# Compliance of Type Two Diabetic Patients to Treatment in a Sample in Baghdad

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**ABSTRACT:**

**BACKGROUND:**

Diabetes is one of the major public health problems all over the world. The world health organization said that about 224 million persons in the world have diabetes mellitus (1). There is a globally agreed target to halt the rise in diabetes and obesity by 2025. Most of this increment will occur in the developing countries and this will be due to population growth, ageing, and sedentary life styles. Many patients with type 2 diabetes are taking a combined regimen of drugs. The lifestyle changes and the drugs to manage type 2 diabetes and the associated issues can only be effective by the attachment to the prescribed regimen. Effective treatment of diabetic patients requires good cooperation between doctors and patients. Compliance is one of the fundamental problems in this cooperation. (2)

**AIMS OF THE STUDY**:

To assess the compliance of type two diabetic patients with the medications, the diet, and the appointments to the diabetic clinics
To evaluate the Factors involved with it.

**METHODS:**

A cross- sectional study was carried out in 300 convenient samples of diabetic type 2 patients of both sexes and their age between 35-80 years attending Al-Imamein al-Kadhimein medical city and Alyarmook teaching hospital diabetic centers through the direct interview using a specially designed questionnaire.

**RESULT:**

Out of the whole sample (300) patients, two thirds (65%) of them were females. The average age of the studied sample was 55.1 (± 9.5) years, and ranged from 35 to 80 years. Good compliance of patients with medications was seen in (48.7%),while (49.7%) of the whole sample had good compliance to diet regimen that had been given to them by their doctors. only (49.3%) of the diabetic patients in our study had good compliance with appointments at the diabetic clinics. Fasting blood level was 243 ± 73.3 mg/dl in those with poor compliance to medication while those with good compliance readings of fasting blood sugar were 177.2 ± 67.5 mg/dl. Males were significantly associated (p= 0.004) with good compliance for medication, as 112 (42.6%) of females reported good compliance in comparison to (60%) of males. Poor compliance was prevalent among 67 (64.4%) of the rural cases in comparison to 87 (44.4%) of the urban cases. The study showed a significant poor compliance in the illiterate as compared to the higher education groups.

**CONCLUSION:**

Compliance of type 2 diabetic patients to the treatment was relatively low in Baghdad city. Extremely significant protection against the poor compliance was seen among the diet followers and to those satisfied by the consultations and doctors advices.

**KEYWORDS:** Type2 diabetes, good, poor, Compliance, Baghdad

## INTRODUCTION:

Diabetes Mellitus (DM) is one of the most important chronic diseases according to the number of patients with diabetes and complaining from its morbidity and mortality. Most of the cases of diabetes mellitus are of type 2 diabetes, in spite of type 2 diabetes mostly occurs in people with age more than 40 years; it is increasingly becoming also common in children, adolescents and young adults due to the reduced physical activity and unhealthy eating patterns, leading to obesity (3). Compliance is the best way to control diabetes and prevents its Complications.

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Personal factors like age, gender, marital status, educational status, smoking status, and BMI grades play an important role in the compliance of diabetic patients at primary health care centers of Iraq regarding their exercise, diet, medications and follow-up. As a part of a larger study, we identified the personal characteristics which determined the compliance (4).

**PATIENTS AND METHODS:**
This study was carried out in diabetic centers in AL-Imamein Al-Kadhimein Medical City and At AL-Yarmook Teaching Hospital for a period of four months from the 1st of February to the 30th of May 2016.

Three hundred adults' type 2 Diabetes mellitus men and women were selected conveniently in this study. The age of them ranged from 35-80 years.

The design of the study was a descriptive cross-sectional study. The data collection was done through 2 days /week and 10-15 cases per day by direct interview which was lasted for 10-15 minutes for each patient by using a questionnaire made by the researcher. The questionnaire had been filled by the researcher and divided into three parts related to the compliance with dietary regimen, medications, and with the appointments to diabetes clinics, and was divided into good and poor compliance according to the commitment to the dietary regimen, medications and appointments by their answers in the questionnaire .

The questionnaire includes questions about:
- Socio-demographic variable.
- Duration of diabetes in years.
- Presence of other diseases.
- Family history of diabetes.
- Is income enough to buy all medication related to diabetes?
- Information about management regimen.
- Compliance with diet (good or poor).
- Did high frequency of food gathering with family and friends affect his diet and make it difficult to control his blood sugar levels.
- Compliance with drugs (good or poor).
- Regular physical activity (did the patient do physical exercise at least 30 minutes every day).
- Self monitoring of blood glucose (did the patient do self monitoring of blood glucose at home).

The data had been analyzed by the Statistical Package for the Social Sciences (SPSS) version 20.0

**RESULTS:**
The current study included 300 diagnosed cases of type 2 diabetes mellitus from the tertiary centers' clients cross section selected. About two thirds (65%) of them were females. The average age of the studied sample was 55.1 (± 9.5) years, and ranged from 35 to 80 years. Most Patients 35.3% were in the age group (50 – 59 years) while the least 4.7 % were in age group below40 years as illustrated in table 1

**Table 1:Socio-demographic features of the included patients with type 2 DM.**

| Variables | Number | % |
|---|---|---|
| Age groups | | |
| <40 years | 14 | 4.7% |
| 40-49 years | 76 | 25.3% |
| 50-59 years | 106 | 35.3% |
| 60-69 years | 81 | 27.0% |
| ≥70 years | 23 | 7.7% |
| Total | 300 | 100% |
| Mean±SD (Range) | 55.1 ± 9.5 (35 – 80) years | |
| Sex | | |
| Female | 195 | 65% |
| Male | 105 | 35% |
| Total | 300 | 100% |
| Marital status | | |
| Single | 14 | 4.7% |
| Married | 207 | 69% |
| Divorced | 17 | 5.7% |
| Widowed | 62 | 20.7% |
| Total | 300 | 100% |
| Residence | | |
| Urban | 196 | 65.3% |
| Rural | 104 | 34.7% |
| Total | 300 | 100% |

| Education level | | |
|---|---|---|
| Illiterate | 63 | 21% |
| Primary school | 81 | 27% |
| Secondary school | 87 | 29% |
| Higher education | 69 | 23% |
| Total | 300 | 100% |

Regarding the body mass index of the studied type 2 diabetic patients, the average BMI was 30.7 (± 5.5) kg/m2 and ranged from 18.6 to 46.7 kg/m2.As shown in Figure 1
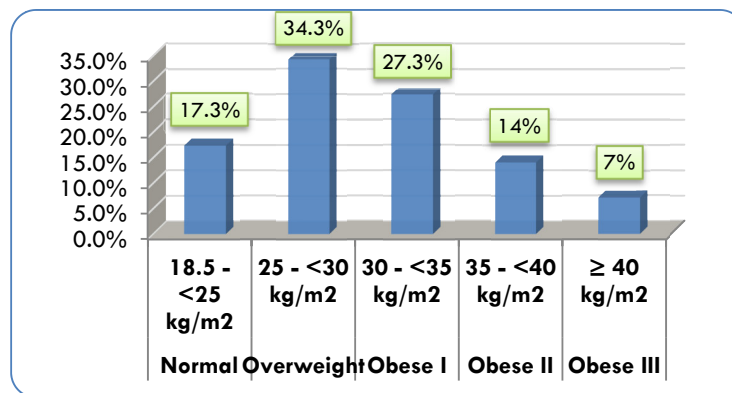


**Figure 1: Percentage of included type 2 diabetic patients, according to their BMI categories, N=300**

Patients compliance with medications out of 300 diabetic patients 146 (48.7%) were presented with good compliance. Good compliance with diet regimen was seen in 149 (49.7%) patients while good compliance with appointment at diabetic clinic was 148 (49.3%) as seen in table 2

**Table 2: Patterns of compliance by diabetic patients at diabetic center.**

| Compliance pattern | Number | % |
|---|---|---|
| Compliance with medications | | |
| Good compliance | 146 | %48.7 |
| Poor compliance | 154 | %51.3 |
| Total | 300 | %100 |
| Compliance with diet regimen | | |
| Good compliance | 149 | %49.7 |
| Poor compliance | 151 | %50.3 |
| Total | 300 | %100 |
| Compliance with appointment at diabetic clinic | | |
| Good compliance | 148 | %49.3 |
| Poor compliance | 152 | %50.7 |
| Total | 300 | %100 |

In comparison of fasting blood level according to patients' compliance with medications, the results showed that the average level of fasting blood sugar in those patients with poor compliance patients was 243 ± 73.3 mg/dl while in those with good compliance was 177.2 ± 67.5 mg/dl. The result was statistically highly significant as illustrated in Figure 2 below.
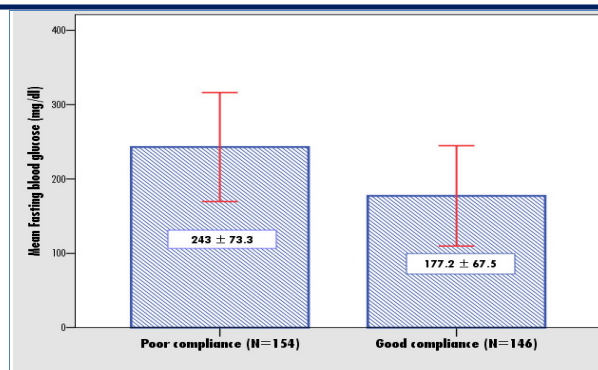
**Figure 2: Comparison of average FBS level in diabetic patients, according to their compliance with medications (t-test= 8.072, d. f. = 298, p<0.001*)**

Considering patients' factor that might affect their compliance with medications, the current study tested the association of compliance with demographic characteristics, there was significant association between male gender, urban and education and good compliance with medications as the results showed in table 3below:

**Table 3: Relation of compliance with medications and demographic characteristics of included T2DM patients.**

| Variables | Poor compliance (N=154) | | Good compliance (N=146) | | χ2 (df) | p-value |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | | |
| Age groups (years) | | | | | | |
| <40 years | 6 | 42.9% | 8 | 57.1% | 4.591 (4) | 0.332 |
| 40-49 years | 46 | 60.5% | 30 | 39.5% | | |
| 50-59 years | 55 | 51.9% | 51 | 48.1% | | |
| 60-69 years | 37 | 45.7% | 44 | 54.3% | | |
| ≥70 years | 10 | 43.5% | 13 | 56.5% | | |
| Sex | | | | | | |
| Female | 112 | 57.4% | 83 | 42.6% | 8.305 (1) | 0.004* |
| Male | 42 | 40% | 63 | 60% | | |
| Marital status | | | | | | |
| Single | 7 | 50% | 7 | 50% | 3.109 (3) | 0.375 |
| Married | 100 | 48.3% | 107 | 51.7% | | |
| Divorced | 11 | 64.7% | 6 | 35.3% | | |
| Widowed | 36 | 58.1% | 26 | 41.9% | | |
| Residence | | | | | | |
| Urban | 87 | 44.4% | 109 | 55.6% | 10.918 (1) | 0.001* |
| Rural | 67 | 64.4% | 37 | 35.6% | | |
| Education level | | | | | | |
| Illiterate | 47 | 74.6% | 16 | 25.4% | 18.856 (3) | <0.001* |
| Primary school | 32 | 39.5% | 49 | 60.5% | | |
| Secondary school | 42 | 48.3% | 45 | 51.7% | | |
| Higher education | 33 | 47.8% | 36 | 52.2% | | |
| *Significant at 0.05 level by chi-square test | | | | | | |

The results also revealed no significant association of body mass index groups, duration of diabetes and the presence of other chronic diseases with patients' compliance with medications. Cases with positive family history of diabetes mellitus showed significantly (p=0.02) better compliance as 124 (52.1%) of them reported good compliance to medications in comparison to 22 (35.5%) of those with negative family history.

**Table 4: Relation of compliance with medications of included T2DM patients with BMI, duration of disease, presence of other diseases & family history.**

| Variables | Poor compliance (N=154) | | Good compliance (N=146) | | $\chi^2$ (df) | p-value |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | | |
| BMI groups | | | | | | |
| 18.5-<25 kg/m2 | 26 | 50% | 26 | 50% | 6.77 (4) | 0.149 |
| 25 - <30 kg/m2 | 47 | 45.6% | 56 | 54.4% | | |
| 30 - <35 kg/m2 | 42 | 51.2% | 40 | 48.8% | | |
| 35 - <40 kg/m2 | 23 | 54.8% | 19 | 45.2% | | |
| ≥ 40 kg/m2 | 16 | 76.2% | 5 | 23.8% | | |
| Duration of diabetes | | | | | | |
| <5 years | 53 | 52% | 49 | 48% | 0.084 (2) | 0.959 |
| 5 - 10 years | 42 | 50% | 42 | 50% | | |
| >10 years | 59 | 51.8% | 55 | 48.2% | | |
| Presence of other diseases | | | | | | |
| Yes | 88 | 47.1% | 99 | 52.9% | 3.631 (1) | 0.057 |
| No | 66 | 58.4% | 47 | 41.6% | | |
| Family history of diabetes | | | | | | |
| Yes | 114 | 47.9% | 124 | 52.1% | 5.437 (1) | 0.02* |
| No | 40 | 64.5% | 22 | 35.5% | | |
| *Significant at 0.05 level by chi-square test | | | | | | |

## DISCUSSION:

In this study, most frequently affected age group with type 2 diabetes were patients (50-59) years of age which form the highest percentage of (35.3%). This result goes with Ula Shaker study in Baghdad 2007, which showed the highest percentage (28.7%) of diabetes was seen in the patient's age group (50-59) years of age [5]. The present study showed that the female constituted (65%) of the sample. This goes with the findings of Mrs.Jansiraninatarajan study in Oman 2013[6], where (55%) of diabetic patients were females, this may be due to the fact that females are aware more for their health and have more free time for visiting diabetic center because most of them were housewives . This study showed that (17.3%) of diabetic patients were in normal BMI and (34.3%) were overweight and (27.3%) were with mild obesity and (14%) with moderate obesity and (7%) with morbid obesity. This goes with Afnan et al study in Al Kuwait 2012 where more diabetes patients present with BMI (35.5%) overweight and (26.9%) mild obesity and (12.7 %) were normal BMI [7]. Our study also goes with M. Adham et al study in Jordan 2010 most diabetic patients Presented with overweight (33.7%) and (33.1%) were obese and (8.7%) were normal BMI [8] , this agreement might be due to similar eastern diet. This result does not go with Muhammed Khalid et al study in Erbil 2012 where the most diabetic patients were obese.[9]In the current study, (51.3%) of diabetic patients found it poor compliance to medications .This does not go with Afnan et al study in al Kuwait in which only (32.1%) of diabetes patients found it hard to follow treatment regimen[7]. This difference might be due to poor commitment of diabetic patients in visiting diabetic center due to load in the diabetic clinic. In the current study, the age of diabetic patients did not show any significant association with their compliance

with medications (the p value 0.332) ,(60.5%) of diabetic patients with age group( 40-49) years of age presented with poor compliance while (57.1%) of diabetic patients with age group less than 40 years of age presented with good compliance. This is going with Mohamed et al study in Egypt in which there was no significant association between age and compliance (p value 0.09), and in less than 40 year of age (51.8%) were presented with good compliance. [10]

In the current study, there is a significant association between sex and compliance with medications (p value 0.004). Where (57.4 %) of females presented with poor compliance with medications and (42.6%) presented with good compliance, (60%) of males had good compliance and (40%) presented with poor compliance. This might be due to the large responsibility of female to the children in addition to shopping and housekeeping making her difficult to concentrate.

This is not going with Mohamed et al study in Egypt 2010 in which there was no significant association between sexes with compliance to medications (p value 0.07), where most of the females presented with good compliance, and most of the males presented with fair /poor adherence to the medications [10]. This difference could be attributed to diet, variation in their education, and social factors.

Regarding residency, there is a significant association between residency and compliance (p value 0.001) in which the high percentage of good compliance (55.6%)were in urban diabetic patients while the highest percentage of poor compliance (64.4%) were in rural residence diabetic patients .This does not go with Mohamed et al study in Egypt where there is no significant association between residency and compliance (p value is 0.243)in which only (13.2%)in urban diabetic patients presented with poor compliance with medications[10]. The significant association might be due to  better financial and educational status at urban patients . In the current study according to education level, there was highly significant association with compliance (p value is <0.001).The highest percentage of good compliance (60.5%) were in diabetic patients with primary school education followed by higher education then secondary education while the highest percentage of poor compliance (74.6%)were in illiterate.  This result does not go with Nur et al study in Malaysia 2013 in which there was no significant association with education level (p value 0.831) [11].

In the current study about BMI, there was no significant association with compliance to medications (p value 0.149) and the highest percentage of good compliance with medication presented in overweight was (54.4%) and the highest rate of poor compliance was (76.2%) presented in morbid obesity diabetic patients. These results agreed with Afnan et al study in Al Kuwait 2012 in which there was no significant association with body mass index (p value 0.153) in spite of the high percentages of (overweight) among Kuwaiti type 2 diabetic adults (7), and disagreed with Muhammed Khalid et al study in Erbil in which the highest percentage of good compliance (37.2 %) was in diabetic patients with normal BMI (9). This does not agree with Mohammad et al study in Abha, Saudi Arabia in which the BMI was a significant determinant of compliance. Patients with normal BMI were found to be more compliant with diet, exercise and appointments. The Obese patients were founded in many studies to be less compliant to the diabetes regimens and failed in reaching the target levels. The less percentage of compliance to medications was in obese patients [12]. This result agreed with Nur et al study in Malaysia 2013 in which there was no significant association with compliance (p value 0.964) the highest percentage of compliance (47.5%)were in obese patients while the highest percentage of non compliance (52.6%) were in diabetic patients with normal BMI [11].

## CONCLUSION:
Compliance of type 2 diabetic patients to treatment was relatively low in Baghdad city.

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