Determining Prescribed Medication Adherence Level and its Predictors among Diabetic Patient, Hawassa, Ethiopia: Facility Based Study

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Abstract

BACKGROUND: World widely, fail to adherence to treatment of diabetes is a worldwide problem and about 50% diabetes (DM) diagnosed was adhered to their prescribed medication in developing country. OBJECTIVE: To assess the level of prescribed medication adherence and its predictors among diabetic patient in diabetic clinic Sidama, Hawassa, Ethiopia, 2019. METHOD: This study was done by using cross-sectional study design at chronic out-patient department of Hawassa University Comprehensive Specialized Hospital (HUCSH) at Hawassa. The study conducted within 3 month of 2019. The WHO guideline of 2012 was used to determine level of prescribed medication adherence among participants. The collected data was entered into EPI-data version 3.1 and exported to SPSS version 22. Then to determine independent predictors multivariate logistic regression was used.

RESULT: The level of prescribed medication adherence was found to be 58.8%. Factors found to predict prescribed medication level were social support AOR; 95%CI 3.2 (1.28, 4.93), dietary regimen AOR; 95% CI 2.45 (1.37, 4.35) and illness in duration of AOR 95% CI 1.52 (1.32, 2.12).

CONCLUSION AND RECOMMENDATION: The level of prescribed medication adherence was low. Factors predicting adherence was social support, dietary regimen and duration of illness. Health information provision and education through different means of communication should be essential to increase prescribed medication adherence among patients. Identifying possible means to overcome factors will be designed.

Keywords: magnitude · medication adherence · factors · diabetes

1. Introduction

1.1 Background

Diabetes mellitus (DM) is a collection of metabolic disorders of carbohydrates, lipids, and proteins characterized by high blood glucose level. DM occurs due to absence of insulin secretion or decreased insulin secretion [1]. According to the estimate of International Diabetes Federation (IDF), about 14.2 million people lived with diabetes in 2015 in Sub-Saharan African countries. This estimate will be projected in 2040 to 34.2 million [2]. Medication adherence is the range in which person’s behavior relates with the agreed recommendation from health care providers as it was stated by world health organization [3]. Adherence has been also defined as the “active, voluntary and collaborative involvement of the patient to certain recommend-ed regimen to brought a therapeutic result” [4]. Worldwide as researchers found that there is a wide range of variation regard to prescribed medication adherence among diabetes. So, poor adherence to treatment of DM is a worldwide problem to decline the medication adherence level. According to World Health Organization (WHO) in developing country, about 50% DM diagnosed were adhered to their prescribed medication. It is true that many patient faces in striking recommended treatment regimen [5]. Anti-diabetic medications are prescribed for DM patients to brought glycaemic control, therefore non-adherence to drugs can alter the level of blood glucose in patients resulting in complications [6]. Poor adherence result in remarkably high rates of morbidity and mortality due to metabolic control, especially poor glycemic control [7]. The studies indicated that there were different factors associated with prescribed medication adherence. These
were patients, conditions, socioeconomic status, the health system and therapy. Therefore, interventions which focus on improving medication adherence should aim this entire factor [8]. So that fixation to prescribed medication requires strict management to bring good patients outcome among diabetic patients. Besides to this, prescribed medication adherence for the patient with their factors in Ethiopia principally in the study area is known little before. Therefore, the aim of this study was to provide rich data on adherence level and associated factors among diabetes in the study area.

1.2 Objective

1.2.1 General objective
To assess the level of prescribed medication adherence and its predictors among diabetic patient having follow up in diabetic clinic of HUCSH, Hawassa, Sidama, Ethiopia, 2019.

1.2.2 Specific objectives
To determine level of prescribed medication adherence among DM patients attending medication at HUCSH, Hawassa, Sidama, Ethiopia, 2019.
To identify predictors for prescribed medication adherence among diabetes patients at HUCSH, Hawassa, Sidama, Ethiopia, 2019.

2 Methodology

2.1 Study area and period
It was directed in HUCSH at Hawassa town which is the capital city of Sidama region in Ethiopia. The hospital is 273 km far from Addis Ababa. Currently Hawassa University Compressive Specialized Hospital (HUCSH) is providing health service for over 18 million people in and around the region. The Hospital had 461 diabetes patients attending the clinic for follow up. It was from 8/3/2019 - 23/5/2019.

2.2 Study design
It was cross-sectional which is conducted at facility.

2.3 Population

2.3.1 Source population
All diabetes out patients who was visiting the diabetic outpatient clinic with in the study period in HUCSH, Hawassa, Ethiopia.

2.3.2 Study population
Sampled DM patient who was randomly selected with in the period of study.

2.3.3 Study unit
Each participant of the diabetes patient engaged in the study.

2.4 Inclusion and exclusion criteria

2.4.1 Inclusion criteria
Those sampled diabetes mellitus patient with the age of 18 and above with the ability to provide consent.

2.4.2 Exclusion criteria
Those sampled diabetic patient who had mental illness or seriously ill when the study was conducted.

2.5 Sample size determination
Single population proportion formula was employed to have appropriate sample size.

\[ n = \frac{z^2 \cdot p(1-q) \cdot d^2}{(q \cdot 0.513 \cdot 0.487)^2} \]

\[ n = 384 \]

n=sample size
p(51.3)=prevalence of medication adherence among diabetes at Zewditu Memorial Hospital [9].
q=1-p = (100-51.3) d=margin of error, Zα/2= at 95%CI

The calculated sample to collect the data was 461. So, correction formula was used because of less than 10,000 study population. Then, n= 210 by considering 10% non-respondent the actual size of the sample to conduct the study were 231.

2.6 Sampling technique
Registered 461 DM patients were found to be in...
the DM registration book. So that, sampling frame had drawn from the list of appointed patients with in the study period. Then systematic random sampling was employed to select 231 patients. Then sampling interval were calculated by \( r = \frac{\text{sample size}}{n} \). Denotes the total number of diabetic patients who had appointment with in study period was 461 and the n is total sample size. So, every 2nd patient was selected from sampling frame and the sampled DM outpatients were interviewed at exit of the service provision.

2.7 Dependent variables
Medication adherence level.

2.8 Operational definition
The operational definition were as follows:- Adherent: Those sampled patients who took prescribed medication at a minimum of 4 and above within 7 days (greater than or equal to 90% adhered to drugs) [10]. Non-adherent: Were those sampled participants who took medication 3 and below less than within 7 days (less than 90% adhered to drugs) [10].

2.9 Data collection methods and tool
Amharic version questionnaire was used after it was interpreted from the preliminary English version questionnaire. Then language experts were engaged to translate it back to it English version autonomously to preserve the similarity. The study surveys have 4 parts. The socio demographic information, some behavioral factors and clinical factors were assembled from study participant’s data and by their own word. The rest behavioral related variables like alcohol drinking, physical activity, dietary regimen were measured based on WHO 2014 guideline. Besides this, social support was operationalized as an individual response whether the participants had/ not a motivational communication support from the friends, nearby, family and community. But the level of medication adherence was measured according to WHO, 2012 guideline.

2.10 Quality control
To assure the quality of the study result; provision of training for 5 data collectors and 2 supervisors had given. Conducting pre-test had also done. Besides to this, assessing whether the questionnaire had fulfilled the necessary data collected from study participants plus monitoring data collectors by principal investigators and supervisor had done.

2.11 Data processing and analyzing
After checking collected data, the responses were entered using Epi-data 3.1 version and exported to SPSS version 22.0. The data was checked for missed value before analysis. Analyzing the frequency distribution was done in the study. Multivariate analysis was done to identify pertinent factors associated with adherence for prescribed medication.

### 3. Result
3.1 Socio demographic characteristic of the respondents
Out of total 231 sampled diabetes patients; 221(95.6%) were those participants who engaged in responding in the study. Among them 110 (49.8%) were females and married. From the participants, 60(27.1%) were found in the age group of 35-44 (Table 1).

| No | Variables | Category | n | %  | Medication adherence | COR95% CI       | p-value |
|----|-----------|----------|---|----|----------------------|-----------------|---------|
| 1  | Sex       | Male     | 111| 50.2| 39(35.1) 72(64.9) | 1.02(0.59,1.7) | 0.92    |
|    |           | Female   | 110| 49.8| 38(34.5) 72(65.5) | 1               |         |
| 2  | Age       | 18-24    | 20 | 9.0 | 6(30) 14(70) | 0.94(0.28,3.17) | 0.92    |
|    |           | 25-34    | 54 | 24.4| 18(33.3) 36(66.7) | 1.1(0.43,2.8)  | 0.84    |
|    |           | 35-44    | 60 | 27.1| 26(43.3) 34(56.7) | 1.68(0.68,4.16) | 0.26    |
|    |           | 45-54    | 55 | 24.9| 17(30.9) 38(69.1) | 0.98(0.38,2.52) | 0.97    |
|    |           | >55      | 32 | 14.5| 10(31.3) 22(68.8) | 1               |         |
| 3  | Marital   | Unmarried | 62 | 28.1| 23(37.1) 39(62.9) | 1.04(0.39,2.75) | 0.92    |
3.2 Magnitude of prescribed medication adherence

The level of prescribed medication adherence among DM patients in our study was 122 (55.2%). Socio demographic related variables and associated factors for medication adherence From the socio demographic variables affecting the medication adherence among diabetes only social support were found to be associated in the binary logistic regression (BLR) (Table 1).

3.3 Behavioral related variables and associated factors for medication adherence

Out of the total 221 diabetes patients; 188 (85.1%) were not chew chat and drink alcohol. Regarding to physical activity and dietary regimen the most participant didn’t adhere according to WHO 2014 guideline (Table 2). Under this factors; drinking of alcohol, Table 2: Behavioral characteristic and factors associated with medication adherence for DM patients in HUCSH, Sidama, Hawassa, Ethiopia, 2019 (n=221).
chat chewing and dietary regimen were found to be associated in binary logistic regression (Table 2).

3.4 Clinical related characteristic and associated factors for medication adherence

Concerning clinical characteristic of the respondents, 107(48.4%) of them had comorbid illness. Regard to factors associated with medication adherence among diabetes; the following variables were significantly associated in binary regression. These were type of DM, type of treatment, duration of illness and level of blood glucose (Table 3).

Table 3: Clinical characteristic and factors associated with medication adherence for DM patients in HUCSH, Sidama, Hawassa, Ethiopia, 2019 (n=221)

| No | Variables | Category | n  | %       | Medication adherence | COR(L,U) | P-value |
|----|-----------|----------|----|---------|----------------------|----------|---------|
| 1  | Type of DM| Type 1   | 91 | 41.2    | 38(41.8)             | 53(58.2) | 1       |
|    |           | Type 2   | 130| 58.8    | 39(39)               | 91(70)   | 0.59(0.34,1.04) | 0.07 |
| 2  | Co morbidity| Yes     | 107| 48.4    | 38(35.5)             | 69(64.5) | 1       |
|    |           | No       | 114| 51.6    | 39(34.2)             | 75(65.8) | 0.94(0.54,1.64) | 0.83 |
| 3  | Type of treatment| Oral | 80 | 36.2    | 30(37.5)             | 50(62.5) | 2.1(0.76,5.78) | 0.15 |
|    |           | Injection| 114| 51.6    | 41(36)               | 73(64)   | 1.96(0.73,5.26) | 0.17 |
|    |           | Both     | 27 | 12.2    | 6(22.2)              | 21(77.8) | 1       |
| 4  | Level of blood sugar| Controlled| 153| 69.2    | 61(39.9)             | 92(60.1) | 0.18(1.12,4.11) | 0.02 |
|    |           | Uncontrolled| 68 | 30.8    | 16(23.5)             | 52(76.5) | 1       |
| 5  | Duration of illness| <5 years| 65 | 29.4    | 19(29.2)             | 46(70.8) | 1       |
|    |           | 5-10 years| 100| 45.2    | 35(35)               | 65(65)   | 1.3(0.66,2.55) | 0.44 |
|    |           | >10 years | 56 | 25.3    | 23(41.1)             | 33(58.9) | 1.68(0.79,3.58) | 0.17 |
| 6  | Complication| Yes     | 91 | 41.2    | 30(33)               | 61(67)   | 1       |
|    |           | No       | 130| 58.8    | 47(36.2)             | 83(63.8) | 1.15(0.65,2.02) | 0.62 |

3.5 Independent predictors for medication adherence

From 19 variables, 8 variables with p < 0.25 were entered into multivariate analysis. Then 3 variables called social support, dietary regimen and duration of illness were found to be significantly associated.

4. Discussion

As the study result indicated that the level of prescribed medication adherence was 122 (55.2%). It was in line with similar study conducted at Zewditu Memorial hospital in 2016 in Addis Ababa which 51.3% of the participants were adhered to the ant diabetic's medication [11]. This shall be due to uniformly distributed socio demographic characteristic of the respondents. Even though it is in line with this study; continuous provision of health education should be strengthened for the patient while they visit during follow up in order to increase level of adherence. Besides, the diabetes association should strictly discuss with them not to interrupt the recommended medication regimen. But this study result is also low when we compare with the study done at University of Gondar Hospital in 2013 of which 85.1% were found to be adhered to prescribed medication [12]. This might be due to low educational status of the participants engaged in our study. It might be also difference in measuring scale to assess level of prescribed medication adherence.

This study also showed that those who responded as they were satisfied by their family and friends support had 3 times more likely adhered to prescribed medication when compared to those who were not satisfied. This social support was also supported with other similar study done at Kenyatta national hospital in Kenya from 2015 to 2016 [13]. The similarity may be due to those who had motivation and encouragement made them to be well psychologically and enable them strictly to follow recommended medication. Studies also indicate that poor social support had as associated with non-adherence to medication [14].

Our study also indicated that respondents who were adhered to the recommended dietary practice were 2 times adhered to prescribed medication.
This study is also supported by studies conducted at Yemen in 2016 [15] which indicated that most of the participants who were not restricted to recommended dietary regimen hadn’t adhered to medication. So, of continuous provision of education about recommended dietary regimen for patients visiting DM clinic should be wired. The accepted scientific proof also confirmed that restricting to recommended dietary habit will bring good clinical output.

Patient’s duration of illness were also found to be significantly associated with prescribed medication adherence status of the participants. In this study, those patients who took prescribed medication for 5 years and above since medically diagnosed with diabetes were more adhered compared with those less than 5 years of duration. This study result was in line with the study done at Urmia, Iran [16] and Nigeria [17].

This could be explained by patients with longer duration of diabetes by increases contacts with health care provider and health professionals were more likely to be given repetitive instruction on medication adherence and become aware of the complications and then adhered to prescribed medication. This might be also due to a reflection of wider social collaboration with their relatives regard to ant diabetic medication adherence.

5. Conclusion

As this study showed that magnitude of prescribed medication adherence level among diabetes patients were low. It also indicated that social support and dietary regimen and duration of years on follow up were factors predicting prescribed medication adherence level independently

6. Recommendation

Health information provision for the patients as well for the community through different means of communication should be essential to increase the medication adherence Identifying factors and managing their factors by designing the strategies will eventually bring the good clinical outcome.

7. Strength

This study addressed variables which haven’t addressed in different studies of the county to determine association.

8. Limitation

There might be recall bias to respond medication intake questions. Since this study was cross sectional study, it shows point time occurrence of the adherence among patient.

9. Declaration

9.1 Ethics approval and consent to participate

The study was conducted after approval of ethical review committee of Hawassa University College of medicine and health science. Permission to conduct the study was obtained from authorities at HUCSH. Written informed consent was obtained from each study participant by assuring privacy and confidentiality throughout the data collection period in the hospital. An individual who was unwilling to participate from the beginning or at any part of the interview was allowed to withdraw. There was no risk or hazardous procedures putting the participants at harm.

9.2 Consent to publish

I am a corresponding author and first author of this finding. Since there is no an individual clinical data have accessed in the article, an individual consent for publication shouldn't needed

9.3 Availability of data and materials

The data supporting the finding were avail in public repositories.

9.4 Competing interests

There is no competing interest.

9.5 Funding

No funding is required. To do this research the researcher did not receive any specific funding and performed as part authors intended to do so by their own intention to do research in the university hospital. It was mainly based on their past experience that we have in the hospital with in the university. Since there is no funder to do this research there is no conflict of interest. We also ask free publication fee since we both authors live in Ethiopia.
9.6 Author’s contribution

The corresponding author contributes in conception and design, acquisition of data, supervision, analysis preparation of manuscript and interpretation of data. The corresponding author also engaged in drafting article or revising and approval of the manuscript before it have been published with accountability of the work done in the manuscript. The author take part in conception and design of the research article, analysis and interpreting the result.

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