ORIGINAL RESEARCH

Perceived Self-Efficacy and Associated Factors Among Adult Patients with Type 2 Diabetes Mellitus at Public Hospitals of Western Ethiopia, 2020

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Background: Diabetes Mellitus is a chronic disease and can be self-managed using five treatment approaches, including education, medical nutrition therapy, physical exercise, pharmacological intervention, and blood sugar monitoring. Improvement of patient compliance and self-efficacy are critical points that impact the self-care behavior in patients with type two diabetes mellitus in order to limit the morbidity and promote glycemic control. Therefore, the present study successfully assesses the effect of perceived self-efficacy and associated factors among patients with diabetes mellitus at public hospitals of western Ethiopia.

Methods: The cross-sectional study design was employed on a sample of 423 diabetic patients. A systematic random sampling method was employed. An interviewer-administered structured questionnaire was used. The data entered into Epi data version 3.1 and exported into Statistical Package for the Social Sciences window version 24 for analysis. All variables significant at $p < 0.25$ in bivariate were entered into multivariate analysis. The multivariable logistic regressions were used to determine factors associated with perceived self-efficacy by considering adjusted odds ratio at CI 95% and the significance level was set at $p < 0.05$.

Results: Out of 423 participants sampled, 398 participated in the study giving a response rate of 94.1%. The level of perceived good self-efficacy among diabetes patients was 52.5%. Being married (AOR=1.611, 95% CI = 1.003, 2.587), home blood glucose test (AOR=3.359, 95% CI = 1.912,5.903), doing exercise (AOR=11.412, 95% CI = 2.488,52.346), having good appetite (AOR=2.587, 95% CI = 1.454,4.606), having special diet (AOR=4.902, 95% CI= 1.202, 19.992), and good self-care behavior (AOR=10.320, 95% CI= 5.657, 18.824) were significantly associated with good self-efficacy.

Conclusion: The level of perceived self-efficacy was high. Home blood glucose tests, good self-care behavior, married, doing exercise, good appetite, having a special diet were significantly associated with high perceived self-efficacy. The national policymaker focused on patients' behavioral change to develop perceived self-efficacy for confidently managing the disease.

Keywords: diabetes mellitus, glycemic control, self-efficacy, Ethiopia

Introduction

Diabetes mellitus is a chronic disease caused by inherited and/or acquired deficiency in production and/or ineffective insulin produced by the pancreas. Globally, an estimated 463 adults (20–79 years) were living with diabetes; by 2045, these numbers rose to 700 million. Approximately about 79% of adults with diabetes were living in low- and middle-income countries. In Ethiopia, the prevalence was

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dramatically increasing from 3.8% to 5.2%.[1,2] Diabetes mellitus (DM) is a serious global public health problem that affects the whole life of the people in terms of their biological, psychological, and social effects. The cost of paying for diabetes is rising dramatically due to complications ranging from an increased risk of heart attacks, strokes, and amputations to blindness and kidney damage.[3,4] Effective control of devastating diabetes complication needs behavioral changes that require self-efficacy and self-care management.[5] The conception of self-efficacy is based on Bandura's social cognitive theory, which describes the interactions of behavioral, personal, and environmental factors. Thus, self-efficacy is a people's beliefs about their capabilities to produce designated levels of performance in terms of patients' feel, think, and motivation toward physical therapies and related activities. In relating to the glycemic control, self-efficacy refers to one's belief that he/she can plan and accomplish behavior change, the belief that I can do it and the perceived ability to adhere to the diabetes care regimen.[6,7] Another diabetes-related study also interpreted self-efficacy in terms of three dimensions which includes patients' perceived ability to obtain social support, manage stress, be self-motivating, and make diabetes-related decisions; patients' perceived ability to identify aspects for caring for diabetes that they are dissatisfied with and their ability to determine when they are ready to change their diabetes self-care plan and patients' perceived ability to set realistic goals and reach them by overcoming the barriers to achieving their goals.[8] The measurement of self-efficacy was a critical concept in chronic disease management including diabetes mellitus. Self-efficacy is an essential factor influencing self-care behavior in patients with type 2 diabetes. Perceived self-efficacy helped plan patient educational programs for targeting diabetic self-management. It also helps to predict the health outcomes including hospital admissions, and quality of life of diabetic patients.[9] The study indicated that self-efficacy has a significant effect on diabetes self-treatment. It leads to metabolic control and improved ability to self-treatment. Patients with good self-efficacy have 20 times the chance of undergoing diabetes treatment as compared to that had poor self-efficacy.[10]

The study revealed that self-efficacy plays a pivotal role in diabetes by assisting individuals to carry out daily tasks to take control of their condition. It has been used to predict behaviors and interventional plans related to diet and nutrient intakes and its outcomes in terms of glycemic and weight control. Therefore, better understandings of self-efficacy are integrated into planning self-management programs and facilitate patient empowerment for improved diabetes-related behaviors and outcomes.[11]

Another study showed that the risk of type 2 diabetes increases with age particularly occurring in patients older than 55 years. Type 2 diabetes also has a psychological impact that causes diabetic complications which relatively increased hospitalized 1.5–3 times than patients without the disease. The major problem in diabetes management is the patient's attitude towards their illness due to the difference in their ideas and beliefs. Patients who gain knowledge about self-care disease management do not always implement the desired behavioral changes that require important counseling skills and need careful attention.[12]

Furthermore, the study indicated that self-efficacy in patients with diabetes was the first step to develop a specific individual intervention. The measurement of self-efficacy was used as diagnostic tools for diabetes patients that helps medical professionals to get information that needs about patient readiness to involve in changing behavior by diabetic education. Diabetes education was the most important task in diabetes management that minimizes the symptoms. Self-efficacy applies for both newly diagnosed patient as well as the patient who have long diagnosed which involves verbal persuasion that influences how someone act and behave and got suggestion that they can resolve their problems.[13]

Previous studies revealed self-efficacy is associated with numerous factors including satisfaction, better adaptation, reduced depression, proper control of diabetes, diverse diabetes management behaviors, selected nutrients, exercise, medications, blood sugar control, problem-solving, social environment support, eating patterns, reduced fat intake, and self-care behaviors. The requirement of perceived self-efficacy for diabetic patients is a baseline for routine diabetes self-management leads to good glycemic control and subsequently reduces the risk of diabetic complications.[12,14–18]

However, in the context of Ethiopia, there was no study conducted regarding perceived self-efficacy among patients with chronic diseases specifically diabetes. Thus, this study will fill this existing gap and contribute to minimizing the adverse effect of prolonged uses of medications through customizing self-arranged routine diabetes management. Therefore, the aim of this was to assess perceived self-efficacy and associated factors among diabetes patients attending public hospitals of western Ethiopia.

Methods

Study Setting and Population

The institutional-based cross-sectional study design was employed. The study was conducted in multi-facility-based public hospitals found in western Ethiopia from January 20-March 20, 2020. The public hospitals were selected randomly by lottery method from all public hospitals found in western Ethiopia. The four selected hospitals were Wollega university referral hospital and Nekemte specialized hospitals which are found in Nekemte town at a distance of 331km from Addis Ababa. Nekemte town has a latitude and longitude of 9º5′N36º33′E and an elevation of 2,088 meters. Ghimbi General and Nedjo General Hospital are found in West Wollega Zone. Ghimbi General Hospital has a latitude and longitude of 9º10′N35º50′E with an elevation between 1845 and 1930 meters above sea level. Nedjo General Hospital has located 518 km from Addis Ababa. The public hospitals selected for the study were serving in terms of primary, secondary, and specialized services for more than a total population of 10 million for the western part of Ethiopia.

tudy Population and Samples

First, we selected randomly four hospitals by lottery method from all public hospitals found in western Ethiopia. After the selection of hospitals, we took the sampling frame from a medical record of the diabetic patients on follow-up receiving ant diabetic medication from the chronic outpatient department of respective hospitals. Then, we calculated a constant k value and included all our potential participants from all selected hospitals. The study was conducted on a total of 1280 patients with diabetes on follow-up and receiving diabetic medications. All diabetic patients including type I and II attending selected hospitals were the source population and all the sampled patients with diabetic on follow-up receiving diabetic medication for at least six months and present during data collection period were the study population. All diabetic patients on follow-up with measured A1C $\geq7.0\%$ (53mmol/mol) were included and those taking anti-diabetic medication for less than six months were excluded from the study.

Sample Size Determination and Sampling Techniques

The sample size of the study was calculated using the formula for estimation of a single population proportion with the assumptions of 95% Confidence Level (CL), marginal error (d) of 0.05. Since there was no study conducted regarding perceived self-efficacy in Ethiopia we considered a population proportion of 0.50 (50%).

Thus, the Sample size was $N = \frac{(z1-\alpha/2)2 \times p(1-p)}{d^2}$

$$ni = \frac{(1.96)^2 * 0.5(1-0.50)}{(0.05)^2} = 385$$

Thus, by adding a non-response rate of 10% and using the correction formula; the final sample size was 423 of people living with diabetes mellitus and treated with medication were enrolled in the study using systematic random sampling techniques from each hospital.

Data Collection Tool and Procedures

Data were collected using a structured questionnaire. Data collection tools consist of four-part questionnaires: The first part consists of demographic questions developed by investigators. Participants' height and weight were measured as part of the physical examination. Body mass index (BMI) was classified as <18.5kg/m^2 (underweight), 18.5–24.9kg/m^2 (normal weight), 25–29.9 kg/m2 (overweight) and that of ≥30kg/m^2 defined as obesity based on the World Health Organization criteria. The second part of the tool was a diabetes self-management questionnaire taken from the previous study originally developed by Schmitt et al[19] at the Research Institute of the Diabetes Academy with Cronbach alpha of 0.856. Originally, the validated scale for diabetes self-management questionnaire has 16 items and 4 sub-scales: However, in the current study, three items were removed due to fewer standards of coefficients. The dimension was reduced to three components including glucose management (4 items), physical activity (4 items), and dietary control (5 items), and finally, thirteen items were used for analysis. Six items are formulated positively and the remaining seven negatively. The DSMQ has a 4-point Likert scale that starts from 0= does not apply to me, 1= applies to me to some degree, 2= applies to me to a considerable degree, and 3=applies to me very much. All negative items were reversed and the higher score indicated more effective self-care. The third part questionnaire was self-efficacy related to glycemic control collected via 8 modified questions from the diabetes mellitus self-efficacy scale (DMSES) adapted from the previous study originally developed by Wallston et al.[20] The responses were rated on a 5-point Likert scale: "1=not confident, 2=not very confident, 3=confident half the time, 4=usually confident, 5=always confident". Self-efficacy was measured

by eight (8) standardized on a five-point (5) Likert scale which was 1=not confident, 2=not very confident, 3=confident half the time, 4=usually confident, and 5=always confident. Thus, respondents who answered "confident half the time and above (≥3) considered as above the mean and had good self-efficacy, and those respondents who answered less than confident half the time regarded as below the mean and had poor self-efficacy (<3)". Cronbach's alpha was 0.880. Finally, glycosylated hemoglobin (HbA1c) was obtained early in the morning on the same day as the measure of glycemic control using the Fast Ion Exchange Resin Separation method the value of glycated hemoglobin found on red blood cells for the previous three months. Thus, A1C levels were categorized according to American Diabetes Association into good glycemic control A1C less than 7% (53mmol/mol) and A1C over ≥7.0% (53mmol/mol) poor Glycemic control. A Close-ended interviewer-administered structured questionnaire was distributed to participants by trained data collectors. Four trained Bsc nurses' data collectors and two supervisors were employed for consecutive two months.

Operational Definition
Self-Efficacy
"The diabetes patients' belief and judgment of their capability of carrying out diabetes self-management activities" (Bandura, 1994) which was measured on a five-point (5) Likert scale which was 1=not confident, 2=not very confident, 3=confident half the time, 4=usually confident, and 5=always confident.

Good Self–Efficacy
Respondents who answered confident half the time and above (≥3) considered as above the mean and had good self-efficacy

Poor Self–Efficacy
Those respondents who answered less than confident half the time regarded as below the mean (<3) and had poor self-efficacy.

Self-Care Behaviors
Defined as activities performed by diabetic patients including healthy eating plan, exercise, self-glucose monitoring, and diabetes medication and/or insulin intake.

Poor Self-Care Behaviors
Those patients' self-care behaviors scored less than 50th percentile of self-care behavior scores.

Good Self Self-Care Behaviors
Those patients' self-care behaviors scored more than 50th percentile of self-care behavior scores.

Reliability of the Instruments
The Sampling adequacy was checked by the Kaiser Meyer Olkin test. For all scales, confirmatory factor analysis was performed to know the adequacy of all instruments (accepted standard >0.5). The reliability determined by the coefficient of loading factors by using the principal component method, Varimax rotation with Kaiser Normalization at Eigenvalue >1. The intraclass correlation coefficient was used for testing the reliability of scales. Some items were reduced based on the value of the intraclass correlation coefficient using the principal component method, Varimax rotation with Kaiser Normalization at Eigenvalue >1. Factor analysis for Diabetes self-management tools with Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.83 (DF=105, p=00). The rotated component matrix showed three dimensions (1, 2 and 3). The total variance explained for the first dimension was 23.44%, the 2nd dimension 39.28% and the third dimension was 57.69%. The overall Cronbach's alpha of the tool was =0.86. Confirmatory factor analysis of the self-efficacy scale with Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.86 (DF=28, p=00). The rotated component matrix of loading factors resulted in two dimensions (1 and 2) with total variance explained for the 1st and 2nd dimensions (35.76% 68.76%) respectively. The overall Cronbach's alpha =0.88.

Data Quality Control
All questionnaires adopted in the English language translated into the local language Afan Oromo and then re-translated back into English by experts. A pretest was conducted on 5% of the questionnaire on diabetic patients at Shambu hospital that was outside the actual study setting before data collection. The training was given one day for both data collectors and supervisors. Data were cleaned, coded, and checked for consistency and completeness. A consistency was checked by a double-entry method to improve the quality of the data.

Data Processing and Analysis
Data were cleaned, edited, coded, and entered into Epi data version 3.1 and was exported to SPSS windows version 24 for analysis. Descriptive statistics including,

percentage, ratios, frequency distribution, mean and standard deviation, and pie chart was used to describe the data. Normalization of the data was checked using Hosmer and Lemeshow test and chi-square to know the homogeneity of variables. All variables were significant at p-value <0.25 in the bivariable were entered in multivariate regression analysis. Backward stepwise goodness of fit was used to ascertain the suitable variables in multiple logistic regression analysis. Finally, multivariate logistic regression analysis with adjusted ORs, CI at 95%, and the significance level was set at p <0.05.

Results

Socio-Demographic Characteristics of Participants

Out of 423 participants sampled, 398 participated in the study giving a response rate of 94.1%. More than half 210 (52.8%) of the participants were male with a median age of 45 (±15.876SD). The majority of the participants 168 (42.2%) were aged above 50 years followed by 40–49 (24.1%) years. Concerning their ethnicity, the majority of the participants 355 (89.2%) were Oromo with language speaker 327 (82.2%) Afan Oromo. Nearly half 189 (47.5%) of the respondents were protestant followers followed by 134 (33.7%) were an orthodox believer. Concerning marital status, about 308 (77.4%) were married. Moreover, concerning the educational status majority of the respondents were 109 (27.4%) college/university and about 97 (24.4%) had no formal education. With regard to their occupation, most of them 169 (42.5%) were employees, and about 246 (61.8%) urban indwellers (Table 1).

Clinical Characteristics of Participants

The study results showed most of the participants (55.78%) were smokers. The majority (76.1%) of the respondents had no family history of diabetes. More than half (53.8%) of patients have suffered from diabetes mellitus for less than five years. Of the total of respondents, 68.1% of them had no diabetes-related complications (hypertension, neuropathy, diabetic coma, foot gangrene) and the remaining 31.9% had diabetes-related complications. Approximately three-fourth (74.1%) of the respondents did physical activity per week and nearly half (51.0%) of them test their blood glucose by glucometer at home. The majority (39.4%) of the respondents were overweight (BMI=25–29.9) and they reported that they experienced increased body weight (51.8%). The

Table 1 Distribution of Socio-Demographic Characteristics of Diabetes Patients Attending Public Hospitals of Western Ethiopia (N=398)

Variables	Category	Number (N)	Percent (%)
Sex	Male	210	52.8
	Female	188	47.2
Age	20–29	66	16.6
	30–39	68	17.1
	40–49	96	24.1
	≥50	168	42.2
Ethnicity	Oromo	355	89.2
	Amhara	38	9.5
	Others©	5	1.3
Language	Afan Oromo	327	82.2
	Amharic	62	15.6
	Others	9	2.3
Religion	Orthodox	134	33.7
	Muslim	59	14.8
	Protestant	189	47.5
	Others®	16	4.0
Educational status	No formal education	97	24.4
	Elementary	96	24.1
	High school	96	24.1
	College/university	109	27.4
Occupation	Daily laborer	48	12.1
	Merchant	87	21.9
	Farmer	94	23.6
	Employee	169	42.5
Residence	Urban	246	61.8
	Rural	152	38.2

Notes: Others© (Tigre, silte, Gumuz); Others® (Wakefata).

participants reported that about seventy percent (70.1%) of them had no special diet and 29.9% of them had a self-arranged special diet. The majority of the patients 285 (71.6%) had been taking a combination of oral hypoglycemic agents and insulin and the remaining had been taking insulin injection and non-pharmacological treatment (23.4% and 5.0%, respectively) (Table 2).

Prevalence of Perceived Self-Efficacy and Self-Care Behavior Among Diabetes Patients

The level of perceived good self-efficacy among diabetes patients was 52.5% with a mean and standard deviation of
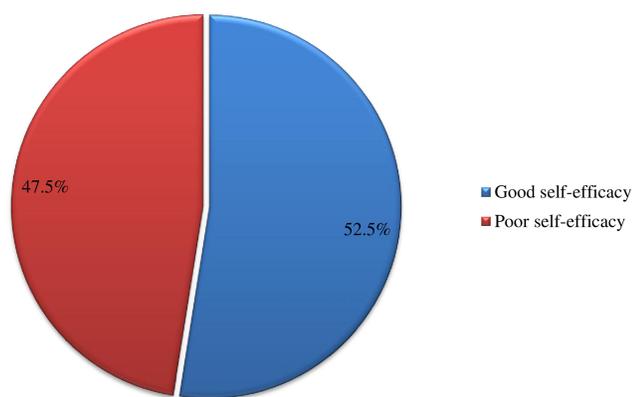
Figure 1 The level of perceived self-efficacy among diabetes patients attending public hospitals of west Ethiopia, 2020.

27.10±6.41. The level of self-care behavior was classified as poor, fair, and good using less than 25th, 25th-75th, and more than the 75th percentile of their possible scores. Thus, of 398 respondents the prevalence of good self-care behavior 20.4% (n=81), fair self-care behavior 51.0% (n=203), and 28.6% (n=114) were poor self-care behavior (Figures 1 and 2).

Bivariable Logistic Regression Analysis of Factors Associated with Perceived Self-Efficacy

In logistic regression good self-care behavior, unmarried, exercise per weeks, home blood glucose test, decreased body weight body overweight, good appetite, having dietary restriction, having a special diet, having food planning, being nonsmoker, were significantly associated variables with good perceived self-efficacy at p<0.25 (Table 3)

Multivariable Logistic Regression Analysis of Factors Associated with Perceived Self-Efficacy

All variables significant at bivariable level entered into multivariable logistic regression found six significantly associated variables with perceived self-efficacy including home blood glucose test, being unmarried, good self-care behavior, having a good appetite, doing exercise, having a special diet. Being unmarried was less likely to have high perceived self-efficacy compared to married (AOR=0.308, 95% CI = 0.160, 0.594). Concerning home blood glucose test participants who test their blood glucose were three times more likely to have high perceived self-efficacy than those who did not test their blood glucose at

Table 2 Proportion of Clinical Characteristics of Diabetes Patients Attending Public Hospitals of Western Ethiopia (N=398)

Variables	Category	Number (N)	Percent (%)
Smoking status	Smokers	222	55.78
	Non smokers	176	44.22
Duration of diabetes	1–4 years	214	53.8
	5–7 years	79	19.8
	≥8 years	105	26.4
Types of treatment	Non pharmacological	20	5.0
	Insulin	93	23.4
	OHA+ insulin	285	71.6
Body mass index (Kg/m^2)	Under weight (≤18.5)	37	9.3
	Normal weight (18.5–24.9)	103	25.9
	Overweight (25–29.9)	157	39.4
	Obese (≥30)	101	25.4
Weight change (kg)	Weight gain	206	51.8
	Weight loss	192	48.2
Family history	Yes	95	23.9
	No	303	76.1
Special diet	Yes	119	29.9
	No	279	70.1
Exercises	Yes	295	74.1
	No	103	25.9
Blood glucose test	Yes	203	51.0
	No	195	49.0
Diabetes complication	Yes	127	31.9
	No	271	68.1

home (AOR=3.359, 95% CI = 1.912,5.903). With regards to doing exercise were eleven times more likely to have high perceived self-efficacy compared to participants who did not do exercise (AOR=11.412, 95% CI = 2.488,52.346). Regarding the description of participants, appetite participants who had a good appetite were three times more likely to have high perceived self-efficacy compared to participants who had poor appetite (AOR=2.587, 95% CI = 1.454,4.606). Concerning having special diet participants who had special diet were five times more likely to have high perceived self-efficacy compared to participants who did not have special diet recommendation (AOR=4.902, 95% CI= 1.202, 19.992).
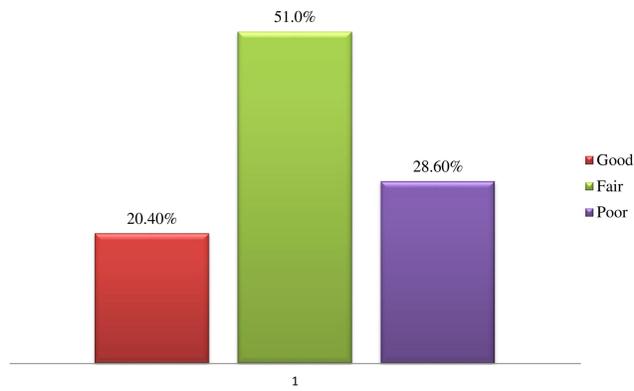
Figure 2 The practice of self-care behaviors among diabetes patients attending public hospitals of west Ethiopia, 2020.

The study result also revealed that participants who had good self-care behavior were ten times more likely to have good perceived self-efficacy than participants who had poor self-care behaviors (AOR=10.320, 95% CI= 5.657, 18.824) (Table 4).

Discussion

This study aimed to determine perceived self-efficacy and its underlying factors among diabetes patients on follow up receiving anti-diabetic medications. The level of good perceived self-efficacy in this study was 52.5%. This finding was almost relatively similar to the result of a study conducted in Indonesia showing that patients who have good self-efficacy (52.4%) as well as poor self-efficacy about 47.6%. However, this finding was relatively lower than the result of a study conducted in Saudi Arabia about 53% of participants reported good self-efficacy. This similarity might justify the fact that individual confidence in self-managing diabetes through nutrition, exercise, and close monitoring of blood glucose is a common strategy across the globe.[20,21]

The study revealed that self-care behavior is associated with perceived self-efficacy considering the joint effect of other variables in the logistic regression model. Having good self-care behavior increased the odds of perceived

Table 3 Bivariable Logistic Registration Analysis of Factors Associated with Perceived Self-Efficacy Among Diabetes Patients Attending Public Hospitals of Western Ethiopia, 2020

Variables	Category	Self-Efficacy		AOR (95% CI)	P-value
		Good Self-Efficacy	Poor Self-Efficacy		
Marital status	Unmarried Married	39 170	51 138	1 1.611 (1.003,2.587)	0.048
Smoking status	Smokers Non smoker	102 107	120 69	1 1.824 (1.221,2.726)	0.003
Weight change (Kg)	Weight gain Weight loss	65 144	42 147	1.580 (1.006,2.480) 1	0.047
Description of appetite	Good Poor	44 165	81 108	2.812 (1.811,4.367) 1	<0.001
Special diet	Yes No	16 193	4 185	3.834 (1.258,11.682) 1	0.018
Dietary restriction	Yes No	2 207	14 175	8.280 (1.856,36.931) 1	0.006
Blood glucose test	No Yes	172 37	80 109	1 6.334 (4.008,10.009)	<0.001
Exercise	No Yes	206 3	177 12	1 4.655 (1.293,16.760)	0.019
Food planning	No Yes	10 199	24 165	1 2.653 (1.222,5.762)	0.014
Self-care behaviour	Poor/Fair Good	64 145	164 25	1 17.262 (9.516,31.312)	<0.001

Table 4 Multivariable Logistic Registration Analysis of Factors Associated with Perceived Self-Efficacy Among Diabetes Patients Attending Public Hospitals of Western Ethiopia, 2020

Variables	Category	Self-Efficacy		AOR (95% CI)	P-value	AOR (95% CI)	P-value
		Good Self-Efficacy	Poor Self-Efficacy				
Marital status	Unmarried Married	39 170	51 138	1.611 (1.003,2.587) 1	0.048*	0.308 (0.160, 0.594) 1	<0.001**
Smoking status	Smokers Non smoker	102 107	120 69	1 1.824 (1.221,2.726)	0.003*		
Weight change (Kg)	Gain Loss	65 144	42 147	1.580 (1.006,2.480) 1	0.047*		
Description of appetite	Good Poor	44 165	81 108	2.812 (1.811,4.367) 1	<0.001*	2.587 (1.454,4.606)	<0.001**
Special diet	Yes No	16 193	4 185	3.834 (1.258,11.682) 1	0.018*	4.902 (1.202,19.992)	0.027**
Dietary restriction	Yes No	2 207	14 175	8.280 (1.856,36.931) 1	0.006*	0.213 (0.041,1.107)	0.066
Blood glucose test	No Yes	172 37	80 109	1 6.334 (4.008,10.009)	<0.001*	3.359 (1.912,5.903)	<0.001**
Exercise	No Yes	206 3	177 12	1 4.655 (1.293,16.760)	0.019*	11.412 (2.488,52.346)	0.002**
Food planning	No Yes	10 199	24 165	1 2.653 (1.222,5.762)	0.014*		
Self-care behaviour	Poor/Fair Good	64 145	164 25	1 17.262 (9.516,31.312)	<0.001*	10.320 (5.657,18.824)	<0.001**

Notes: *Significant at p<0.25; **Significant at P<0.05.

self-efficacy ten times compared to poor self-care behaviors (AOR=10.320, 95% CI= 5.657, 18.824). This finding was similar to a study conducted in Iran which explained that diabetes self – management has a prominent role in perceived self-efficacy which reported that 31.3% variance of diabetes self-care behavioral intention and 11.4% of variance due to diabetes self-care.[22]

The finding of this study showed that participants who tested their blood glucose at home were three times more likely to have high perceived self-efficacy than those who did not test their blood glucose (AOR=3.359, 95% CI = 1.912,5.903). This finding was similar to the study done in Israel which showed self-efficacy was found to be associated with a home glucose monitoring, and lower HbA1c in young people with Type I diabetes as revealed in Pearson's correlations (r=0.47, P < 0.01). This similarity justifies the fact that diabetic patients engaging in the self intervention of home blood glucose measuring enhance their level of confidence to reduce their blood glucose to recommended targets.[23]

The study result also illustrated the relationship between perceived self-efficacy and exercising physical activity per week that diabetes patients who exercise were eleven times more likely to have high perceived self-efficacy compared to participants who did not do exercise (AOR=11.412, 95% CI = 2.488,52.346). This finding was higher than the study conducted by Peyman et al in Iran which revealed patients who had self-efficacy were an important predictor of physical activity in the study, subjects showed a significantly positive correlation between physical activity and perceived self-efficacy (r= 0.176, p <0.005). This finding was also comparable with the result of the study conducted by Albargawi et al showed self-efficacy had a significant, positive correlation with participants' adherence to exercise (r=0.491; p < 0.006). This difference might relate to a variation in economic status

and national health policy guidelines for diabetes treatment modality across the countries.[21,24]

In this current study respondents who had a special diet were found to be a significant predictor of perceived self-efficacy among diabetes patients. Thus, participants who had a special diet were five times more likely to have high perceived self-efficacy compared to participants who did not have a special diet recommendation (AOR=4.902, 95% CI= 1.202, 19.992). This finding was similar to a study conducted in Staffordshire University England that perceived self-efficacy was associated with self-reported adherence to dietary self-care activities (r = 0.21, p < 0.05) and as well dietary self-efficacy and perceived spousal support were associated with dietary behaviors among Type 2 diabetes patients. This similar correlation related to participants' level of confidence enhances the level of dietary adherence for controlling blood glucose levels.[25,26]

Limitations and Strengths of the Study
The Strength of the Study
- The concept was novel and directed the need for further scientific implications.
- The data collection tools were anonymously structured.

Limitations of the Study
- Since it was cross-sectional no comparison of cause and effect relationship.
- There was recall bias.

Study Implications
The findings of the study found important parameters related to perceived self-efficacy including self-care behaviour, blood glucose test, doing regular physical activities per week, and adherence to dietary restriction. Theses parameters were important focus areas for implications of this study in order to integrating in national health policy making and practicing individually for self-monitoring blood glucose and reduce potential complication.

Conclusion
The overall prevalence of good perceived self-efficacy was high. Home blood glucose, good self-care behavior, unmarried, exercise per week, good appetite, having dietary restriction, having a special diet were significantly associated variables with high perceived self-efficacy. Therefore, it is better if the national health policymaker focused on management modality that engages patients' behavior change to develop good perceived self-efficacy for their better confidently managing their blood glucose level.

Abbreviations
ADA, American Diabetes Association; AOR, adjusted odds ratio; BMI, body mass index; DM, diabetes mellitus; DMSES, Diabetes Mellitus Self-efficacy Scale; DSMQ, diabetes self-management questionnaire; HIV, human immunodeficiency virus; SD, standard deviation; SMBG, self-monitoring of blood glucose.

Data Sharing Statement
The data used during this study are available from the corresponding author on reasonable request.

Ethical Approval and Consent to Participate
The study was reviewed and approved by the Institutional Review Boards of Wollega university Ethical review board. The purpose of the study was explained to the medical director and staff of the hospital and permission was obtained. We conducted the study in accordance with the Declaration of Helsinki by including basic principles of ensuring the study subject's privacy, risk and benefit, conducted by trained professionals, true informed consent obtained, and even we allowed the right to withdraw if the study participants requested. No minors were involved in the study and the consent was obtained from the participants themselves. Moreover, the confidentiality of the information was assured.

Author Contributions
All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to

which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests for this work.

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