

Predictors of Diabetes Self-Care Practice and Associated Factors among Patient on Follow Up at Hadiya Zone, Health Institutions Southern Ethiopia, Using Health Belief Model, Cross-Sectional Study Design

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Abstract

Background: Diabetes self-care practices are undertaken by people with or at risk of developing diabetes in order to successfully delay the onset and manage the disease by their own. It includes healthy eating habits, being physically active, regular monitoring of blood glucose and blood pressure level, taking medication properly and reducing other potential risks which lead to the development of diabetes complications.

Objective: To assess the magnitude and associated factors of self-care practice among diabetic patients who are on follow up at primary level health care (health centers and private clinics) in Hadiya zone, Ethiopia.

Methods: Facility based, cross-sectional study was conducted from February to April 2017 among 595 diabetic patients ever enrolled in chronic care follow up in public health centers and private clinics. Data was collected using pre tested structured questioner. Descriptive statistics was done and summarized accordingly. Level of diabetic self-care practice was determined based on the mean value among the self-care practice questions asked.

Bivariate and multivariable binary logistic regression analysis was done to select potential candidates and identify factors that were associated with diabetic self-care practice respectively. Odds ratio was used to determine the association. A statistical significance was declared at p value < 0.05.

Result: Of 595 respondents, about 311 (52.3%) had good diabetic self-care practice. The mean (SD) age of the respondents was 53.5 (14) and 343 (57.6%) were male. The presence of comorbidities (AOR = 1.68, 95%CI; 1.07 - 2.65), having glucometer at home (AOR = 2.01, 95%CI; 1.19 - 3.38), diabetic association membership (AOR = 3.02, 95%CI; 1.30 - 7.04), follow up in private clinics (AOR = 3.05, 95%CI; 1.55 - 5.97), treatment satisfaction (AOR = 1.69, 95%CI; 1.08 - 2.59) were significantly associated with good self-care practice.

Conclusion: The current study demonstrated almost half of the patients 52.3% had good diabetic self-care practice but still substantial number 47.7% of respondent had poor self-care. Good self-care was associated with having glucometer at home, diabetic association membership, attending follow-up in private clinics, treatment satisfaction. Advocating and empowering patients regarding the importance of diabetic self-care practice is highly recommended.

Keywords: Diabetes; Self-Care Practice; Hadiya; Ethiopia; Health Belief Model

Abbreviations

ADA: American Diabetes Association; DM: Diabetes Mellitus; DTSQ: Diabetic Treatment Satisfaction Questionnaire; FMOH: Federal Ministry of Health; IDF: International Diabetes Federation; Km: Kilo Meter; ROC: Receiver observed Characteristics; UAE: United Arab Emirates; USA: United States of America; VIF: Variance Inflation factor

Background

Diabetes mellitus (DM) is a clinical syndrome characterized by hyperglycemia due to absolute or relative deficiency of insulin [1]. The American diabetes Association (ADA) clinically categorized DM as Type I diabetes, Type II diabetes, Gestational diabetes mellitus and other specific types of diabetes due to other causes such as genetic defects in b-cell function, genetic defects in insulin action, diseases of the exocrine pancreas [2].

According to the 6th edition of the international diabetes federation (IDF) Diabetes Atlas 2013, there are an estimated 382 million people with diabetes and the number of people to rise beyond 592 million in less than 25 years worldwide if uncontrolled [3].

Even though the number of people who develop type I diabetes is increasing but most common and rapidly expanding is type II diabetes which is associated with economic development, aging population, dietary changes reduced physical activity and increasing urbanization resulting change in lifestyle pattern. According to the regional IDF report in Africa, the prevalence of type I diabetes is 6.4 million while type II diabetes was 19.8 million [4,5].

Diabetes has acute as well as chronic complications, which are responsible for the majority of morbidity and mortality associated with the disease, therefore requires continuing medical care and ongoing patient self-management education and support to prevent acute complications and to reduce the risk of long-term complications [6,7]. Diabetes self-care practices are undertaken by people with or at risk of developing diabetes in order to successfully delay the onset and manage the disease by their own, it includes healthy eating habits, being physically active, regular monitoring of blood glucose and blood pressure level, taking medication properly and reducing other potential risks which leads to the development of diabetes complications [8]. Generally, it accounts for about 95% of all diabetes management since most people with diabetes may only have contact with a healthcare professionals for a total of a few hours per year, the rest of the time they care and manage their diabetes by themselves [9].

The cost of treatment and death of diabetes arise mainly from its complications, such as heart diseases, stroke, amputations and kidney failure and serious infections. These can be prevented or long-delayed by inexpensive, patient self-care practice by monitoring their blood sugar, blood pressure level, quit smoking and alcohol and practice that reduces bad cholesterol and by adopting a healthy diet and exercise [10,11]. In higher income countries, the cost for medical care of diabetes contributes for more than 80% of their expenditures globally. Less than 20% of all expenditures for medical care are made in the middle- and low-income countries where 80% of people with diabetes will soon live [12].

Particularly, health care in sub-Saharan Africa is epidemiologically known with high burden of communicable diseases and the face of scarcity of financial and human resources, diabetes presents an additional challenge by accounting for the 76% of deaths in people under the age of 60 annually [4,11]. Even though Ethiopia is third among the top 5 countries in Africa by prevalence of diabetes with an estimated 1.8 million people, the cost for diabetes medical care does not meet the expenses incurred during outpatient and inpatient care delivery services by the fast increment in the incidences and complications. This situation also contributes for the service does not fulfill the required standard [4,13,14]. However, through good self-practice, people with diabetes can delay the onset and reduce the development of complication that leads to a prolonged hospital admission and reduces their quality of life [15].

In line with the increasing prevalence of non-communicable disease especially diabetes, WHO encourages low and middle income countries to take on and provide support for the adoption of effective measures for the surveillance, develop a mechanism for the prevention and control of diabetes and its complications, through a primary health care approach [16]. Several institution based studies conducted in different regions of Ethiopia indicated that the diabetes self-care practice was below the overall mean value [17-20]. Most of the available literatures in Ethiopia were from tertiary hospitals where their service is relatively better organized. There is no such study that tries assessing diabetes self-care practice in primary health level care both in the private clinics and public health facilities located close to the people and the meant to be the first point of entry to the health care system of the country. Hence the finding of the study provides and fills the information gap related with the level of self-care practice.

Rational of the study

Various specific personal and external factors influence one's ability to perform diabetes self-care and these factors are not typically stable for all patients. Identification of those parameters may help the health care system and the primary care physician to individualize clinical approaches toward improving diabetes self-care, glycemetic and other outcomes according to the local context of the population is crucial to focus and address them directly, in order to improve patient satisfaction and possibly influence clinical outcomes [9,15].

Despite a number of articles on self-care management and related issues locally and internationally, some of the associated factors are not been well assessed.

Therefore, this study can assist in targeting public health efforts that improves patient self-care practice which accounts for more than 95% of care that delay the onset and reduce diabetes complications. Knowing the level of the real self-care practice among diabetic patients at this level also helps the design and implementation of appropriate intervention and strategies that contributes for alleviating the burden in higher level/hospitals.

Materials and Methods

Study setting and area

This study was conducted in Hadiya zone, which is divided in to 10 rural Woreda and two administrative towns with total of 329 kebeles of which 303 are rural and 26 of them are urban. Hadiya zone hosts a total of 1,573,841 populations with a total area of 3542.66 Sq. Km.

There were also 3 hospitals, 64 health centers, 35 private clinics, 1 university, and 1 health science colleges. Diabetic follow up service is given in hospitals, health centers as well as in higher clinics. Facility based cross- sectional study was carried out using interviewer-administered questionnaire data collection tool among 595 diabetic patients at primary level health care in Hadiya zone, February to April 2017.

Source population

All type I and type II diabetic patients above or equal to 18 years who were on diabetic follow up among primary level of health care in Hadiya Zone were used as source population.

Study population

Randomly selected type I and type II diabetic patients above or equal to 18 years who were on diabetic follow up visits in the selected sub-cities health centers and private clinics in Hadiya Zone during the study period were used as study population.

Inclusion criteria

All diabetics' patients aged 18 years or over and on management of diabetes who had at least 2 outpatient visits to the clinic within the previous two years were included.

Exclusion criteria

Patients who were critically ill and those patients with severe mental illness who were unable to provide the required information by themselves were excluded from the study.

Sample size determination

The sample size was determined using the single population proportion by Epi Info window version 3.5.3 statistical software using the following assumptions: The prevalence rate of good diabetic self-care practice was taken as 56% from study conducted in Tikur Anbessa specialized hospital [17], desired degree of precision was 5%, 95% confidence interval and 1.5 design effect. Using a contingency of 5% for non-respondent, the final sample size was 595. $n = Z^2 \alpha / 2 p (1-p) / d^2$ where z = the standard score corresponding 95% confidence level P = proportion of diabetic patients with good self-care practice = 56, d = margin of sampling error = 5%.

Sampling procedures

Multistage stratified sampling method was used. Among ten administrative woredas in Hadiya zone, Shone and Hosanna town were randomly selected by lottery method. The health facilities under these woredas giving diabetic follow up service were stratified in to public and private. Accordingly, 7 public health center and 6 private higher clinics at Shone and 9 public health center and 8 private clinics from Hosanna town were listed by assuming that the proportion of diabetes self-care practice would vary by place of treatment.

Since the health centers have similar setting 2 health centers were selected by simple random sampling method out 7 health centers in shone and 3 from the 9 health centers in Hosana town. From the private higher clinics 2 clinics from 6 private higher clinics in Shone and 3 clinics from 8 private higher clinics in Hosana were selected randomly by lottery method. In each facility the total sample size was allocated proportionally according to the size of patients in one month preceding the data collection. Systematic random sampling technique was used to select study subjects from the selected facilities based on the flow rate during the study period that come for follow up during a month preceding the data collection. The sampling interval 'k' was obtained by dividing the sampling proportion in one months (N) to the number of sample (n) at each data collection site (n') i.e. $k = N' / n'$. The patients were selected every 2 to 5 interval according to the facility size calculated.

Data collection procedure (Instrument, personnel, data quality control)

Data was collected using a structured interviewer administered questionnaire which has 6 subparts namely socio demographic, clinical characteristic, knowledge related questions, Diabetic treatment satisfaction questionnaire (DTSQ), health belief questions and self-care practice related question. DTSQ consists of six items assessing treatment satisfaction, each was scored on a scale of 0-6, with six representing the greatest satisfaction. Knowledge and practice questions consisting of 15 and 8 questions respectively were adapted and modified contextually from Medi media USA and had been used in previous Knowledge and practice studies among diabetics and proven to be reliable in similar study in our country [18].

The diabetic health belief was assessed by adapting 16 item questionnaire as developed by Given, on perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, to measure the beliefs of diabetic patients about their diabetes which had proven to be reliable in similar study in Nigeria. The questionnaire was initially prepared in English then translated into local language (Amharic) by an individual who has good ability of the two languages then translated back to English by different person to ensure consistency. A

week prior to the actual data collection, the questionnaire was pre-tested on 5% patients identified from health centers and private higher clinics which were not included in the actual data collection. Findings of the pretest were incorporated to modify and clarify the collection tool before the actual data collection. Data was collected by four trained BSc nurses and two supervisors (BSc health officer) for five weeks from February 2, to April 7, 2015.

Dependent variable was Diabetic Self-Care Practice. Independent variable were Socio-demographic factors: (age and sex of child, religion, educational, occupational, income and marital status), Clinical characteristic (type of diabetes, duration of DM, family history of diabetes, type of treatment, comorbidity), Diabetic Knowledge (Knowledge about DM, Knowledge on diabetic self-care practices, Source of information, Consultation time), Treatment satisfaction (Satisfaction with current treatment, convenience, treatment time flexibility, understanding of DM, recommendations), Diabetes health belief (Perceived susceptibility and severity of DM complication, Perceived benefit of self-care practice, Perceived barrier of self-care practice).

Operational definitions

- **Diabetes self-care:** Is a daily regimen tasks that the individual performs to manage diabetes (diet plan, regular exercise, daily medication and regular monitoring of blood glucose, daily foot care, regular checkup, check blood pressure at least every visit, yearly eye examination) [2].
- **Regular checkup:** All patients who under taking investigations at least within three months. Those who were undertaking checkup within three months or less given a score of one and other wise zero.
- **Regular exercise:** 30 minutes activity involved in walking and running for at least five days per week.
- **Regular monitoring of blood glucose:** Monitoring of blood glucose at least once every week [18].
- **Adequate glycemic control for DM:** FBS measurement 70 mg/dL - 126 mg/dL [2].
- **Inadequate glycemic control for DM:** FBS measurement \geq 126 mg/dL.
- **Good self-care practice:** Is those who scored the mean [5] and above the overall self-care practice score.
- **Poor self-care practice:** Is those who scored below the overall mean self-care practice score
- **Good Knowledge:** Respondents who answer correctly to knowledge related question and those who scored equal and above the overall mean value.
- **Poor knowledge:** Respondents who answered in-correctly to knowledge related question and those who scored equal and above the overall mean value.
- **High income:** Respondents whose income level is equal to the mean and above.
- **Low income:** Respondents whose income level is below the mean.

Data quality management

The quality of data was assured before, during and after data collection process accordingly.

- **Before data collection:** Objective based and standardized questionnaire was prepared, training of data collectors and supervisors on sampling procedures, techniques of interviews and data collection process and supervisors participated in pre-testing of the questionnaire for its understandability by 5% of sample on volunteer individuals in the facilities which were not included in the actual data collection. The supervisors closely followed the day-to-day data collection process and ensure completeness and consistency of questionnaire administered each day.

- **After data collection:** The collected information was rechecked for its completeness and consistency by the supervisors and the principal investigator before transferring into computer software. No overlapping numerical code was given for each question and the coded data was entered and cleaned in STATA version 12 statistical software packages.

Data analysis procedure

The collected data was checked for its completeness manually and then entered and analyzed using STATA version 12 statistical software packages. Descriptive statistic including proportion, percentage, ratios, frequency distribution, mean and standard deviation was used. A binary logistic regression analysis was done to see the effect of predictors on self-care practice. Bivariate logistic regression analysis was done to select potential candidates for multi variable analysis at pre-set P-value < 0.25.

Multivariable logistic regression analysis was employed to see the independent effect of predictors and to control confounders. Model was built by step wise back ward elimination procedure and compared by using log likelihood ratio test. Model diagnostic tests like interaction and confounders was checked at change in beta coefficient $\geq 20\%$ and multi collinearity was checked at cutoff of point mean VIF ≤ 10 . Classification ability of full model was tested by ROC curve at cutoff point $\geq 70\%$ and final model fitness was checked by using Hosmer and Lemme show chi square test. Odds ratio with 95% C.I was used to measure the association between dependent and independent variables. P value < 0.05 was used to determine level of statistical significance.

Ethical consideration

The ethical approval for this study was obtained from the Research Ethical review committee of Arbaminch University school of public health, Permission letter was written for Hadiya zone public health centers and the private clinics then informed consent was obtained from the participants, after the necessary explanation about the purpose, benefits and risks of the study and their right on decision to participate in the study. All the interviews with respondents were made under strict privacy. After getting informed consent from the respondents the right of the respondents to refuse answer for few or all of the questions was respected.

Dissemination of results

The final report of this study was submitted to Arbaminch University College of medicine and Health Sciences, School of Public health. It will also be sent to FMOH, Hadiya zone Health department, the health facilities and Ethiopian diabetic association. Effort will be made to disseminate through publication and presentation in scientific conferences.

Results

Socio demographic characteristics

From 595 respondents, 343 (57.6%) were male. The mean (SD) age of the respondents was 53.5 (14). One hundred forty four 24.2% of them were between 55 to 63 years of age group. Majority were 437 (73.4%) married and 74 (12.4%) were widowed.

Among the study participants 106 (17.8%) were illiterate, regarding occupation 232 (39.3%) were self-employed; nearly half of respondents (46.6%) were Hadiya followed by Kambeta 161 (27.1%). The large majority of respondents 552 (92.8%) were living with family. See the detail from table 1.

Clinical characteristics of study participants

Nearly half of the respondents 309 (51.9%) didn't know their diabetes type. Of those who knew their diabetes type, 181 (30.4%) had type II diabetes and 105 (17.6%) had type I diabetes. The median (IQR) duration of diabetes was 5 (8) ranging from 6 months to maximum of 45 years, predominantly in 1 - 5 years. Overall, the mean (SD) value of FBS for of the participants was 183 (59.6) with minimum of 56 mg/dL and maximum of 479mg/Dl. See the detail from table 2.

Variables	Frequency	Percentage
Gender (n = 595)		
Female	252	42.4
Male	343	57.6
Age (n = 595)		
19 - 27 years	12	2
28 - 36 years	54	9.1
37 - 45 years	116	19.5
46 - 54 years	128	21.5
55 - 63	144	24.2
> 64	141	23.7
Marital Status (n = 595)		
Married	437	73.4
Single	66	11.1
Widowed	74	12.4
Divorced/separated	18	3
Educational Status (n = 594)		
Illiterate	106	17.8
Can read and write	102	17.2
Primary	52	8.8
Secondary	88	14.8
Certificate	56	9.4
Collage and above	190	32
Occupation (n = 591)		
Student	8	1.4
Self employed	232	39.3
Government employed	160	27.1
Unemployed	73	14.0
House wife	108	18.3
Ethnicity (n = 595)		
Hadiya	277	46.6
Kambeta	161	27.1
Silxe	91	15.3
Gurage	51	8.6
Other	15	2.5
Monthly Income (n = 571)		
Low	371	65
High	200	35

Table 1: Socio demographic characteristics of study population on diabetes follow-up at health centers and private clinics in Hadiya Zone, April 2017 GC.

Variables	Frequency	Percentage
Type of DM (n = 595)		
Type one	105	17.6
Type two	181	30.4
Didn't know	309	51.9
Duration of DM (n = 588)		
> 1 year	105	17.9
1 - 5 year	213	36.2
6 - 10 years	132	22.4
11 - 15 years	67	11.4
> 15 years	71	12.1
Comorbidity (n = 595)		
No	385	64.7
Yes	210	35.3
Treatment Intensity (n = 595)		
Insulin injection	101	17
Oral medication	429	72.1
Both	14	2.4
Diet only Family History (n = 595)	51	8.6
No	428	71.9
Yes	167	28.1
Place of follow up (n = 595)		
Public health center	317	53.3
Private clinic	278	46.7
Knowing Current FBS (n = 595)		
No	166	27.9
Yes	429	72.1
Current FBS (n = 429)		
Adequate glycemic level	47	11
Inadequate glycemic level	382	89

Table 2: The Clinical characteristics of the study population at diabetic on follow up at health centers and private clinics in Hadiya zone, April 2017.

Diabetes knowledge and source of information

The knowledge level was assessed using 11 multiple response questions, the mean (+SD) diabetes knowledge score of respondents was 17.3 (5.99%) with a maximum possible score of 24 and minimum zero. About 251 (42.2%) respondents had poor diabetes knowledge while 339 (57.5%) had good diabetes knowledge. Respondents were asked for risk factors of DM and majority were responded as Family history of DM 142 (23.8%), Insulin injection, oral medication, dietary modification and exercise at 118 (19.8%), 159 (26.7%), 161 (27.1%) and 149 (25%) respectively were the identified treatment options.

Tiredness 131 (22%) and excessive thirst 137 (23%) were more frequently identified symptoms of poorly controlled DM followed by Passing lots of urine 129 (21.7%), weight loss 94 (15.8%), and loss of appetite 88 (14.8%). Most respondents had identified ophthalmologic 170 (28.6%) and renal and neurologic 151 (25.4%) complications related to DM. Dietary modification 215 (36.1%), exercise 231 (38.8%), weight reduction 160 (26.9%) were identified as a life style modification for diabetes, however 12 (2.1%) don't know any life style modifications. Most 531 (89.2%) knew about the importance of controlling glucose as to reduce complication of DM. Five hundred eight (85.4%) of the respondents knew the importance of controlling blood pressure as a means to prevent DM complication.

For more than half (56.3%) of the respondents source of knowledge was medical staffs, 205 (23%) from media and the remaining 183 (20.6%) from friend and family. At first diagnosis the time devoted by the physician to discuss about DM was more than 20 minutes for 151 (25.4%) of respondents, twenty minutes for 49 (8.2%), greater than ten minutes for 82 (13.8%), ten minutes for 125 (21%) of the respondents, but 150 (25%) of the respondents don't remember the time and 38 (6.4%) of diabetic patients reported that the doctor did not discuss anything about diabetes. During follow up 210 (35.3%) respondents were given greater than ten minutes, ten minutes for 195 (32.8%), five minutes for 36 (6%), less than five minutes for 66 (11%) but forty four (7.4%) of the respondents reported no time was devoted for discussion and another 44 (7.4%) participants didn't know the time they were given for discussion about their diabetes. Among respondents 265 (44.5%) would like to access information's about DM through video or tapes, 190 (31.9%) through both handouts/leaflets and videotapes as well, 99 (16.6%) through handouts and leaflets. See the detail from table 3.

Variables	Frequency (n = 595)	Percentage
Identify risk factors for diabetes		
Over eating	306	14.5
Family history	501	23.8
Eating too much fat and sugar	458	21.7
Alcohol	435	20.6
Smoking	388	18.4
Don't know	19	0.9
Treatment options for DM		
Insulin injection	369	19.9
Oral medication	498	26.8
Dietary modification	507	27.3
Exercise	463	25.0
Other	6	0.3
Don't know	12	0.6
Symptoms of poorly controlled DM		
Passing lots of urine	441	21.6
Loss of appetite	300	14.7
Excess thirst	475	23.3
Tiredness	450	22.0
Weight loss	322	15.8
Don't know	55	2.7

Complications of DM		
Ophthalmologic	447	28.6
Hypoglycemic	324	20.3
Renal	395	25.3
Neurologic	395	25.3
Don't know	99	7.8
Life style modifications for DM		
Exercise	489	34.8
Dietary modification	508	36.2
Weight reduction	377	26.9
Don't know	30	2.1

Table 3: Knowledge of Diabetes and source of information among study population, at public health centers and private clinics in Hadiya zone, April 2017.

**Multiple response questions.*

Treatment satisfaction of diabetes patients

The satisfaction level regarding service/treatment provided during their current visit was assessed using diabetes treatment satisfaction questionnaire (DTSQ) which was made available for 595 diabetes patients, the maximum possible score was 25 and minimum of five, with a mean (SD) score of 18 (3.96). Over all, more than half 342 (57.5%) of respondents were satisfied with the treatment they were given. Among the respondents 253 (42.5%), 440 (73.9%), 411 (69%), 365 (61.4%), 385 (64.9%) and 445 (74.8%) had high level of satisfaction with current treatment given, treatment convenience, flexibility, understanding of diabetes, recommending treatment to other diabetic patients and treatment continuation respectively (Table 4).

Treatment of DM	Frequency	Percentage
Current treatment (n = 595)		
Satisfied	342	57.5
Unsatisfied	253	42.5
Convenience (n = 595)		
Satisfied	440	73.9
Unsatisfied	155	26.1
Flexibility (n = 595)		
Satisfied	411	69.1
Unsatisfied	184	30.9
Understanding of diabetes (n = 594)		
Satisfied	365	61.4
Unsatisfied	229	38.6
Recommendation (n = 593)		
Satisfied	385	64.9
Unsatisfied	208	35.1
Treatment Continuation (n = 595)		
Satisfied	445	74.8
Unsatisfied	150	25.2

Table 4: Diabetes treatment satisfaction among the study population at health centers and private clinics Hadiya zone, April 2017.

Diabetes health belief

Diabetic health belief was assessed using 16 questions with four questions each assessing the perceived susceptibility to diabetes complications, perceived severity, perceived benefit and barrier to self-care practice. The perceived susceptibility of diabetes complication with mean (\pm SD) score was 15 (\pm 2.57) and a maximum possible score of 20 and minimum of 4. Accordingly more than half study participants reported high perceived susceptibility diabetes complications. Among the total number of respondents to perceived severity and its related complications with mean (SD) score 10.99 (\pm 3.8), three hundred frothy eight (59.5%) had high perceived severity. The mean (SD) score of perceived benefit and barrier to self-care practice were 16 (2.6) and 12 (3.06) respectively (Table 5).

Variables	Frequency	Percentage
Perceived Susceptibility		
Low	181	30.7
High	409	69.3
Perceived Severity		
Low	237	40.5
High	348	59.5
Perceived Benefit		
Low	158	26.6
High	435	73.4
Perceived Barrier		
Low	249	41.9
High	345	58.1

Table 5: Diabetes health belief among study population at health centers and private clinics Hadiya zone, April 2017.

Diabetic self-care practice

The mean (+SD) score of diabetes self-care practice of respondents was 4.5 (1.79) with a maximum score of eight possible and minimum of zero. About 311 (52.3%) had good self-care practice meanwhile 284 (47.7%) had poor self-care practice.

Half (50%) of the respondents checked their blood pressure within week, 85 (31%) within a month and 69 (11.6%) three months ago. Two hundred fifty eight (43%) of respondents had last physician visit within a month or less, 181 (30%) a month ago, 113 (19%) two/ three months ago, 35 (5.9%) six months ago, while 8 (1.3%) a year or above. More than half (53.4%) of them had checked their blood glucose level a week ago, 186 (31.3%) a month ago, 57 (9.6%) three month ago and 6 (1%) don't check their blood glucose level regularly.

Almost half (49.2%) of the respondents managed their diet regularly, 240 (40%) managed their diet occasionally and 62 (10.4%) never managed their diet. Furthermore only 195 (32.8%) had a regular exercise, 271 (45.5%) exercise occasionally and 129 (21.7%) study participants never managed their weight. Two hundred ninety (36.8%) respondents had never done an eye examination, 70 (11.8%) had examination more than a year ago, 306 (51.4%) within a year. One hundred eighteen (19.8%) respondents reported they checked their feet every day, 136 (22.9%) checked occasionally, however more than half never checked their feet. Majority (76.3%) of respondents reported they had never forgotten their medication, 64 (10.8%) forgotten taking their medication once or two times a week, and 40 (6.8%) don't take their medications regularly but the rest 37 (6.2%) were not on diabetes medication.

Overall few practiced regular exercise 195 (32.8%), daily foot care 118 (19.8%). Almost half had dietary adherence 293 (49%) but regular blood pressure monitoring 557 (93.6%), adherence to regular blood glucose testing 318 (53.4%) and medication adherence 416 (70%) were better practiced (Figure 1).

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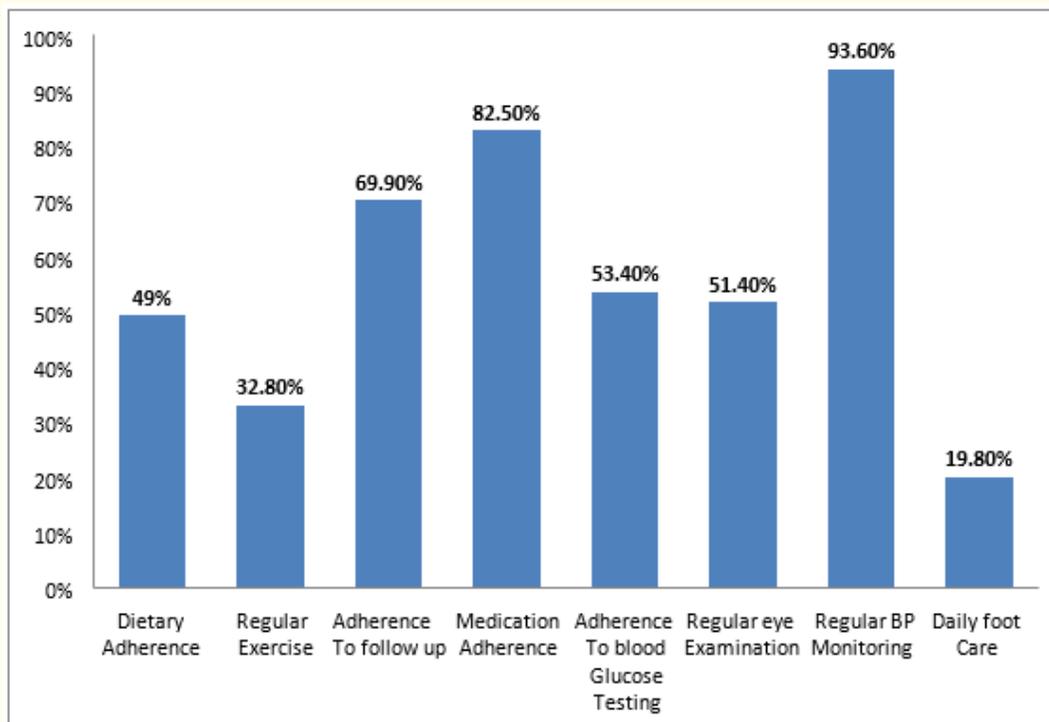


Figure 1: The magnitudes of diabetic self-care practice indicators among study population at health centers and private clinics in Hadiya zone, April 2017.

Factors associated with diabetes self-care practice

Variables with p-value less than 0.2 on bivariate analysis were entered to multivariate analysis. Among these variables which were entered to multivariate analysis marital status, type of DM, co-morbidities, treatment intensity, diabetes association membership, having glucometer at home, place of follow up, diabetes treatment satisfaction were the independent predictors of good diabetic self-care practice.

The likelihood of good self-care practice was 77% less for separated or divorced than married one's (AOR = 0.23, 95%CI, 0.05 - 0.89).

The presence of co-morbidities was 1.7 times more associated with good self-care practice than patients without comorbidities (AOR = 1.68, 95%CI; 1.07 - 2.65). Patients who do not know their diabetes were 65% less likely to practice good self-care practice than type one diabetic patients (AOR = 0.35, 95%CI; 0.19 - 0.67). Patients taking oral medication were also 49% less likely to practice good diabetes self-care practice as compared to patients taking insulin injection (AOR = 0.53, 95%CI; 0.28 - 0.98). A diabetic association membership, having a glucometer at home and attending in private clinic was 3 times (AOR = 3.02, 95%CI; 1.30 - 7.04), 2.01times (AOR = 2.01, 95%CI; 1.19 - 3.38), 3 times (AOR = 3.05, 95%CI; 1.55 - 5.97) were more likely to adopt good self-care practice compared to patients who were not a diabetic association member, who do not have glucometer at home and those who attend in public health centers respectively. Diabetic patients satisfied with their treatment were also 1.7 times more adherent to good diabetes self-care practice than unsatisfied patients (AOR = 1.69, 95%CI; 1.08 - 2.59) (Table 6).

Variables	Self-Care practice		COR (95%C.I)	AOR (95% C.I)
	Good	Poor		
Marital Status				
Married	249 (57)	188 (43)	1	1
Single	31 (47)	35 (53)	0.67 (.398, 1.124)	0.81 (0.39-1.71)
Widowed	27 (36.5)	47 (63.5)	0.43 (.261, .722)	0.81 (0.42-1.58)
Divorced/Separated	4 (22.2)	14 (77.8)	0.216 (.070, .666)	0.20 (0.05-0.89)*
DM Type				
Type one	57 (54.3)	48 (45.7)	1	1
Type two	119 (65.7)	62 (34.3)	1.6 (0.989, 2.643)	0.93 (0.47-1.82)
Don't know	135 (43.7)	174 (56.3)	0.65 (0.419, 1.019)	0.35 (0.19-0.67)**
Comorbidity				
No	181 (47)	204 (53)	1	1
Yes	130 (61.9)	80 (38)	1.83 (1.300, 2.581)	1.68 (1.07-2.65)*
Treatment intensity				
Insulin injection	76 (75.2)	25 (24.8)	1	1
Oral medication	203 (52.7)	226 (47.3)	0.296 (0.18-0.48)	0.53 (0.28-0.98)*
Both	7 (50)	7 (50)	0.33 (0.11, 1.03)	0.83 (0.18-3.97)
No medication	25 (49)	26 (51)	0.32 (0.16-0.64)	1.31 (0.51-3.35)
Diabetic association membership				
No	266 (49.3)	274 (50.7)	1	1
Yes	45 (81.8)	10 (18.2)	4.6 (2.289, 9.388)	3.02 (1.30-7.04)*
Having glucometer at home				
No	191 (44.6)	237 (55.4)	1	1
Yes	120 (71.9)	47 (28.1)	3.17 (2.151, 4.667)	2.01 (1.19-3.38)**
Place of treatment				
Public health center	113 (35.6)	204 (64.4)	1	1
Private clinic	198 (71.2)	80 (28.8)	4.47 (3.159, 6.320)	3.05 (1.55-5.97)**
Treatment Satisfaction				
Unsatisfied	122 (43.6)	158 (56.4)	1	1
Satisfied	189 (60)	126 (40)	1.94 (1.401, 2.693)	1.69 (1.09-2.59)*

Table 6: Multivariate logistic regression model for diabetes self-care practice with associated factors among study population at public health centers and private clinics in Hadiya zone, April 2017.

* P- value < 0.05, ** p-value < 0.01.

Discussion

The magnitude of good diabetes self-care practice was 311 (52.3%) among diabetic patients on follow-up at public health centers and private clinics in Hadiya zone. From the available study finding, the magnitude of diabetes self-care practice is consistent to the study conducted in Tikur Anbessa specialized hospital [17], in Dilla university hospital [20] and Nekemte Referral Hospitals in 2013 [19] which were 56%, 76.8% and 55% respectively however higher than the study conducted in Felege Hiwot Hospital, Northwest Ethiopia (36%) [18].

The variation might be due to health care accessibility and even if the health care were accessible the waiting time and short consultation time might discourage patients from attending their follow-ups and accessing the required information regarding self-care practices as well as from regularly monitoring their blood glucose level and blood pressure. Even though adequate diabetes self-care practice can be achieved through patient centered communication and empowering patients, physicians might fail to devote adequate time for discussion to educate and motivate patients to follow the recommended diabetes self-care practice due to high number of patients in the facilities.

Dietary adherence was about 49% which is similar to the study conducted in Dilla specialized hospital 2014 (49.7%) [20]. Adherence to exercise was 32% similar to the study in Eastern Ethiopia, Harari town 31% [18]. The study revealed that regular monitoring of blood glucose was 53.4% which was higher than the study conducted in Felege Hiwot Hospital, Northwest Ethiopia 2012 [18] indicating 23.6% checked their blood glucose level within a month and less. These might be due to the difference in life style. It could also be due patients' failure to regularly monitor their blood glucose level or different instruments used [21-26].

Patients taking oral medication were less likely to practice good diabetes self-care practice as compared to patients taking insulin injection in line with the study done in urban area of Uremia, Northwest of Iran in 2010 [27] which indicated insulin injection was significantly associated with self-care practice. These might be due to patients on insulin injection are more likely to notice the effect immediately than patients on oral medication. Diabetic association membership was also significantly associated with good diabetes self-care practice which was in line with the study in Felegehiwot [18]. This might be due to the association's regular monthly diabetic education and Support given to patients such as securing medicine to some of the lower income members and blood glucose testing with a relatively lower price. However according to this study among 540 (90.8%) who were not members of a diabetic association, 149 (25.1%) didn't know there was a diabetes association which may be due to the associations' poor advocacy and/or the physicians' negligence to explain about importance of the diabetic association to gather information about diabetes self-care practice.

The study also indicated having glucometer at home was 2 times more associated with good self-care practice similar to the study in Tikur Ambesa which indicated having glucometer was associated with self-monitoring of blood glucose level [17]. Therefore, having glucometer at home might reinforce patients to control their blood glucose level regularly.

Among subjects who participated in the study, patients attending their follow up in private clinic were more associated with good self-care practice than patients who attend their follow up in public health centers which indicated adherence to diabetic self-care practice was significantly higher in private consulting clinics than community health centers. This might be due to less waiting time and longer consultation time during their visit in private clinics which could reinforce their adherence to physician visit and in most of the private clinics the follow up is given by specialized diabetic physician where as in the public health centers the service is given by general practitioners and health officers. It may also have been due to the income, educational status, occupation and other factors which might have influenced patients attending in these facilities.

Diabetes treatment satisfaction was 1.7 times more associated with good diabetes self-care practice than unsatisfied once which identified that lower treatment satisfaction is related to difficulties in adherence to taking medications and attending follow-up clinic visits among other factors. Therefore improving diabetes patient satisfaction can reinforce patients' adherence to the recommended diabetes self-care practices.

Strength of the Study

This study was conducted by incorporating diabetic patients in public and private health facilities, hence the samples were representative and the obtained findings were valid estimates.

Limitations of the Study

Since it is cross-sectional study, it doesn't measure temporal relationship, causal inferences and has recall bias.

Conclusion and Recommendations

This study revealed that a substantial number 284 (47.7%) of respondents in Hadiya zone health centers and private clinics had poor self-care practice. Regular exercise and daily foot care were the least practiced diabetes self-care practice. About half of the respondents had less dietary adherence, to blood glucose testing and regular eye examination. Being divorced/separated, not knowing their diabetes type and taking oral medication was associated with poor self-care practice whereas the presence of comorbidities, having glucometer at home, being a member of diabetic association, attending follow up in private clinics and treatment satisfaction were associated with good self-care practice.

Planners and policy makers need to address the high proportion of uncontrolled glycemic level among diabetes patients through advocating and supporting Self-monitoring of blood glucose (SMBG) which is vital for improving glycemic control through handouts/leaflets and videotapes as most preferred by the majority of respondents. Public health centers should advice and empower patients to adhere to the recommended diabetes self-care practices and health facilities in general should improve the diabetic patient treatment satisfaction through managing the follow up time more flexible and convenient for patients and devoting adequate time for consultation during each visit.

Health care providers need to spend more time in notifying the patient's diabetes type and the corresponding diabetic self-care that should be taken, especially focus on patients taking oral medication. Advocate on diabetes association membership as well as the importance of having glucometer at home and daily self-monitoring to attain the recommended level of FBS. Furthermore, investigation is needed to identify the reasons for poor adherence to regular exercise, foot care, and dietary adherence and identify factors. The Ethiopian Diabetes association needs to advocate on the benefits of the diabetes association membership and the recommended self-care practices.

Competing Interest

We declare that we do not have competing interests.

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Authors' Contributions

Tesfaye Feleke: Conceived, designed and coordinated the study. Yilma C, Biruk Wogayehu, participated in formal analysis and interpretation of the data. Yilma C and Tesfaye Feleke prepared original draft of the manuscript coordinated the data collection process, funding acquisition and supervision of data collectors. Tesfaye F and Biru W review and editing of the manuscript; all authors read and approved the final manuscript.

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