

BMJ Open Recommended dietary practice and associated factors among patients with diabetes at Debre Tabor General Hospital, northwest Ethiopia: institutional-based cross-sectional study design

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ABSTRACT

Objective This study aimed to assess dietary practice and associated factors among patients with diabetes attending the Debre Tabor General Hospital.

Design Institutional-based cross-sectional study.

Setting Amhara regional state, Debre Tabor General Hospital.

Participants Patients with diabetes attending the diabetics' clinic.

Measurements The study was conducted from February to March 2016. Simple random sampling technique was used to select the study participants and data were collected using a pretested structured interviewer administered questionnaire. Patients' dietary practice was assessed using the general advice for diabetic plan containing 11 items. The data were entered using Epi Info V.7 and analysed using SPSS V.20. Binary logistic regressions analysis was used to identify factors associated with poor dietary practice. Adjusted ORs (AORs) with corresponding 95% CI and $p < 0.05$ were used to identify significant factors affecting poor dietary practice.

Results A total of 390 patients with diabetes were participated in the study making a response rate of 96.5%. The overall proportion of poor dietary practice was 55.4% (95% CI 50.8% to 60.5%). Respondents of rural residence (AOR 1.99, 95% CI 1.21 to 3.28), Not getting diabetic nutrition education (AOR 3.32, 95% CI 2.02 to 5.44), difficulty to determine what to eat (AOR 5.49, 95% CI 3.34 to 9.02), not having family/friends support (AOR 2.50, 95% CI 1.46 to 4.27), worried about high cost of foods (AOR 2.12, 95% CI 1.29 to 3.49) were significantly associated with poor dietary practice.

Conclusions More than half of patients with diabetes were had poor dietary practice. Rural dwellers, not getting nutrition education, difficulty of choosing foods, not getting family/friends support and worried about high cost of foods were positively and significantly associated with poor dietary practice. Hence, integration of diabetic based nutrition education with motivation particularly for rural patients is highly recommended.

Strengths and limitations of this study

- In this study, diet recall method was used and the study did not use any additional data on duration of diabetic diet consumption, which may either reduce or exaggerate the result.
- Self-report method was used rather than direct observation of patients' dietary practices and may suffer from recall bias.
- This cross-sectional study cannot identify causal relationships.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder of multiple aetiologies that affect the body's ability to process and use glucose for energy and characterised by elevated blood glucose levels resulting from defects in insulin secretion, insulin action or both.¹⁻³

Diabetes, one of the rapidly increasing non-communicable diseases, is an important public health problem of the 21st century.^{4,5} It is the fourth-leading cause of death in most high-income countries and there is substantial evidence that it is epidemic in many low-income and middle-income countries.⁶ Globally in 2013, 382 million peoples were affected with diabetic, and this will rise to 592 million by 2035.⁷ The number of people living with diabetes in Africa among adult populations were 19.8 million and this will rise to 41.5 million by 2035.^{7,8} According to International Diabetic Federation, Ethiopia placed third in the continent with an estimated diabetic prevalence of 4.36% (1.8 million) for adults.⁸ The main factors responsible for this worldwide public health problem

are genetic disorder, behavioural and environmental risk factors, obesity and physical inactivity.⁹

Diabetes is associated with micro vascular and macro vascular complications that can lead to visual impairment, blindness, kidney disease, nerve damage, amputations, heart disease and stroke if left untreated.^{5 10} Moreover, diabetes decreases both quality and expectancy of life and imposes large economic burdens on individuals and on national healthcare system.^{5 11} Early identification and optimal management of people with diabetes is therefore critical. Medication therapy and physical activity interventions alone are generally not adequately effective in maintaining persistent glycaemic control over time for many individuals.¹²

Dietary management which is considered to be one of the cornerstones of diabetes care is an important component of the overall treatment plan.³ Choosing and relaying on healthy diet is important for everyone, especially for people with diabetes. Whether one is being treated with insulin or tablets, the patient needs to have a good dietary practice.^{13 14} There are studies on the assessment of dietary practices among patients with diabetes in different countries. Studies done on United Arab Emirates, Nepal, Riyadh of Saudi Arabia, Bahrain and Iran^{13–17} and similar studies in South Africa, Egypt and Ethiopia showed the dietary practice of patients with diabetes were inadequate.^{18–20}

In Ethiopia, there are studies about management of diabetes,^{21–24} but studies on dietary practice and associated factors are scarce particularly in the study area. Therefore, this study aimed to assess dietary practice and associated factors among patients with diabetes.

MATERIALS AND METHODS

Study design and participants

Institutional-based cross-sectional study was conducted from February to March 2016 at Debre Tabor General Hospital, northwest Ethiopia. The hospital is located in Debre Tabor town of South Gondar Zone, 667 km Northwest of Addis Ababa (the capital of Ethiopia). It is the only general hospital providing comprehensive curative, preventive and promotive services for about 2.3 million populations in the zone and nearby districts. The hospital has 12 outpatient departments (OPDs) including specialty chronic illness clinics where patients with specific chronic diseases such as DM patients are referred for follow-up. In this clinic, physicians give services to 30–40 patients with diabetes a day two times a week. Patients who had been diagnosed and registered with type 1 and 2 diabetes for at least 6 months and aged 15 years and older were included in the study. Critically ill patients and patients with gestational DM were excluded from the study.

Sample size and sampling procedure

The sample size of 404 was determined using single population proportion formula based on the assumptions of 95% CI, proportion of poor dietary practice as 51.4%,²⁰

5% margin of error and a non response rate of 5%. Simple random sampling technique was used to identify study participants by using the DM clinic appointment list as a sampling frame.

Data collection tools, procedures and measurements

A structured interviewer administered questionnaire including the sociodemographic characteristics, clinical, behavioural, social and food related factors were used to collect the data. Moreover, data on nutritional knowledge and their dietary practice were assessed using the general advice for diabetic diet plan developed from the South African Diabetes Association.^{3 20} The questionnaire was initially prepared in English and translated to Amharic (local language) then retranslated back to English by language experts. The questionnaire was pretested on 21 patients with diabetes nearby health centre for consistency of responses and then corrective action was taken. Three data collectors (BSc nurses) and a supervisor were participated in the data collection process. Training was given for 2 days and continuous follow-up and supervision was made by the supervisor and principal investigator throughout the data collection period.

Diabetic diet was defined as a dietary adjustment for patients with DM intended to decrease the need of insulin or oral hypoglycaemic agents to avoid wide fluctuations in plasma glucose levels and to control weight by adjusting caloric and carbohydrate intake. Therefore, patients' dietary practice was assessed using the general advice for diabetic plan with 11 items included; forgot to plan meals ahead, missed dietary plan, not took dietary plan over the past 2 weeks, forgot to comply dietary plan with everyday life, stop to take dietary plan when they feel under control of DM, feel hassled about sticking to dietary plan, dietary deprivation, rigid instead of flexible eating to control DM, forgot to eat fruits in food daily, forgot to eat vegetables daily, and forgot to cut down butter and fat intake. Response categories were either 'yes' or 'no' for each item. In all, 0 point was allocated to a yes (good practice) and 1 point to a no (wrong practice). The responses were computed for all questions of dietary practice by taking mean value and classified as having 'good' and 'poor dietary practice'.³

Nutritional knowledge of the patients was assessed using six item questions. The patients asked about the frequency of fruits and vegetables eaten per day, oils to cut down, foods to cut down a lot, identifying healthy oil, numbers of regular meals patients with diabetes ate per day and number of snacks per day. A correct answer was coded as '1' and an incorrect answer was as '0'. Finally, their responses were computed using the mean value and participants who scored mean and above the mean value were classified as having good nutritional knowledge.²⁰

To ascertain blood glucose level, the data collectors reviewed and recorded the last three consecutive months of Fasting Blood Glucose (FBG) results from patient's chart and took the average blood glucose test.

Poor dietary practice of the patient was defined as patients who scored mean and above the mean value for the dietary practice questions.³ Patients were defined as having regular physical activity if the patient performed ≥ 5 days of moderate intensity activity or, walking of at least 30 min per day.

Data management and analysis

Data were entered using Epi Info V.7 and exported to SPSS V.20 for further analysis. Descriptive statistics such as frequencies, percentages, mean and SD were used to summarise the data. Bivariate analysis was done to check the association between each variable with poor dietary practice. Variables with p value of up to 0.20 during the bivariate analysis were included in to multivariable analysis in order to control the possible effects of confounding factors. Finally the variables which had significant association with poor dietary practice were identified on the basis of OR with 95% CI and $p < 0.05$.

Patient and public involvement

Not applicable.

RESULTS

Sociodemographic characteristics of patients with diabetes

A total of 390 patients with diabetes aged 15 years and older were participated in the study, making a response rate of 96.5%. The mean age of the participants was 40.3 (SD ± 16.7) years. Two hundred and twenty-one (56.7%) of the participants were males and more than half 198 (50.8%) were also married. Majority of the participants 335 (85.9%) were Orthodox Christianity by religion and two hundred twenty five (57.7%) of the participants were urban dwellers. Nearly one-fourths 90 (23.1%) were illiterate and one hundred seventeen participants 117 (30%) were farmers by occupation (table 1).

Clinical characteristics of the participants

In this study, 214 (54.9%) of the participants had type I diabetes. The mean duration of diabetic disease was 7.7 (SD ± 6.6) years. Of the participants, over half (53.1%) of them had > 5 years duration of diabetic disease, and sixty participants 60 (15.4%) had chronic diseases other than diabetes. From the total participants, nearly half 187 (47.9%) of them did not get diabetes nutrition education in the hospital.

Behavioural and social conditions of participants

From the total participants, majority 353 (90.5%) of them checked their FBG level monthly. Thirty (7.7%) of the participants used alcohol on daily basis, and few of them 15 (3.8%) have had smoking habit. Thirty (7.7%) of the participants were used holidays and celebrations as free days to eat, and nearly one-tenth 36 (9.2%) did not make food choice when they ate out of home. Three hundred and thirty- one (84.9%) of participants did exercise daily.

Table 1 Sociodemographic characteristics of participants, Debre Tabor General Hospital, northwest Ethiopia, 2016 (n=390)

| Variable | Frequency | Per cent |
|---------------------------------------|-----------|----------|
| Sex | | |
| Male | 221 | 56.7 |
| Female | 169 | 43.3 |
| Age | | |
| ≤ 30 | 161 | 41.3 |
| > 30 | 229 | 58.7 |
| Educational status | | |
| Illiterate | 90 | 23.1 |
| Able to read and write | 27 | 6.9 |
| Primary school | 85 | 21.8 |
| Secondary school | 67 | 17.2 |
| Above secondary | 121 | 31.0 |
| Marital status | | |
| Married | 198 | 50.8 |
| Single | 111 | 28.5 |
| Separated | 29 | 7.4 |
| Divorced | 27 | 6.9 |
| Widowed | 25 | 6.4 |
| Religion | | |
| Orthodox | 335 | 85.9 |
| Muslim | 38 | 9.7 |
| Protestant | 17 | 4.4 |
| Place of residence | | |
| Rural | 225 | 57.7 |
| Urban | 165 | 42.3 |
| Wealth | | |
| Poor | 230 | 59.0 |
| Medium | 101 | 25.9 |
| Rich | 59 | 15.1 |
| Occupation | | |
| Farmer | 117 | 30.0 |
| Employee | 113 | 29.0 |
| Merchant | 43 | 11.0 |
| Student | 37 | 9.5 |
| Daily labourer | 30 | 7.7 |
| House wife | 23 | 5.9 |
| Pension | 16 | 4.1 |
| House maid | 11 | 2.8 |
| Number of family size | | |
| < 5 | 97 | 24.9 |
| ≥ 5 | 293 | 75.1 |
| Distance of home from hospital | | |
| ≤ 5 km | 160 | 41.0 |
| > 5 km | 230 | 59.0 |

**Table 2** Food-related factors of participants, Debre Tabor General Hospital, Northwest Ethiopia, 2016, (n=390)

| Variables | Frequency | Per cent |
|---------------------------------------|-----------|----------|
| Availability of fruits and vegetables | | |
| Always | 240 | 61.5 |
| Sometimes | 150 | 38.5 |
| Get diabetes nutrition education | | |
| Yes | 203 | 52.1 |
| No | 187 | 47.9 |
| Foods prepared based on their disease | | |
| Yes | 160 | 41.0 |
| No | 230 | 59.0 |
| Difficulty in choosing diabetic foods | | |
| Yes | 191 | 49.0 |
| No | 199 | 51.0 |
| Friend/family support | | |
| Yes | 258 | 66.2 |
| No | 132 | 33.8 |
| Worry about high cost of food | | |
| Yes | 189 | 48.5 |
| No | 201 | 51.5 |

Food-related factors of participants

Of the participants, half of them 203 (52.1%) got diabetic nutrition education in the hospital, and two hundred and thirty participants (59%) replied that, foods were not prepared based on their disease type. Nearly half of them 191 (49%) have had difficulty in choosing foods, and 132 (33.8%) had not family and friends support. Almost half 189 (48.5%), worried about high cost of food accounted (table 2).

Dietary practice of the participants with respect to the 11 variables

Of the total participants, 79 (20.3%) participants forgot to plan meals ahead, and nearly one-thirds, 119 (30.5%) were stopped following their dietary plan when they feel their DM is under control. Majority of them, 317 (81.3%) were hassled to follow the diabetic dietary regimen, and 333 (85.4%) reported that they feel dietary deprivation (table 3).

Proportion of dietary practice and nutritional knowledge of the participants

The overall proportion of poor dietary practice was 55.4% (95% CI 50.8% to 60.5%), while good nutritional knowledge among the respondents was 69% (95% CI 65.1% to 73.9%). The proportion of poor dietary practice was higher (65.3%) among rural residents than urban residents.

Factors associated with poor dietary practice of patients with diabetes

The multivariable logistic regression analysis revealed that rural residence, not getting diabetic nutrition education, having difficulty to choose foods, not getting family/

friends support and worried about the high cost of foods were significantly associated with poor dietary practice.

In this study, patients with diabetes who lived in rural areas were two times (adjusted OR, AOR 1.99, 95% CI 1.21 to 3.28) as likely to had poor dietary practice as compared with those who lived in urban areas. Patients who did not get diabetic nutrition education were three times (AOR 3.32, 95% CI 2.02 to 5.44) more likely to had poor dietary practice as compared with those of who got diabetic nutrition education.

Patients with diabetes who had difficulty to choose diabetic foods were five times (AOR 5.49, 95% CI 3.34 to 9.02) as likely to had poor dietary practice as compared with those of patients who did not had. Patients who did not have family/friend support were three times (AOR 2.50, 95% CI 1.46 to 4.27) as likely to had poor dietary practice as compared with those who had family support. As well, patients who worried about the high cost of foods were two times (AOR 2.12, 95% CI 1.29 to 3.49) as likely to had poor dietary practice as compared with those who did not (table 4).

DISCUSSION

Diabetes is the most common chronic disease with devastating complications.²⁵ In this study the overall proportion of poor dietary practice among patients with diabetes was found to be 55.4% (95% CI 50.8% to 60.5%). This finding is consistent with those of studies done in Yekatit 12 Medical College Hospital, Ethiopia (51.4%),²⁰ Riyadh Saudi Arabia (58.3%)¹⁵ and United Arab Emirates

Table 3 Dietary practice of participants with respect to the eleven variables measuring failure in practice, Debre Tabor General Hospital, Northwest Ethiopia, 2016, n=390.

| Variable | Type I Frequency (%) | Type II Frequency (%) | Total (%) |
|--|----------------------|-----------------------|-------------|
| Forgot to plan meals ahead | | | |
| Yes | 45 (21.0) | 34 (19.3) | 79 (20.3) |
| No | 169 (79.0) | 142 (80.7) | 311 (79.7) |
| Missed dietary plan yesterday | | | |
| Yes | 47 (21.9) | 28 (15.9) | 75 (19.2) |
| No | 167 (78.1) | 148 (84.1) | 315 (80.8) |
| Not took dietary plan over the past 2 weeks | | | |
| Yes | 51 (23.8) | 44 (25.0) | 95 (24.4) |
| No | 163 (76.2) | 132 (75.0) | 295 (75.6) |
| Forgot to comply dietary plan with everyday life | | | |
| Yes | 64 (29.9) | 53 (30.1) | 117 (30) |
| No | 150 (70.1) | 123 (69.9) | 273 (70) |
| Stop to take dietary plan When feel under control of DM | | | |
| Yes | 56 (26.2) | 63 (35.8) | 119 (30.5) |
| No | 158 (73.8) | 113 (64.2) | 271 (69.5) |
| Feel hassled about sticking to dietary plan? | | | |
| Yes | 171 (79.9) | 146 (82.9) | 317 (81.3) |
| No | 43 (20.1) | 30 (17.1) | 73 (18.7) |
| Dietary deprivation | | | |
| Yes | 181 (84.6) | 152 (86.4) | 333 (85.4) |
| No | 33 (15.4) | 24 (13.6) | 57 (14.6) |
| Rigid, instead of flexible eating to control DM | | | |
| Yes | 153 (71.5) | 141 (80.1) | 294 (75.4) |
| No | 61 (28.5) | 35 (19.9) | 96 (24.6) |
| Forgot to eat fruits in food daily | | | |
| Yes | 135 (63.1) | 120 (68.2) | 255 (65.4) |
| No | 79 (36.9%) | 56 (31.8%) | 135 (34.6%) |
| Forgot to eat vegetables daily | | | |
| Yes | 88 (41.1) | 85 (48.3) | 175 (44.4) |
| No | 126 (58.9) | 91 (51.7) | 217 (55.6) |
| Forgot to cut down butter and fat intake | | | |
| Yes | 91 (42.5) | 92 (52.3) | 183 (46.9) |
| No | 123 (57.5) | 84 (47.7) | 207 (53.1) |

DM, diabetes mellitus.

(60%).¹³ The possible reason might be due to the studies were had similar methodologies and population groups. It is lower than studies done in Tikur Anbessa Specialised Hospital, Ethiopia (68.2%)²⁶ and Kenya (75%).²⁷ But it is higher than studies done in Ahmadabad district of Gujarat state of India (27%)²⁸ and in five health regions of Bahrain (10.5%).¹⁶ The difference might be due to differences in the study setting and population, data collection tools, socioeconomic status as well difference in diet habits of the patients. Additionally, the differences

also might be due to having different information, education and communication strategies in those countries.

Residence was one of the main factors that were identified to have association with poor dietary practice of patients with diabetes. This study revealed that rural patients with diabetes were two times more likely to had poor dietary practice as compared with urban resident. This is in line with the study conducted in Bangladesh²⁹ and China.³⁰ This might be due to differences in educational level of the participants where rural resident are

Table 4 Bivariate and multivariable logistic regression analysis of factors affecting dietary practice of patients with diabetes, Debre Tabor General Hospital, Northwest Ethiopia, 2016

| Variables | Dietary practice | | COR (95% CI) | AOR (95% CI) |
|------------------------------|------------------|-------------|-----------------------|-----------------------|
| | Poor | Good | | |
| Residence | | | | |
| Urban | 69 (41.8%) | 96 (58.2%) | 1 | 1 |
| Rural | 147 (65.3%) | 78 (34.7%) | 2.62 (1.73 to 3.97)* | 1.99 (1.21 to 3.28)* |
| Occupation | | | | |
| Employee | 60 (53.1%) | 53 (46.9%) | 1 | |
| Farmer | 79 (67.5%) | 38 (32.5%) | 1.84 (1.08 to 3.14)* | – |
| House wife | 12 (52.2%) | 11 (47.2%) | 0.96 (0.39 to 2.37) | – |
| Merchant | 20 (46.5%) | 23 (53.5) | 0.77 (0.38 to 1.55) | – |
| Pension | 7 (43.8%) | 9 (56.2%) | 0.69 (0.24 to 1.97) | – |
| Daily labourer | 14 (46.7%) | 16 (53.3%) | 0.77 (0.35 to 1.73) | – |
| Maid | 4 (36.4%) | 7 (63.6%) | 0.51 (0.14 to 1.82) | – |
| Student | 20 (54.1%) | 17 (45.9%) | 1.04 (0.49 to 2.19) | – |
| Distance | | | | |
| ≤5 km | 76 (47.5%) | 84 (52.5%) | 1 | |
| >5 km | 140 (60.9%) | 90 (39.1%) | 1.72 (1.14 to 2.59)* | – |
| Nutrition education | | | | |
| Yes | 71 (38.0) | 116 (62.0%) | 1 | 1 |
| No | 145 (71.4%) | 58 (28.6%) | 4.09 (2.67 to 6.24)* | 3.32 (2.02 to 5.44)** |
| Difficult food choice | | | | |
| Yes | 150 (78.5%) | 41 (21.5%) | 7.37 (4.68 to 11.61)* | 5.49 (3.34 to 9.02)** |
| No | 66 (33.2%) | 133 (66.8%) | 1 | 1 |
| Family support | | | | |
| Yes | 118 (45.7%) | 140 (54.3%) | 1 | 1 |
| No | 98 (74.2%) | 34 (25.8%) | 3.42 (2.16 to 5.42)* | 2.50 (1.46 to 4.27)* |
| Worried high cost | | | | |
| Yes | 126 (66.7%) | 63 (33.3%) | 2.47 (1.64 to 3.72)* | 2.12 (1.29 to 3.49)* |
| No | 90 (44.8%) | 111 (55.2%) | 1 | 1 |

*P<0.05, **p<0.001, Hosmer-Lemeshow goodness of fit=0.83.

AOR, adjusted OR; COR, Crude odd ratio.

more likely to be illiterate and less understand their diabetic nutrition education than urban respondents. The way of life (culture) of rural residents might also be the possible reason for the difference, which can be explained by the fact that rural family members usually ate on the same plate altogether without special attention for patients with diabetes and makes them less compliance about their diet.

Diabetic nutrition education in the hospital was another factor that was identified to have positive association with dietary practice. Patients who did not get diabetic nutrition education were more likely to had poor dietary practice as compared with those of who got diabetic nutrition education. This finding is in line with the study done on diabetic OPD of three selected teaching hospitals (tirunesh beijing, black lion specialised and saint paul

specialised hospitals),³¹ China,³² Iran and Ankara,³³ Addis Abeba, Ethiopia,²⁰ South Africa³⁴ and Malaysia.³⁵ This might be due to the shortage of skilled nurse, dietician/nutritionist and other trained healthcare professional in the principles of diabetic nutrition in the hospital. Additionally, having nutrition education programme enhanced self-care dietary practices, improved glycaemic control and enhances the knowledge and skills of people with diabetes to optimise their ability to self-manage their diabetic nutrition and the disease.³⁶

Difficulty to choose foods was also identified as a significant factor for poor dietary practice. This study revealed that patients who had difficulty of choosing diabetes foods were five times as likely to have had poor dietary practice as compared with patients who didn't had. This study is supported by studies done in Yekatit 12 Medical College

Hospital, Ethiopia,²⁰ Egypt¹⁹ and Kenya.²⁷ The possible reason might be, almost half (47.9%) of the respondents in this study did not get diabetic nutrition education and this might influence on their food preference/choice. And also due to sociocultural, personal food preferences, economical status of the patient,³⁷ and unavailability of prepared dietary guideline for patients with diabetes in the country's context.

In this study, patients who had not family/friends support was three times as likely to had poor dietary practice as compared with those of patients with DM who have had. This result was supported by a study done in five health regions of Bahrain,³⁷ systematic review on Thailand³⁸ and triethnic population in South Florida communities.³⁹ This might be due to being busy and did not understand what to do. Family support has a major impact on a patient's ability to self-manage their chronic condition.⁴⁰ Friends and families can promote good health by influencing a person's daily behaviour, and the loss or reduction of such support can have negative health effects.⁴¹

Worried about the high cost of foods was another factors significantly associated with poor dietary practice. Participants who worried with the high cost of foods were two times as likely to had poor dietary practice than those who didn't. This result was in line with studies done in Yekatit 12 Medical College Hospital, Ethiopia²⁰ and Iranian adults with diabetes.¹⁷ This might be due to the poor economical background of the patient. Those who have had limited resources might not afford to buy health-promoting foods and forced to consume only some specific foods without choice and got exposed to poor self dietary management.¹²

CONCLUSION

The proportion of patients with diabetes with poor dietary practice is found to be very high. Being rural resident, not getting diabetic nutrition education in hospitals, difficulty of choosing relevant foods for their specific health problem, not getting family/ friends' support of foods and worried about the high cost of foods were the major determinants of poor dietary practice. An appropriate, strong and effective patient and family nutrition education, food guide, personalised patient and family supervision programme should be planned for patients with diabetes to promote good dietary practice and improve their quality of life.

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Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information. All data relevant to the study are included in the article.

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REFERENCES

- 1 WHO. *Definition, diagnosis and classification of diabetes mellitus and its complications*. Geneva: WHO, 1999.
- 2 Loghmani E. *Diabetes mellitus: type 1 and type 2*, 2005.
- 3 Amod Aet al. The 2012 SEMDSA guideline for the management of type 2 diabetes. *J Endocrinol Metabol Diabetes S Af* 2012;17:61–2.
- 4 CDC. *The power of prevention: chronic disease... the public health challenge of the 21st century*, 2009.
- 5 Sicree R, Shaw J, Zimmet P. The global burden of diabetes. diabetes and impaired glucose tolerance: prevalence and projections. *Diabetes* 2003;27:25–17.
- 6 Richard Sicree JS, Zimmet P. *Baker IDI heart and diabetes Institute, diabetes and impaired glucose tolerance. IDF diabetes atlas fourth edition*, 2010.
- 7 Guariguata L, Whiting DR, Hambleton I, et al. Global estimates of diabetes prevalence for 2013 and projections for 2035. *Diabetes Res Clin Pract* 2014;103:137–49.
- 8 Bouenizabila E. *International diabetes Federation Africa: Africa at a glance*, 2013.
- 9 Horton ES. Exercise and diabetes mellitus. *Med Clin North Am* 1988;72:1301–21.
- 10 RACGP. *General practice management of type 2 diabetes-2014-15*. Melbourne, 2014.
- 11 Health Social and Behaviour Change Network. *Diabetes: the hidden pandemic and its impact on sub-Saharan Africa*. Johannesburg, 2010.
- 12 Evert AB, Boucher JL, Cypress M, et al. Nutrition therapy recommendations for the management of adults with diabetes. *Diabetes Care* 2013;36:3821–42.
- 13 Al-Kaabji J, Al-Maskari F, Saadi H, et al. Assessment of dietary practice among diabetic patients in the United Arab emirates. *Rev Diabet Stud* 2008;5:110–5.
- 14 Parajuli J, Saleh F, Thapa N, et al. Factors associated with nonadherence to diet and physical activity among Nepalese type 2 diabetes patients; a cross sectional study. *BMC Res Notes* 2014;7:758.
- 15 Sabbah KOA, Al-Shehri AA. Practice and perception of self-management among diabetics in Taif, KSA: impact of medical factors. *Am J Res Commun* 2014;2.

- 16 Shamsi N, Shehab Z, AlNahash Z, *et al.* Factors influencing dietary practice among type 2 diabetics. *Bahrain Medical Bulletin* 2013;35:130–5.
- 17 Yekta Z, Pourali R, Aghassi MR, *et al.* Assessment of self-care practice and its associated factors among diabetic patients in urban area of Urmia, northwest of Iran. *J Res Health Sci* 2011;11:33–8.
- 18 Mabaso RG, Oduntan OA. Knowledge and practices related to diabetes mellitus among adults with diabetes in the Mopani district, Limpopo Province, South Africa. *African Vision and Eye Health* 2016;75.
- 19 Mahfouz EM, Awadalla HI. Compliance to diabetes self-management in rural El-Mina, Egypt. *Cent Eur J Public Health* 2011;19:35–41.
- 20 Worku A, Mekonnen Abebe S, Wassie MM. Dietary practice and associated factors among type 2 diabetic patients: a cross sectional hospital based study, Addis Ababa, Ethiopia. *Springerplus* 2015;4:15.
- 21 Hailu E, Mariam WH, Belachew T, *et al.* Self-Care practice and glycaemic control amongst adults with diabetes at the Jimma university specialized hospital in south-west Ethiopia: a cross-sectional study. *Afr J Prim Health Care Fam Med* 2012;4.
- 22 Addisu Y, Eshete A, Hailu E. Assessment of diabetic patient perception on diabetic disease and self-care practice in Dilla university referral Hospital, South Ethiopia. *J Metab Syndr* 2013;3.
- 23 Amente T, Belachew T, Hailu E. Self care practice and its predictors among adults with diabetes mellitus on follow up at Nekemte Hospital diabetic clinic, West Ethiopia. *World J Medical Sci* 2014;2:1–16.
- 24 Tegegne GT, Shiferaw A, Gelaw BK. Glycemic control and self-care practice among ambulatory diabetic patients in Ambo General Hospital, West Showa, Ethiopia. *Glob J Med Res* 2014;17.
- 25 Wild S, Roglic G, Green A, *et al.* Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047–53.
- 26 Berhe KK, Demissie A, Kahsay AB. Diabetes self care practices and associated factors among type 2 diabetic patients in Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia- a cross sectional study. *Int J Pharm Sci Res* 2012;3:4219–29.
- 27 Maina WK, Ndegwa ZM, Njenga EW, *et al.* Knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. *Pan Afr Med J* 2011;7.
- 28 Patel M, Patel IM, Patel YM, *et al.* Factors associated with consumption of diabetic diet among type 2 diabetic subjects from Ahmedabad, Western India. *J Health Popul Nutr* 2012;30:447–55.
- 29 Fatema K, Hossain S, Natasha K, *et al.* Knowledge attitude and practice regarding diabetes mellitus among nondiabetic and diabetic study participants in Bangladesh. *BMC Public Health* 2017;17:364.
- 30 Li Z, Jin H, Chen W, *et al.* Influencing factors of knowledge, attitude, and practice regarding medical nutrition therapy in patients with diabetes: a national cross-sectional study in urban China. *J Diabetes Res* 2017;2017:1–10.
- 31 Mohammed MA, Sharew NT. Adherence to dietary recommendation and associated factors among diabetic patients in Ethiopian teaching hospitals. *Pan Afr Med J* 2019;33:260.
- 32 Wang H, Song Z, Ba Y, *et al.* Nutritional and eating education improves knowledge and practice of patients with type 2 diabetes concerning dietary intake and blood glucose control in an outlying city of China. *Public Health Nutr* 2014;17:2351–8.
- 33 Malek M, Cakiroglu F. The effects of nutritional education on patients with type-II diabetes on the nutritional knowledge and consumption. *European Journal of Experimental Biology* 2013;3:217–22.
- 34 Mabaso RG, Oduntan OA. Knowledge and practices related to diabetes mellitus among adults with diabetes in the Mopani district, Limpopo Province, South Africa. *African Vis Eye Health* 2016;75:1–6.
- 35 Tiew KF, Chan YM, Lye MS, *et al.* Factors associated with dietary diversity score among individuals with type 2 diabetes mellitus. *J Health Popul Nutr* 2014;32:665.
- 36 Self management Education/Training Reimbursement Toolkit. *Disabilities national coordinating office*, 2013.
- 37 Jones-McLean EM, Shatenstein B, Whiting SJ. Dietary patterns research and its applications to nutrition policy for the prevention of chronic disease among diverse North American populations. *Appl Physiol Nutr Metab* 2010;35:195–8.
- 38 Pamungkas RA, Chamroonsawasdi K, Vatanasomboon P. A systematic review: family support integrated with diabetes self-management among uncontrolled type II diabetes mellitus patients. *Behav Sci* 2017;7. doi:10.3390/bs7030062. [Epub ahead of print: 15 Sep 2017].
- 39 Vaccaro JA *et al.* *The role of family/friend social support in diabetes self-management for minorities with type 2 diabetes*, 2014.
- 40 Beanlands H, Horsburgh ME, Fox S, *et al.* Caregiving by family and friends of adults receiving dialysis. *Nephrol Nurs J* 2005;32:621–31.
- 41 Black S, Maitland C, Hilbers J, *et al.* Diabetes literacy and informal social support: a qualitative study of patients at a diabetes centre. *J Clin Nurs* 2017;26:248–57.