



## Factors Associated With Non Adherence to Diet and Physical Activity among Diabetes Patients: A Cross Sectional Study

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## ABSTRACT

**Introduction:** This study was conducted to assess nonadherence to diet and physical activity among diabetic patients and the study factors associated with it and reasons behind poor adherence to dietary and physical exercise advise.

**Methods:** Patients >18 years and diagnosed with diabetes mellitus for duration of minimum 1 years was included in study. Adherence to dietary and physical activity is assessed by using revised version of Summary of Diabetes Self-care Activities

**Results:** Majority of participants (76%) were followed healthful diet plan. Less than half patients among study participants were adhered to exercise. Frequent food gatherings, eating out restaurant & foods offers by others was common barriers to dietary practices. Lack of time & laziness was common barriers to physical activity.

**Conclusions:** Patients with high level of education, housewives, Single/ever married , patients lived in nuclear family, less duration since diagnosis, patients was on insulin were more adhered to dietary practices. Patients <55 years, male, married, high education, skilled/semiskilled worker, less duration since diagnosis were more adhered to exercise than other. Frequent food gathering and lack of time were most common barriers to diet and physical activity respectively.

**Key words :** Diet and physical activity, Diabetes patients, Tertiary care hospital, Barriers

## INTRODUCTION

The prevalence of diabetes mellitus (DM) has been increasing all over the world in past 30 years and particularly higher prevalence is seen in the Indian Subcontinent. According to newly released diabetes atlas, 7<sup>th</sup> edition from the International Diabetes Federation (IDF), the global diabetes prevalence for the year 2015 was found to be 8.5%, affecting 415 million adults. As per IDF data for the year 2015, there were 65.1 million people with diabetes in India, which is predicted to rise up to 109 million by the year 2035.<sup>1</sup>

In a study conducted in India, dietary prescriptions and exercises were followed regularly by only 37% and 35% of patient.<sup>2</sup> Rapid socioeconomic development, urbanization, globalization, and an ex-

panding number of fast food outlets, leading to unusual consumption and over dependence, may be contributing to factors influencing adherence to lifestyle modification recommendations amongst diabetes mellitus patients.<sup>3</sup> The extent of non adherence to diet and physical activity and the factors influencing it are different in different populations in India. This may be due to difference in lifestyle, culture, eating habits, knowledge and beliefs. Moreover dietary adjustment and lifestyle modification are the integral part of management of diabetes. Since management of the disorder creates a great physical, psychological and socioeconomic burden on the family and the society, priority should be given on the preventive aspects of disorders with diet and lifestyle modifications. This study aims to assess the proportion of

nonadherence to diet and physical activity among diabetic patients and the factors associated with nonadherence to diet and physical activity advices. And barriers or reasons behind not adhering to Dietary and physical activity among diabetes patients in a tertiary care hospital in Surat City.

## METHODOLOGY

Cross sectional study was carried out among indoor as well as outdoor diabetes patients in a tertiary care hospital in Surat city. Patients >18 years and diagnosed with diabetes mellitus for duration of minimum 1 years was included in study. Study was conducted Sample size was calculated by using open EPI software considering power of 80%, Confidence level of 95%, an absolute precision of 6% and assuming the prevalence of Self-care activities among patients with diabetes to be 50%, Considering non-response rate of 10%, the final sample size was for this study was estimated to be 290. The Questionnaire consists of Socio-demographic characteristics of patients, co-morbid conditions like hypertension, IHD, Asthma, liver disease for Socio-economic status of patients using Modified Prasad socio-economic classification<sup>4</sup> & Adherence to dietary and physical activity is assessed by using revised version of Summary of Diabetes Self-care Activities (SDSCA).<sup>5</sup> Dietary recommendations comprised of a recommendation by a health care professional of a diet comprising of High fiber diet, fruits and vegetables (at least 5 servings per day), Eat very few sweets, low-fat milk and dairy products. Participants was regarded to non-adherence to dietary recommendations as self-reported adherence of less than three days a week. Participants was regarded adherent to exercise if she or he reported exercising for a duration of  $\geq 30$  minutes per session, most days of the week. We defined non-adherence to exercise for less than three days per week and also find out Barrier-reasons for not adhering dietary & physical activities among diabetes patients. Informed written consent was taken from all the participants after persuading the patients about the possible benefits of the study. Strict confidentiality of the data was maintained. Data was entered using microsoft excel software. Data analysis was done with the help of SPSS version 20. Chi-square tests and odds ratio were used to evaluate significant difference between proportions. P value less than 0.05 was considered as statistically significant.

## RESULTS

Majority of study participants (76%) were adhered which means follow healthful diet plan (high fiber

diet, low fat diets, eat fruits & vegetables, eat very few sweets) at least 3-4 days per week. only 24% participants were not adhered which means followed diet management practices for only 1-2 days per week. Patients with high level of education, housewives, single/ever married, lived in nuclear family, on insulin treatment was found statistically significant adherence to dietary activity ( $p < 0.05$ ). Patients with high level of education (graduate & above) were three times more likely to adherence to dietary practices as compared to others. Housewives were two times more likely to adhere than those who done jobs or employed. Participants who were single/ever married were three times more likely to adhere than married. Patients lived in nuclear family were showed two times more engaged than lived in joint family. Patients was on Insulin were showed more adherence to dietary practices than other treatments (oral hypoglycemic drugs) (Table 1)

Of the total study participants 133 (45.6%) were reported adhered to Physical activity and 157 (54.4%) were not adhered to physical activity. Younger patients (<55 years) were one times more likely adhere than old age patients. Male Patients were two times more likely to adhere to physical activity than female patients. Patients with high level of education (graduate & above) were four times more likely to adhere than others. Patients engaged in skilled & semiskilled work were three times more likely adhere than others. Married participants were two times more likely to engaged in physical activity than single/ever married. Participants who had Duration of diabetes  $\leq 10$  years & Type-II diabetes Patients had statistically significant association with their adherence condition about two times and five times more likely to engaged in physical activity when compared with their counterparts respectively. These all variables showed statistically significant adherence ( $p < 0.05$ ) (Table 2).

Most of the patients (45.6%) believed that high frequency of food gathering (functions or festivals) with family and friends affect their healthy diet plan. 33.8 % patients said that situational factors like eating out at restaurant and inappropriate foods offers by others affect their healthful diet plan according to health care team (Doctors, dietitians) advice. Regarding Barriers to Physical activity, 36.7% patients had lack of time due to 9-10 hours daily working; 30.2% patients could not exercise due to negative attitude or laziness; 17.7% patients believed that surrounding environment or weather doesn't suit them to exercise regularly. (Table 3)

**Table 1: Distribution of Patients according to adherence to dietary practices (n=290)**

Variable	Adhered (n=221) (%)	Not adhered (n=69) (%)	Total (%)	OR	95% CI	P value
<b>Age (years)</b>						
< 55	156(70.6)	47 (68.1)	203	1.12	0.62-2.01	0.69
>=55	65(29.4)	22 (31.9)	87	1		
<b>Sex</b>						
Female	115(52)	28(40.6)	143	1.58	0.91,2.74	0.09
Male	106 (48)	41 (59.4)	147	1		
<b>Education</b>						
Graduate and above	30 (13.6)	3 (4.3)	33	3.45	1.02,11.7	0.03
Others	191(86.4)	66 (95.7)	257	1		
<b>Occupation</b>						
Housewives	67(30.3)	11 (15)	78	<b>2.29</b>	1.13,4.64	<b>0.018</b>
Others	154(69.7)	58 (85)	212	1		
<b>Marital Status</b>						
Ever married/single	30 (13.6)	3 (4.3)	33	<b>3.45</b>	1.02,11.7	<b>0.03</b>
Married	191(86.4)	66 (95.7)	257	1		
<b>Socio-economic status (modified Prasad classification)</b>						
Upper (1,2)	109 (49.3)	33(47.9)	142	1.06	0.61,1.82	0.828
Lower (3,4,5)	112 (50.7)	36(52.1)	148	1		
<b>Type of family</b>						
Nuclear	175(79.1)	41(59.4)	216	<b>2.59</b>	<b>1.45,4.64</b>	<b>0.001</b>
Joint	46 (20.9)	28 (40.6)	74	1		
<b>Family H/o DM</b>						
Yes	161 (72.8)	52 (75.4)	213	0.87	0.47,1.62	0.68
No	60 (27.2)	17(24.6)	87	1		
<b>Duration of Diabetes</b>						
<=10 years	206(89.6)	51 (85.5)	257	<b>4.84</b>	<b>2.28,8.27</b>	<b>P &lt;0.001</b>
>10 years	15(10.4)	18(14.5)	33	1		
<b>Type of DM</b>						
Type -I	13 (6.3)	2 (1.5)	15	2.09	0.46, 9.51	0.31
Type-II	207 (93.2)	68 (98.5)	275	1		
<b>Type of treatment</b>						
Oral hypoglycaemic	72 (32.5)	16 (23.1)	88	1.68	0.85,2.99	0.138
Insulin	74 (33.4)	7 (8.64)	81	4.45	1.94,10.22	0.0001
both	75 (33.9)	46 (66.6)	121	0.256	0.222,0.673	
<b>Co-Morbidity</b>						
Yes	83 (37.6)	26 (37.7)	109	0.99	0.56,1.73	0.985
No	138 (62.4)	43 (62.3)	181	1		

## DISCUSSION

Present study showed that more than three fourth (76%) patients were adhered to healthy diet plan (high fiber diet, low fat diets, eat fruits & vegetables, eat very few sweets) for at least 3-4 days of week. However study done by Feyissa Lemmessa et al in addis Ababa, Ethiopia shows that only 41.4% of participants were adhered to dietary practices.<sup>6</sup> Participants with high level of education were followed dietary advice more than others. Similar findings were found in study done in by janki parajuli et al in Bangladesh also shows that Patients with high education were more adhered to dietary regime than others.<sup>7</sup> Patients who had more education had better knowledge about how to follow healthy diet plan than those who had no or less education. Present study the respondents from the nuclear family has higher adherence level than joint family and the difference is statistically significant. Similar results are seen in study done by Kapur k et al<sup>8</sup> and janki parajuli et al<sup>7</sup> in which patients from nuclear family has higher adherence

level than joint family. Less family members may be economically secure about various food options which they require. In our study those whose marital status was ever married/widow were more adhere to dietary practice than those who are married. Similar findings were found in study done by janki parajuli et al in which those who are single/widow was more adhere to dietary practices than married. The reason might be ever married/widows are more free of any responsibilities and concerned about their health than others. In our study adherence to dietary practices was higher among Patients with diabetes duration >10 years. Study done by khattab Ms et al<sup>9</sup> also shows that with the other studies which showed comparing acute and chronic forms of diseases in which chronicity was associated with poor compliance, increasing duration was found to be predictive of decreasing total compliance score. This can be explained by the reason that with increase in duration of disease, patients might be fed up with dietary regimen to follow.

**Table 2: Distribution of Patients according to adherence to Physical activity Practices (n=290)**

Variable	Adhered (n=133)(%)	Not adhered (n=157)(%)	Total	OR	95%CI	P value
<b>Age (years)</b>						
<55	101(75.9)	102(64.9)	203	1.70	1.01, 2.84	0.04
>=55	32 (24.1)	55 (35.1)	87	1		
<b>Sex</b>						
Male	82(61.6)	65 (41.4)	147	2.27	1.41, 3.65	0.005
Female	51(38.3)	92 (58.6)	143	1		
<b>Education</b>						
Graduate & above	25(18.8)	8 (5.1)	33	4.31	1.87, 9.92	0.0002
Others	108(81.2)	149 (94.9)	257	1		
<b>Occupation</b>						
Skilled/Semiskilledworker	48 (36.0)	20(12.7)	68	3.86	2.14, 5.96	P<0.001
Others	85 (64.0)	137(87.3)	222	1		
<b>Type of Family</b>						
Nuclear	78(58.6)	138 (87.9)	216	0.19	0.10, 0.35	<0.001
Joint	55(41.4)	19 (12.1)	74	1		
<b>Marital status</b>						
Married	124(93.2)	133 (84.7)	257	2.48	1.11, 5.56	0.022
Ever married/single	9(6.8)	24 (15.3)	33	1		
<b>Socio-economic status</b>						
Upper (1,2)	72 (54.1)	70 (44.6)	142	1.46	0.92, 2.33	0.10
Lower (3,4,5)	61 (45.9)	87 (55.4)	148	1		
<b>Duration of Diabetes</b>						
<=10 years	125(94.0)	132 (84.1)	257	2.95	1.29, 6.81	0.008
>10 years	8 (6.0)	25 (15.9)	33	1		
<b>Type of DM</b>						
Type-II	131(98.5)	144 (91.7)	275	5.91	1.31, 26.7	0.009
Type-I	2 (1.5)	13 (8.3)	15	1		
<b>Family h/o DM</b>						
Yes	92 (69.2)	121 (77.07)	213	0.66	0.39, 1.12	0.12
No	41(30.8)	36 (22.9)	77	1		
<b>Type of Treatment</b>						
Oral Hypo glycaemic	43 (32.3)	45 (28.6)	88	1.18	0.72, 1.96	0.49
Insulin	39 (29.3)	42 (26.7)	81	1.13	0.62, 1.89	0.62
both	51 (38.3)	70 (44.5)	121	0.86	0.54, 1.37	0.53
<b>Co-morbidity</b>						
No	85 (63.9)	96 (61.1)	181	1.12	0.69, 1.81	0.62
Yes	48 (36.1)	61 (38.9)	109	1		

**Table 3: Barriers to Dietary and Physical activity among diabetes Patients (n=290)**

Barriers	Frequency
<b>Barriers to Diet Care</b>	
High Frequency Of Food Gathering with Family and Friends	124 (45.6)
Situational Factor of eating out at restaurant and inappropriate foods offer by others	92 (33.8)
Difficulty in choosing foods	37 (13.6)
Following healthy diet plan, still feel hungry	12 (4.4)
Don't have time to prepare healthy foods	7 (2.6)
no any barriers facing	18 (6.2)
<b>Barriers to Physical activity</b>	
Lack of Time	91 (36.7)
Negative attitude or laziness	75 (30.2)
Surrounding environment (weather)	44 (17.7)
Fear of injury due to engaging in sports activity	17 (6.9)
Exercise is boring	16 (6.5)
Cost of joining the gym	5 (2.0)
<b>No any barriers facing</b>	42(14.5)

In our study Houswives were more adhered to dietary practices than others. This can be explained by reason that housewives had more experience or knowledge about how to make healthy diets in diabetes.

The present study observed that only 45.86% patients were adhered to physical activity for at least 3-4 days of week. Almost similar findings were found in study done by Feyissa lemmessa et al <sup>6</sup> in which 49.1% study participants were adhered to

physical activity for at least 3-4 days of week. Similar findings were found study done by Ganiyu et al<sup>10</sup> shows that only 51% patients adhered to exercise. In our Study Younger (<55 years) were more adhered to physical activity than old age. The reason behind this most of old age patients was living retired life. Male patients were more adhered to exercise than female. In our study among physical activity adherence, 61.6% male and 38.3% female Participants were adhered to exercise. This findings was consistence with study done by zahra yeakta et al<sup>11</sup> shows that 66.1% male and 46.3% female patients were showing good adherence to physical activity. In our study patients with higher education (graduate & above) were more adhered to physical activity than others. Study done by Feyissa Lemmessa et al shows similar results in which patients with higher education adhered more than others. In Our study high adherence to physical activity was found among Skilled /semiskilled workers than others. The reason behind this was skilled /semiskilled worker was physically more active in daily routine work than others. Non adherence level was lower in married than ever married/single. This might be due to the reason that married respondents get better spouse and family members support than divorce or separated. One study showed that the patients who were not supported by the spouse and the family members, only 14.2% were adherent to the exercise regimen.<sup>12</sup> However, Study done by Welschen Lmc et al<sup>13</sup> shows that there was no any consistent relationship of physical activity adherence with the marital status. However these findings were different from study done by Feyissa lemmessa et al shows that Nonadherence level was higher among married than single.<sup>6</sup> In our study Patients who had diabetes duration  $\leq 10$  years were more adhered to exercise than  $>10$  years. However .study done by Vaman kulkarni et al<sup>14</sup> shows that there was no any no statistically significant difference in relation to practicing daily physical activities among those with duration of DM. In our study Type-II diabetes patients were more adhered to Exercise than Type-I diabetes patients.

Most common barriers to diet care among study participants in our study was high frequency of food gathering with friends and families which affects their healthy diet plan, followed by situational factors like eating out at restaurant etc. Similar findings were found in study done by Afnan Abdul Hamid Al-Ibrahim, et al<sup>15</sup> who reported that 54.8 % patients were strongly believed that frequent food gathering with families and friends affect their diet plan. However study done by mujuni brian et al<sup>16</sup> shows that financial constraints for preparing healthy foods was main reason behind non adhering to dietary practices. In

our study, majority of the patients reported barriers to physical activities like lack of time, negative attitude or laziness and surrounding environment or weather. Juma-Al-kaabi et al<sup>17</sup> reported majority of barriers to physical activities were disease (osteoarthritis), lack of time, cultural issues and lack of interest and weather in her study done on diabetes patients. study done by Serour M et al<sup>18</sup> also shows that weather was main reason behind non adhering to exercise.

## CONCLUSIONS

From our study we conclude that Patients with high level of education, housewives, Single/ever married, patients lived in nuclear family, less duration since diagnosis, patients was on insulin were more adhered to dietary practices. Patients <55 years, male, married, high education, skilled/semiskilled worker, less duration since diagnosis were more adhered to exercise than other. Frequent food gathering and lack of time were most common barriers to diet and physical activity respectively.

## RECOMMENDATIONS

Diabetic patients should be educated about basic nutritional facts like calories in food, glycemic index of foods, food exchanges etc. This knowledge could help the patients to opt for the foods beneficial to their health, and knowledge on food exchanges could help in munching on their favorite food in social gatherings, festivals. Females should be encouraged to spare some time (at least 30 minutes) to adopt daily physical activity like brisk walking, cycling, jogging etc. —Laziness is the biggest enemy of human beings. Diabetics should develop positive mindset about their disease. They should learn about time management skill to be able to spare at least 30 minutes from their daily routine. It is the duty of the treating physicians to explain the importance of physical exercise on blood glucose control, health benefits of physical activity, and eventually on the quality of life.

## REFERENCES

1. 7 th ed. Brussels, Belgium: International Diabetes Federation; 2013. [Last accessed on 2015 April 02]. International Diabetes Federation. IDF Diabetes Atlas. Available from: <http://www.idf.org/diabetesatlas>.
2. Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE. Psychosocial problems and barriers to improved diabetes management: results of the cross national Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabet Med*. 2005;22:1379-1385.
3. Bisiriyu G. NonAdherence to Lifestyle Modification Recommendations (Diet And Exercise) Among Type 2 Diabetes

- Mellitus Patients Attending Extension II Clinic in Gaborone, Botswana. 2008.
4. Sharma R. Revision of Prasad's social classification and provision of an online tool for real-time updating. *South Asian J Cancer* 2013; 2(3):157.
  5. Deborah J, Toobert and Sarah E, Hampson et al., The summary of Diabetes self-care activities measure: Results from seven studies and a revised scale *Diabetes care*,2000; 23(7).
  6. Feyissa Lemessa, Asrat Demissie, Assessment Of Self- Care Practices And Associated Factors Among Type 2 Diabetic Patients At Tikur Anbessa Specialized Hospital Addis Ababa, Ethiopia June 2014,12-13.
  7. Janki Parajuli,, Farzana saleh ,factors associated with non adherence to diet and physical activity among Nepalese type 2 diabetes patients October 2014.
  8. Kapur K, Kapur A, Ramachandran S, Mohan V, Aravind SR, Badgandi M, Srishyla MV. *J Assoc PhysiciansIndi. Barriers to changing dietary behavior.*
  9. Khattab MS, Abolfotouh MA, Khan MY, Humaidi MA, Alkaldi YM. Compliance and control of diabetes in a family practice setting, Saudi Arabia. *East Mediterr Health J.* 2012 ;5:755-765.
  10. Ganiyu adewale, LH mabuza, Non-adherence to dietary modifications recommendations among type 2 diabetes patients attending extension II clinic in Gaborone, Botswana.
  11. Zahra yekta, Reza Pourali, Mohammad Reza aghassi, Assessment of self-care practices and its associated factors among diabetes patients in urban area of urmia, Northwest of Iran.
  12. WHO Appropriate body mass index for Asian population and its implications for policy and intervention strategies. *Lancet.* 2011;363:157-163.
  13. Welschen LMC, Oppen PV, Dekker JM, Bouter LM, Stalman WAB, Nijpels G. Study protocol: the effectiveness of adding cognitive behavioral therapy aimed at changing lifestyle to managed diabetes care for patients with type 2 diabetes - design of a randomized controlled trial. *BMC Public Health.* 2007;7:74-83.
  14. Vaman Kulkarni, D rajasekharan, B unnikrishnan,N kumar, Self-care activities among diabetes patients attending a tertiary care hospital in manglore, Karnataka, *Ann Med Health Sci Res.* 2015 JanFeb;5(1): 59-64.
  15. Afnan Abdul Hamid Al-Ibrahim, Robert T Jackson, Factors Associated With Compliance to Diabetes Self-Care Behaviours And Glycemic Control Among Kuwaiti People With TYPE 2 Diabetes.2012; 4-15.
  16. Mujuni Brian muhaburra, John onjech, Prevalence and factors associated with non adherence to diet and exercise lifestyle recommendations among type 2 diabetes patients, October 2014.
  17. Juma Al kabi and Ftima Al maskari physical activity and reported barrier to activity among type 2 diabetes patterns in United Arab Emirates. *Journal of the society for biomedical diabetic research.* 2011.
  18. Serour, M., Alqhenaei, H., Al-Saqabi, S., et al.Cultural factors and patients' adherence to lifestyle measures. *British Journal of General Practice*; 57: 291-295.