective:** The aim of this study was to determine the magnitude of non-adherence and its contributing factors among diabetic patients attending DM clinic in Adama referral hospital.

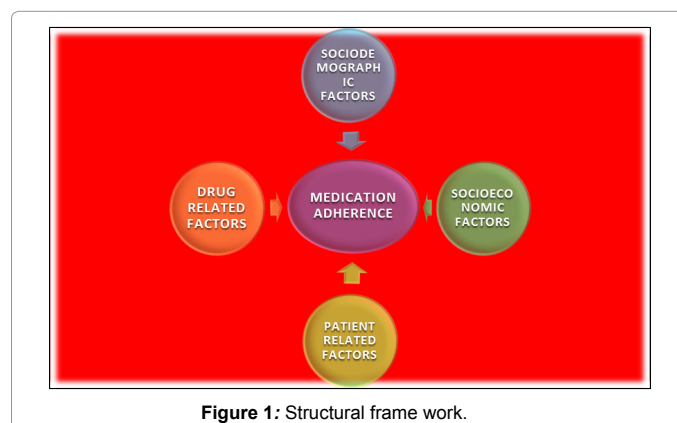


Figure 1: Structural frame work.

### Specific objectives:

1. To assess adherence to medication among ambulatory patients with diabetes,
2. To identify the probable reasons for non adherence with a view to develop intervention to improve adherence.
3. To determine the relationship between non-adherence and various socio demographic and other drug and patient related factors.
4. To describe the prevalence of different perceived problems of respondents with disease or the medication and on the health care system,
5. To provide the base line data for future study.

## Study Method

### Study area and period

The study setting was Adama referral hospital, East Showa, Oromia National Regional State, Ethiopia. Adama is located 99 km south east of Addis Ababa, (the capital city of Ethiopia). It was established in 1946 by Italian Missionaries and formerly called "Haile Mariam Mammo memorial hospital". It is a medical college and teaches Accelerated Medicine, Emergency Surgery and Anesthesia Nurses. The hospital gives services for about 5 million people East and Southern parts of Oromia, Afar, Somali and Southern Nation Nationalities and People (SNNP). Now the hospital has 465 different workers to who different services, of which 194 are administration workers. The other 271 workers are health professionals. There are specialist in different field (23), Practitioners (GP) 36, Nurses (116), Laboratory Workers (20), X-Ray (5), Physiotherapy (2), Sanitarians (2), Biomedical (1), Midwifery (16), Anesthesia (9), Health Officers (9), Psychiatry Nurses (3) And Masters in different fields(14).

The data obtained from the hospital shows that averages of 723 ambulatory diabetes patients attend the clinic for follow up. There are two formal diabetes clinic days per week "Wednesday and Thursday ". This study was done for a period of one month from 15<sup>th</sup> April to 15<sup>th</sup> May 2014.

### Study design

A prospective cross-sectional study was conducted at the ambulatory diabetic clinic of Adama Referral Hospital (ARH).

#### Inclusion criteria:

1. Ambulatory patients who are
  - 1.1 On anti-diabetic medications for greater than six months.
  - 1.2 Consented to participate in the study.
  - 1.3 Will attend the diabetic clinic during the study period

#### Exclusion criteria:

1. Unconscious patients
2. Patient age less than 18 years and
3. Very ill patients were excluded

#### Population:

1. Source population  
Diabetic patients being treated at adama referral hospital.

### 2. Study population

All diabetic patients receiving anti diabetic medication in the ambulatory diabetic clinic during the study period.

**Sample size determination:** The sample size was calculated using single population proportion formula as follows

$$n = \frac{Z^2 P(1-P)}{W^2}$$

where,

**n**=desired sample size for population>10,000

**Z**=standard normal duration usually set as 1.96 (which corresponds to 95% confidence level)

**P**=we use positive prevalence estimated. To maximize sample size.

Negative prevalence =1-0.5=0.5

**W**=degree of accuracy desired (marginal error is 0.05 then the sample size is

$$n = \frac{(1.96)^2 0.5(1-0.5)}{(0.05)^2} = 384.16 \approx 384$$

Since the total population is <10,000 that is 723; we use the Correction formula to determine final sample size.

$$nf = \frac{n}{1 + \frac{n}{N}} = nf = \frac{384}{1 + \frac{384}{723}} \quad nf = 250$$

**N**=final sample size when a population is <10,000

**n**=initial sample size when the population is >10,000

**nf**=estimated study population

Then 10% contingency was added on 250

$$250 \times 10\% = 25$$

$$nf + \text{contingency} = 275$$

### Sampling technique

A systematic random sampling technique was used.

**Data collection procedure:** The study involves cross-sectional interview of consecutive diabetic patients who visit the DM clinic during the study period. The interview was conducted with pre-tested adherence tool. Patients included in the pretest were subsequently excluded from the study. After the pilot testing, some question-items in the questionnaire were modified and reframed to ensure validity of the instrument.

**Instruments:** The questionnaire, which was the instrument of the study, was pre tested on diabetes patients.

This tool consists of information about the socio demographic characteristics of the respondents, the pattern of drug adherence and factors contributing to non-adherence. It also consists of information related to drugs prescribed, dose, frequency and Patients' mean fasting plasma glucose reading at the last clinic visit. Each questionnaire containing 25 questions that took an average of 5 to 10 minutes to fill was used in the interview. It was designed to have two sections; the first section elucidate the socio-demographic characteristics of diabetic patients while the second section contained questions that assess the

adherence patterns and the likely reasons for patients' non adherence to prescribed medications.

### Study variables

#### Independent variables:

1. Age
2. Religion
3. Educational level (class year)
4. Marital status
5. Income
6. Residence

#### Dependent variables:

1. Knowledge about the medications
2. Knowledge about the disease
3. Outcomes of treatment with anti-diabetic drugs.

### Data analysis

**Data quality assurance and interpretation:** Data were sorted, coded and entered into Predictive Analytics Software (PASW) (formerly SPSS) window version 16 for management and analysis. Descriptive statistics including frequency, mean, range, and standard deviation were used to summarize patients' baseline socio-demographic data and evaluate distribution of responses. Correlation and logistic analysis was employed.

**Ethical considerations:** Before data collection to conduct this

study ethical approval was obtained from Ambo University College of medicine and health science research team leader and the letter was submitted to Adama referral hospital medical director office prior to the beginning of undertaking the study in the area. All the study participants were informed about the purpose of the study; their right to refuse was maintained. Ethical conduct was maintained during data collection and throughout the research process. Verbal consent was obtained from each patient before the interview. Patients were assured of their anonymity. The confidentiality of the data obtained was assured and the name and address of the patient was omitted from the questioner.

### Result

The response rate from this study was 98.3%. A total of 270 patients were interviewed; One hundred thirty one (48.5%) were females. The mean age for the studied population was 55.11 (SD=14.24) years (range 19 to 85 years). The education profile of these patients revealed that 74 (27.4) had no formal or informal education while 99 (36.7%) have secondary or post secondary education. Sixty six (24.4%) were retirees from private and public establishments and 33 (12.2%) were government employees. A total of 184 (68.1%) of the patients included in the study were married. Thirty eight (14%) of the patients were younger than 40 years of age, one hundred and thirty five (50%) were between 40 and 60 years of age and 97 (35.9%) were older than 60 years of age. This and other socio demographic characteristics are given in Table 1.

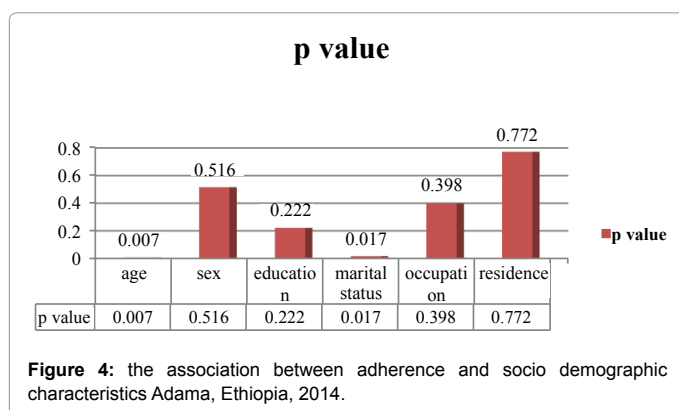
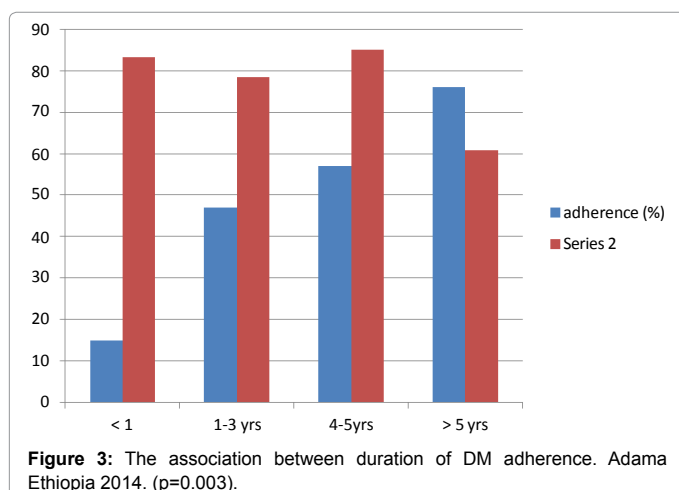
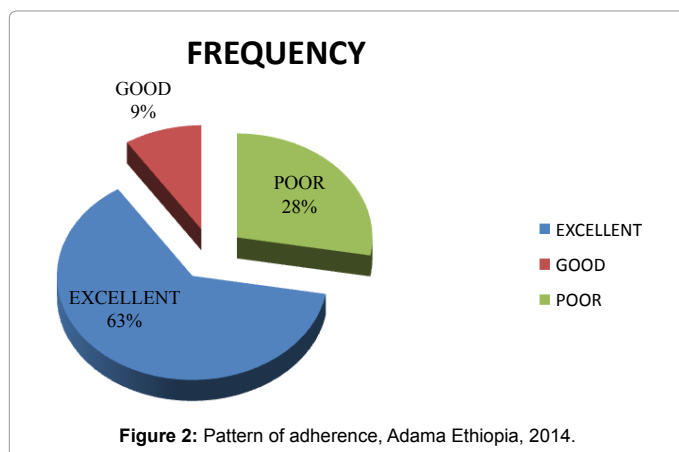
Approximately 195 (72.2%) of patients self-reported adherence to their anti diabetic drug regimens. In the pattern of drug use, 170 (62.96%) of patients have excellent adherence, 25 (9.26%) have good and 75(27.8%) have poor adherence (Figure 2).

A total of 59 (21.8%) of the participants ascribed their non-

Variable	Frequency	percentage	Variable	Frequency	Percentage
<b>Age (years)</b>			<b>Occupation</b>		
18-30	22	8.1	Government employee	33	12.2
31-40	16	5.9	NGO employee	20	7.4
41-50	50	18.5	Self-employee	75	27.8
51-60	85	31.5	Student	54	20
>60	97	35.9	House wife	6	2.2
			Retired	66	24.4
			Dependent	16	5.9
<b>Sex</b>			<b>Monthly in come</b>		
Female	131	48.5	<500	94	34.8
Male	139	51.5	501-1000	75	27.8
			1001-2000	49	18.1
			>2000	37	13.7
			No income	15	5.6
<b>Marital status</b>			<b>Place of residence</b>		
Married	18	6.7	Rural	51	18.9
Divorced	184	68.1	Urban	219	81.1
Separate	33	12.2			
Widowed/er	3	1.1			
	32	11.9			
<b>Educational level</b>			<b>Religion</b>		
Never went	74	27.4	Orthodox	149	55.2
Primary school	97	35.9	Muslim	63	23.3
Secondary school	50	18.5	Protestant	43	15.9
Post-secondary	49	18.1	Waqefeta	9	3.3
			Others	6	2.2

**Table 1:** Socio-demographic characteristics of patients, Adama Ethiopia, 2014.





adherence to forgetting to take their medications. Other factors include use of traditional and/or religious medicines 48 (17.8%), lack of finances 39 (14.4%). Of the total population, 248 (91.85%) of the patients reported that they monitored their blood glucose levels monthly at the DM clinic of the Hospital on a regular basis. The proportion of male patients adherent to their anti-diabetic medications was found to be lower 97 (69.78%) compared to the female patients (74.81%), but the difference was not statistically significant ( $p>0.05$ ). Adherence to anti-diabetic drugs was found to be higher among graduates (post secondary e.g. college (80.77%) and university (73.91%)) compared to those with illiterate and up to secondary school (71.04%), but this finding was not statistically significant ( $p>0.05$ ). It was also noted that patients with a

duration of diabetes  $\leq 5$  years (82.07%) were more compliant to their medication than those with diabetes  $>5$  years (60.8%), which was found to be statistically significant ( $P=0.003$ ) (Figure 3).

Investigation of association between respondents' socio-demographic characteristics and estimates of non adherence, such as and forgetfulness of medication doses, showed that age and marital status seemed to have statistically significant influence ( $p<0.05$ ) on respondents' tendencies to have good adherence (Figure 4).

The duration of diabetes from first diagnosis indicates that eighteen (6.7%) had been diagnosed for less than one year, 60 (22.2%) diagnosed 1 to 3 years, 67 (22.2%) for 4 to 5 years and 125 (46.3%) patients diagnosed before five years. Co morbid conditions include, Hypertension 148 (54.82%), Visual impairment 89 (32.96%), Nephropathy 37 (13.71%), Limb paralysis 30 (11.1%) and 44 (16.3%) have no co morbidity. The profile of prescribed anti diabetic medications among the patients indicated that a combination of sulfonylurea mostly glibenclamide, and metformine as co-administered products 118 (43.7%) was the most commonly prescribed combination therapy. Insulin alone, 127 (47%); glibenclamide alone was used by 19 (7%); and metformine alone, 1 (0.4%). Combination of glibenclamide and insulin were used by 4 (1.5%). Only 12 (4.4%) monitor their blood glucose level on regular basis using their glucose measuring device at home. All the respondents, 270 (100%) agree that they needed to continue taking their hypoglycemic medications throughout their lifetime and inappropriate use of medications will lead to development of more problems. Fifty nine (21.8%) forget to take the prescribed medication(s). Some of the approaches reported to be adopted, once they remembered included; taking the required dose of medication as soon as remembered or skip it if it is close to the next dose 66 (24.4%), doubling the next dose to make up for the forgotten dose 16 (5.9%), and 17 (6.3) forget it completely (Tables 2-4).

## Discussion

The management of diabetes mellitus involves both pharmacologic and non pharmacologic approaches. For the patient both approaches need a strict compliance to the agreements reached with the physician in order to achieve the desired goals of treatment. Despite this fact most patients were found to be non adherent to their recommended treatments and this is caused by several factors. As a result assessment adherence of patients to their respective treatments through continued researches is crucial.

This is a research done on patients with diabetes to evaluate the patients' self-reported adherence to their anti-diabetic drug therapy. The prevalence of adherence to anti-diabetic medications in this study was 72.2%. In comparison to this finding, two studies conducted in India showed that the patients' self-reported adherence rate to anti-diabetic medications was 66.9% and 57.5% [11-16]. In this regard most

Factors	Frequency	Percentage (%)
Forgetfulness	59	21.8
High cost of the drug	39	14.4
Lack of trust in the efficacy of the drug	9	3.3
Nature or schedule of my work	9	3.3
Traditional and/or religious belief	48	17.8
Side effect of the drug	14	5.2
Feeling better	23	8.5
Feeling worse	9	3.3

**Table 2:** Patients' opinions on factors that prevent optimal medication adherence Adama Ethiopia 2014.

QUESTIONS	Adherence score (frequency [%])				Mean score
	1	2	3	4	
1. How often do you forget to take your medicine?	0	6 (2.2%)	53 (19.6%)	211 (78.1%)	3.76
2. How often do you stop taking your medicine because you feel better?	0	1 (0.4%)	22 (8.1%)	247 (91.5%)	3.91
3. How often do you stop taking your medicine because you feel worse?	0	0	9 (3.3%)	261 (96.7%)	3.97
4. How often do you stop taking your medicine because you feel they are ineffective?	0	1 (0.4%)	8 (3%)	261 (97.7%)	3.96
5. How often do you stop taking your medicine because you fear side effects or have caused side effects?	0	0	14 (5.2%)	256 (94.8%)	3.95
6. How often do you stop taking your medicine because you are using traditional medicine or religious belief?	0	5 (1.9%)	43 (15.9%)	222 (82.2%)	3.77

Note: Adherence Scores Scales: 4, Never; 3, Rarely; 2, Frequently; 1, Daily.

**Table 3:** Adherence scores, Adama Ethiopia, 2014.

Adherence Score	Adherence Status	Frequency	Percentage (%)
24 (Full Score)	Adherent	170	62.96
23 (One Point Missed From Question 1)	Adherent	25	9.26
23 (One Point Missed From Other Question)	Non Adherent	27	10
20-22	Non Adherent	45	16.67
<20	Nonadherent	3	1.11
Total	270	100	

Note: Adherers were those that scored a full score of 24 or score of.

**Table 4:** Frequency distribution of adherers and no adherers, Adama Ethiopia, 2014.

patients in the present study are resides in a big city and benefit from the widely disseminated information concerning their disease and directly from their physician.

A systematic review on the compliance to medication among diabetic patients, showed that the average compliance to the oral hypoglycemic agents ranged from 36%-93% [17].

Study from UAE reported a relatively higher over all adherences of 84% [12].

The adherence rates differed across gender and females were more compliant 74.81% than males 69.79% in the present study. This was in contrast to the result of study from India and UAE [11,12]. Women spent most of their time at home and they might benefit from this to taking their medications as prescribed.

With regard to the educational level, higher adherence rates were noted among graduated patients (diploma) 80.77% and secondary school 80% were found to be the most compliant to the prescribed treatment in this study. This was supported by previous researches done in Saudi Arabia and UAE [12,15]. And it is consistent with the assumption that as the complexity of the diabetes drug therapy increases, patients are required to understand the prescribed drug therapy to adhere to treatment; hence it would be better understood by those with higher educational profiles. The duration of diabetes plays an important role in management of diabetes. This study showed that most of the patients (53.7 %) had a diabetic history of 1-5 years and the longer the duration of diabetes, the lower the rate of adherence (82.07% vs. 60.8%) in duration  $\leq$  5 years and  $>$ 6 years respectively. This finding was consistent with the study from UAE and India indicating a negative relationship between the duration of diabetes and patient adherence to drug therapy [11,12]. During the early stage of the disease patients tend to be more committed to their disease, but their commitment do not lasts long since they adapt the burden and deterioration continues.

The most common reasons for non adherence to medications were modifiable factors that could be overcome by adopting suitable

measures. Forgetfulness was the most commonly mentioned reason for non-compliance, similar to the findings from studies from UAE, Nigeria, and India [12,13,17]. In contrast, a study from India reported self decision 35.08% as the main causal factor for non-adherence to anti-diabetic medications [16]. This barrier can be overcome by assisting patients in organizing their medications with pillboxes and dosing alarms and family members can assist in medication adherence in the elderly and in those taking multiple medications.

The high cost of medication agreed by majority of the patients as the most important reason preventing optimal adherence.

In this study, the main external challenge of adherence is financial problem (61.90%) This is in agreement with study done in Nigeria in which around 2/3, 37.1% in Ethiopia where the non-adherence is due to financial difficulty [8,14]. Ethiopia is a developing country in which most of the population has a lower income and this is one factor that contribute the limited health service in general and DM management in particular. The identified causes of non-adherence to taking anti-diabetic medications as prescribed were nature of work /busy schedule of work, patient dissatisfaction, cost of drug and forgetfulness were found to be 13.85%, 10.77%, 21.54% and 53.85% , respectively in this study. Similarly, non-adherence to appointment keeping was caused by forgetfulness 9.53%, nature of work and busy schedules 42.86%, travelling away from home 42.86%, intentional 4.76%. Patients who come from rural areas and those elderly patients who don't have care giver have difficulty of keeping clinic appointments. Similar study identified busy work schedules especially for patients in the working population as one of the reasons why some patients do not take their anti-diabetic medications 16.19% [14].

The majority of the patients were on mono therapy the same result as with study from Ethiopia [14]. But the mono therapy mostly prescribed in this case was Insulin (47%) unlike the above study in which glibenclamide (74.3%) was used. The present study includes both type one and type two diabetes patients and it is not surprising that insulin is used in most patients that it is used in both type I and II

(when necessary) and also the prevalence of the types of DM should be considered in this two areas. The most commonly used combination therapy was Glibenclamide and metformine (43.7%). This is in agreement with the Study in Nigeria that showed the same combination therapy in 36.8% of patients.

The practice of self-monitoring of blood glucose levels by patients is indicative of their commitment to diabetes management. The study showed that 41.1%. Of the patients had adequate glycemic control and it is consistent with other study who reported adequate glycemic control in 41.8% of type-2 diabetic patients. Although, HbA1c is the established gold standard, FPG level is being used to assess and monitor glycemic control in this hospital. The glycosylated hemoglobin (HbA1c) test was not routinely recommended for patients probably on account of the high cost of the test in the hospital or because it may not be part of the established guideline within the hospital.

## Conclusion and Recommendation

### Conclusion

This study was able to show the main factors that can undermine the desired outcomes of diabetes pharmacotherapy in diabetic patients by decreasing adherence to their medications. This factors can be patient related such as (forgetfulness, intentional omission of dose) and drug related (cost, side effects and multiple drug therapy especially in those with co morbidity), all of which are modifiable factors. Most diabetic patients are currently being managed with the most effective available drugs. However as the result from this study indicates the desired blood sugar level could not be controlled and maintained adequately. This was because of poor adherence with the prescribed drug regimen and poor knowledge and practice of successful self management.

### Recommendation

1. Adequate, clear and quality information regarding diabetes and anti diabetic medications should be provided to all diabetic patients in order to make the patient aware of future complications of the disease and the benefits of drug therapy as the factors related to non adherence in this area are modifiable and associated with low knowledge about the disease and treatment.

2. The practice of cost free medication service to the patients that cannot afford to buy in this hospital is appreciable as cost of drug is among the factors hindering adherence but the inclusion of other needy patients should be considered since there are still large number of poor patients who are losing hope of their future.

3. The role of health professionals at this point should be considerable in providing a cost effective, safest and the most effective available medication.

4. Patients should be encouraged to appropriately use anti diabetic drugs and a regular awareness should be created regarding the benefits of using them there by preventing the intentional non adherences.

5. The medication adherence rate in this study was 72.2%. Although the exact estimate of adherence may not be accurately depicted, as this is a small cross-sectional study; future large-scale studies are needed for further understanding of the problem and development of more effective interventions

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### References

1. Anjana RM, Ali MK, Pradeepa R, Deepa M, Datta M, et al. (2011) The Need for Obtaining Accurate Nationwide Estimates of Diabetes Prevalence in India-Rationale for a National Study on Diabetes. *Indian J Med Res April* 133: 369-380.
2. Oputa RN, Chinenye S (2012) Diabetes Mellitus: A Global Epidemic with Potential Solutions *Afr J Diabetes Medicine*.
3. Majaliwa ES, Elusiyan BE, Adesiyun OO, Laigong P, Adeniran AK, et al. (2008) Type 1 diabetes mellitus in the African population: epidemiology and management challenges. *Acta biomed* 79: 255-259.
4. Cramer JA (2004) A systematic review of adherence with medications for diabetes. *Diabetes Care* 27: 1218-1224.
5. Solomon AF, Chalachew MA, Hawult TA (2013) Assessment of the Level and Associated Factors with Knowledge And Practice Of Diabetes Mellitus Among Diabetic Patients Attending At Felegehiwot Hospital, Northwest Ethiopia. *Clinical Medicine Research* 2: 110-120.
6. Rwegerera GM (2014) Adherence to anti-diabetic drugs among patients with Type 2 diabetes mellitus at Muhimbili National Hospital, Dar es Salaam, Tanzania- A cross-sectional study. *Pan Afr Med J* 17: 252.
7. JT Dipiro, RL Talbert, GC Yee (1229) *Pharmacotherapy: A Pathophysiologic Approach*; Seventh Edition; Section 8.
8. Adisa R, Fakeye T, Fasanmade A (2011) Medication Adherence among Ambulatory Patients with Type 2 Diabetes in a Tertiary Healthcare Setting In Southwestern Nigeria. *Pharmacy Practice* 9:72-81.
9. Kalyango JN, Owino E, Nambuya AP (2008) Non-adherence to diabetes treatment at Mulago Hospital in Uganda: prevalence and associated factors. *Afr Health Sci* 8: 67-73.
10. Tamiru S, Alemseged F (2010) Risk Factors for Cardiovascular Diseases among Diabetic Patients In Southwest Ethiopia. *Ethiop J Health Sci* 20: 121-128.
11. Manjusha S, Madhu P, Atmatam P, Modi A, Sumariya R (2014) Medication Adherence to Antidiabetic Therapy in Patients with Type 2 Diabetes Mellitus. *Int J Pharm Pharm Sci* 6:564-570.
12. Arifulla M, John LJ, Sreedharan J, Muttappallymyalil J, Basha SA (2014) Patients' Adherence to Anti-Diabetic Medications in a Hospital at Ajman, UAE. *Malays J Med Sci* 21: 44-49.
13. Adisa R, Alutundu M, Fakeye TO (2009) Factors Contributing to Nonadherence to Oral Hypoglycemic Medications among Ambulatory Type 2 Diabetes Patients in Southwestern Nigeria. *Pharmacy Practice* 7:163-169.
14. Wabe NT, Angamo MT, Hussein S (2011) Medication adherence in diabetes mellitus and self management practices among type-2 diabetics in Ethiopia. *N Am J Med Sci* 3: 418-423.
15. Khan AR, Al-Abdul Lateef ZN, Al Aithan MA, Bu-Khamseen MA, Al Ibrahim I, et al. (2012) Factors Contributing to Non Compliance among Diabetics Attending Primary Health Center at Al Hasa District of Saudi Arabia. *J Family and Community Med* 19:26-32.
16. Kumar P A Study on Medication Non-Adherence in Ambulatory Diabetic Patients and Need for Pharmacist Intervention for Improving Patient Adherence. *Indian Journal of Research in Pharmacy and Biotechnology* 1: 446.
17. Mukherjee S, Sharmasarkar B, Das KK, Bhattacharyya A, Deb A (2013) Compliance to anti-diabetic drugs: observations from the diabetic clinic of a medical college in kolkata, India. *J Clin Diagn Res* 7: 661-665.