

**FACTORS ASSOCIATED WITH LEVEL OF PATIENT ACTIVATION AND ITS ROLE TO GLYCEMIC CONTROL and AMONG ADULTS WITH TYPE II DIABETES ATTENDING DIABETIC CLINIC AT HOSPITALS IN ADDIS ABABA**

**Abstract**

**Introduction:** Lifestyle intercessions as supper arranging and exercise assume a significant job in a Diabetes Self-Management Education (DSME) program. The impact of poly-pharmacy on way of life changes, for example, nourishment and exercise isn't surely known. Deciding and evaluating patient's dimension of enactment and its association with physical action level, supper arranging, and poly-pharmacy in patients with Type II diabetes is a significant standard for Diabetes Self-Management mediations.

**Objective:** The aim of this study was to determine patient activation levels and associated factors among type II diabetic patents attending diabetic clinic at hospitals in Addis Ababa.

**Methods:** Institutional based cross-sectional examination configuration was led. This investigation was led on 423 Type II diabetic patients going to diabetic facilities at emergency clinics in Addis Ababa. Study members were chosen by utilizing orderly arbitrary examining procedure. A pre-tried organized survey was utilized to gather the information. Understanding Activation Measure (PAM-13) was utilized to survey tolerant actuation levels. Information were entered and dissected utilizing SPSS rendition 23 for windows. Concentrate members' qualities were portrayed as far as mean (Standard deviation) and recurrence (extent). Bivariate examination and various calculated relapse investigations were completed to recognize free factors related with patient enactment among sort II diabetes patients.

**Results:** The mean (SD) age of the study participants was 55.7( $\pm$ 9.8) years. Majority of the study participants, 319 (77.8%) had low meal planning knowledge, 62.4% of patients involved in low physical activity and 82.2% had poor glycemic control. About 75.6% of the patients had low activation and the remaining 24.4% had high activation. The independent factors associated with lower activation were Illiterate educational status (AOR=2.4, 95% CI: 1.5-3.3), low physical activity (AOR=1.8, 95% CI: 1.4-2.9), low meal planning knowledge (AOR=1.5, 95% CI: 1.3-2.4), chronic comorbidities (AOR=2.1, 95% CI: 1.6-3.9) and poor glycemic control (AOR = 4.2, 95% CI: 2.4–7.5).

**Conclusions:** The findings revealed that majority of diabetic II patients had low activation; indicating patients had low knowledge and understanding regarding the influence of lifestyle in diabetes management. Illiterate educational status, low physical activity, low meal planning knowledge, chronic comorbidities and poor glycemic control were significantly associated with lower activation.

**Keywords:** Patient Activation, Glycemic Control, Type II diabetes

## **INTRODUCTION**

Way of life mediations as meal planning and exercise assume a significant job in a Diabetes Self-Management Education (DSME) program [1].

Generally, dietitians have not been told on techniques for consolidating the patient enactment estimation model in their training. With an end goal to comprehend quiet adherence to the prescribed way of life changes for overseeing type II diabetes, it is essential to comprehend the connection between a patient's dimension of self-enactment and their insight in regards to sustenance and exercise. Additionally, the impact of poly-pharmacy on way of life alterations, for example, nourishment and exercise isn't surely known [2]

Hemoglobin (A1C) is a perceived marker for glycemic power over a 3-month timeframe [3]. Raised dimensions of A1C are firmly connected with complexities of diabetes [4] Patient instruction in regards with the impacts of nourishment, work out, medicine, stress, ailment, and diabetes intricacies are a piece of the DSME projects perceived by the American Diabetes Association (ADA) [5,6]. Helpful way of life changes might be viably tended to in far reaching Medical Nutrition Therapy (MNT) programs. MNT can improve wellbeing and decrease restorative expenses usually connected with poor glycemic control [7]. So as to all the more likely oversee blood glucose levels consolidating changes in way of life, for example, diet and nourishment, it is significant for patients with type II diabetes to expand their dimension of initiation. Expanded enactment with respect to the patient requires a lot of abilities, learning, convictions and practices significant to dealing with their diabetes. The Patient Activation Measure (PAM) created by Hibbard [7] is a substantial and dependable 13-thing instrument used to evaluate a patient's advancement through four phases of initiation. The four dynamic phases of the PAM to turning into an initiated patient include: Initially, a patient accepts their job in their own consideration is significant; besides, they learn and build up the aptitudes and certainty to settle on choices with respect to their wellbeing; thirdly, they complete the choices they make lastly, they can settle on these choices even under pressure [8]. PAM can be utilized by doctors to individualize a consideration plan for the patient dependent on the patient's dimension of initiation. Patients who are educated, dynamic members in their very own ceaseless infection care have improved practical results [9]

While long-term adherence to a patient activated program of nutrition and exercise are essential in the management of type II diabetes, initiating an exercise program requires self-activation on the patient's part. Factors that may influence a patient's ability to initiate an exercise program include varying degrees of knowledge regarding the influence of nutrition and exercise in the management of type II diabetes, a low level of patient activation regarding the management of their disease, and polypharmacy, specifically  $\geq 2$  oral hypoglycemic medications [10]

However, the relationship between fitness level and mortality among diabetic patients is currently being studied. After adjusting for confounding variables, low-fit diabetic men had a 2.2-fold greater mortality risk compared with men with moderate or high fitness. Also, mortality in diabetic men reporting no physical activity participation in the previous 3 months was 1.8-fold higher than in those reporting any participation in such activity [11] Although a program in DSME is available to newly diagnosed type II diabetics through the Center for Medicaid and Medicare Services (CMS); the actual percentage of patients who participate is not known.

## **2. RESEARCH METHODS AND MATERIALS**

## 2.1 Study design and period and Study area

An institution based cross-sectional study design was used to determine levels of patient activation and factors associated with patient activation among type II diabetic patients in Addis Ababa. This study was conducted from March 19 to June 25 of 2018

This study was conducted in Addis Ababa which is the capital of Ethiopia with total population of more than 3 million. The city has about 39 government and private hospitals.

## 2.2. Source population or target population

All type II diabetic patients living in Addis Ababa

## 2.3. Study population

All type II diabetic patients available at hospitals in Addis Ababa at the time of study

### 2.3.1. Study unit

Systematically selected type II diabetics' patients who are attending the diabetic's clinics

### 2.3.2. Inclusion criteria

All adult patients ( $\geq 18$  years) with a diagnosis of diabetes

### 2.3.3. Exclusion Criteria

Pregnant women were excluded from the study

## 2.4. Sample size determination

In this study, the sample size was determined using single population proportion formula. Taking the overall prevalence initial stage of PAM 50% to obtain the maximum sample size at 95 % certainty and a maximum discrepancy of  $\pm 5\%$  between the sample and the underlying population; an additional 10 % was added to the sample size as a contingency to increase power.

The sample size was determined based on the following assumptions:

The level of confidence,  $\alpha = 0.05$  (95%)

$$P = 50\% = 0.5$$

$$= \text{the degree of precision} = 0.05 \text{ (5\%)}$$

$$\text{Non response rate} = 10\%$$

$$Z_{\alpha/2} = 0.5 - \alpha/2 = 0.5 - 0.05/2$$

$$= 0.475$$

Then using normal table area of 0.475 is converted into Z value of 1.96.

So, the sample size was calculated using the formula as follow:

When adding 10% for the non-response rate:

$$384 + (384 \times 10\%/100\%) = 423$$

Therefore, the total sample size is 423.

## **2.5. Sampling procedure**

Among hospitals in Addis Ababa, three government and five private hospitals were randomly selected. Sample size was proportionally allocated to each selected hospital (population to population size). List of diabetic patients from the selected hospitals were obtained and study participants were selected using systematic random sampling method. The first study participant was included in the study by a lottery method from 1 to K interval of list of diabetic patient. Then every Kth diabetic patient was included in the study.

## **2.6. Method of data collection**

The methods employed for the study are described under the following headings:

### **1. Patient Activation Measure (PAM)**

Created by [12], PAM is a legitimate and dependable instrument that was utilized to evaluate a patient's advancement through four phases of enactment. PAM instrument estimates the fundamental parts of an initiated patient and is a substantial and solid device to both measure and comprehend patient enactment, and furthermore to assess intercessions. The four dimensions of the PAM incorporate dimension 1) patient's faith in the significance of playing a functioning job in their own consideration, 2) information and certainty to follow up for their own benefit, 3) act to improve and look after wellbeing, and 4) proceeded with initiation in dealing with their wellbeing even in the midst of pressure. The Patient activation estimation (PAM) comprises of 13 items all relating to articulations concerning individual wellbeing. Four decisions dependent on dimension of understanding for each inquiry incorporate Disagree strongly= 1, Disagree= 2, Agree=3, Agree strongly=4. The crude scores were determined by including every one of the reactions to the 13 questions and the crude scores were changed over into proportion of initiation. In light of the patient activation score, patients were arranged into four dimensions: level 1 (crude scores 13-35), level 2 (crude scores 36–38), level 3 (crude score 39–42) and level 4 (crude scores 43-52). The initiation levels were then dichotomized into low enactment (levels 1 and 2) and high enactment (levels 3 and 4).

### **2. Family Practice Diabetes Care Profile (DCP) Patient Interview**

This instrument is received and changed from Centers for Disease Control and Prevention. The DCP is a self-controlled poll which was utilized to survey the patient's therapeutic, socio-affordable, self-care rehearses, physical action level and mental variables identified with diabetes and their treatment. A 2-things scale was utilized to gauge the members' present physical action level [13] Participants were solicited to pick in which kind from physical movement week by week interest in high, moderate, and low action. The second poll thing was utilized to compute the recurrence of movement.

### **3. MNT Knowledge Test Diabetes Meal Planning**

The meal planning poll comprises various decision addresses which is embraced and altered from a review adjusted from a Diabetes Knowledge Test utilized at the Michigan Diabetes Research and Training Center

[14] Participants were approached to recognize the appropriate response that best finishes the announcement or answer the inquiry relating to sustenance decisions, starch timing, and diabetes. The meal planning survey comprises of 10 numerous decision questions. Members were classified into a high learning gathering (7-10 right answers) or low information gathering (0-6 right answers) in light of their Meal Planning Knowledge (MPS) score.

### **Medications and Glycemic control:**

Complete number of prescriptions taken by every member was determined dependent on data acquired from the Diabetes Self-Management Patient Interview. Extra data relating to prescription history was gotten from the Medical record information. Data accumulated included: tallness, weight, date of diabetes beginning, endorsed drugs, circulatory strain, and blood test outcomes.

Mean fasting blood glucose from the last three facility visits were utilized to decide glycemic control. With the end goal of this investigation, we classified the examination members in to two gatherings dependent on the American Diabetes Association (ADA) proposal [15]. Great glycemic control: fasting blood glucose of 70–130 mg/dl while poor glycemic control: fasting blood glucose of <70mg/dl and >130mg/dl.

### **2.7. Data quality Assurance**

To guarantee the nature of the information high accentuation was given in planning information accumulation instrument for its straightforwardness. Poll was additionally pre-tried on 5% of test seven days before genuine information gathering period. Preparing was given to the information gatherers. Bosses were doled out during the information accumulation period. Polls were checked for culmination and consistency of data by the manager on regular schedule.

### **2.8. Methods of Data Analysis**

Information were checked for fulfillment and consistency, coded, and entered and broke down utilizing SPSS adaptation 23 for windows. Concentrate members' qualities were portrayed as far as mean (Standard deviation) for nonstop information and recurrence conveyance for straight out information. Chi square (X<sup>2</sup>) test were utilized for straight out factors. Multicollinearity was checked utilizing change swelling factor (VIF). Bivariate investigation and various calculated relapse examinations were completed to recognize autonomous elements related with patient enactment among sort II diabetes patients. Chances proportion with 95% Confidence interim was utilized and the dimension of noteworthiness was taken at  $\alpha < 0.05$ .

## **3. Results**

### **3.1 Socio-demographic characteristics of type- 2 Diabetes patients**

A total of 410 study participants responded to the study with response rate of 96.9%. The mean age (SD) was 55.7(±9.8) years. Slightly more than half of the study participants, 221 (53.9%) were females. Majority 320(78.0%) of the study participants were married. Out of the total respondents, 198(48.3%) were Amhara in ethnicity and 250(60.9%) were orthodox Christians. Regarding education, 178(42.7%) had completed secondary school education and 107(26.1%) had completed grade 12th and above while 36(8.8%)

respondents were illiterate. Concerning occupation, 157 (38.3%) were unemployed and 253(61.7%) were employed (Table 1).

**Table 1.** Socio-demographic characteristics of type II diabetic patents attending diabetic clinic at selected hospitals in Addis Ababa, 2019

Demographic characteristics	Frequency	Percent	
Age (years)	Mean(SD) = 53.7±9.8		
	< 40	22	5.4
	40-49	104	25.3
	50-59	138	33.7
	≥60	146	35.6
Sex	Male	189	46.1
	Female	221	53.9
Religion	Orthodox	250	60.9
	Protestant	79	19.3
	Muslim	66	16.1
	Others	15	3.7
Marital status	Single	47	11.4
	Married	320	78.0
	Widowed	31	7.7
	Divorced	12	2.9
Ethnicity	Amhara	198	48.3
	Oromo	103	25.1
	Gurague	46	11.2
	Others	63	15.4
Educational status	Illiterate	36	8.8
	Primary school (1-8)	92	22.4
	Secondary school (9-12)	175	42.7
	College/University	107	26.1

Occupational status	Governmental employee	131	31.9
	Private employee	122	29.8
	Unemployed	157	38.3

### 3.2 Clinical characteristics, Patient activation level and Glycemic control

Among the study population 231 (56.4%) had taken three oral hypoglycemic pill per day, 153(37.3%) had taken two oral hypoglycemic pill per day, 21(5.1%) of the respondents taken more than three and only 5(1.2%) of the respondents were used one oral hypoglycemic pill per day. Out of the total respondents, 86 (21%) had been on treatment follow-up for less than five years 189(46.1%) for 5 to 9 years while 135 (32.9%) had been on treatment follow-up for ten and more years (Table 2).

Majority of the study participants, 319 (77.8%) had low meal planning knowledge and the remaining 91 (22.2%) participants had high meal planning knowledge. About one-third 139 (33.9%) of study respondents had other chronic diseases co-morbidities, mainly hypertension 98(23.9%) and heart diseases 26(6.3%). Regarding nutritional status, 84 (20.5%) of the respondents were Obese, 172(41.9%) were Overweight, 148 (36.1%) participants had Normal weight and the remaining 6 (1.5%) were underweight. Majority of study participants 366 (89.3%) were non-smoker and the remaining 44 (10.7%) were smoker (Table 2).

Majority 256 (62.4%) of the study participants were performed low physical activity, 129(31.5%) were participated in moderate level of physical activity and only 25 (6.1%) of the participants were involved in high level physical activity. And regarding the frequency of Physical activity, majority respondents 227 (55.4%) were never involved in physical activity, 157(38.3%) of the respondents were participated in physical exercise sometimes and only 26(6.3%) of the respondents were participated always in physical exercise (Table 2).

Concerning self-reported patient activation stage, 114(27.8%) were PAM level one, 192(46.8%) were stage two, 98(23.9%) were stage three and only 6(1.5%) were stage four. The proportion of the patients with low activation (levels 1 and 2) score was 75.6% and with high activation (levels 3 and 4) was 24.4% (Table 2).

Mean fasting blood glucose (FBS) of the respondents was 169.7 mg/dl  $\pm$ 55.4 mg/dl. Proportion of good glycemic control (fasting blood glucose of 70–130 mg/dl) was 73(17.8%) and proportion of patients with poor glycemic control at level of FBS >130 mg/dl and FBS <70 mg/dl was 337(82.2%) (Table 2)

**Table 2. Clinical characteristics, Patient activation level and glycemic control among type II diabetic patents attending diabetic clinic at selected hospitals in Addis Ababa, 2019**

Characteristics	Frequency	Percent
Follow-up duration	< 5years	86 21.0
	5-9 years	189 46.1
	$\geq$ 10 years	135 32.9

Oral Hypoglycemic Pills	1	5	1.2
	2	153	37.3
	3	231	56.4
	≥4	21	5.1
Physical activity	Low	256	62.4
	Moderate	129	31.5
	High	25	6.1
Frequency of Physical Activity	Often	26	6.3
	Sometimes	157	38.3
	Never/rare	227	55.4
Meal planning Knowledge	Low	319	77.8
	High	91	22.2
Body mass Index(BMI)	<18.5kg/m <sup>2</sup>	6	1.5
	18.5-24.9 kg/m <sup>2</sup>	148	36.1
	25 -29.9 kg/m <sup>2</sup>	172	41.9
	≥30 kg/m <sup>2</sup>	84	20.5
Smoking status	Yes	44	10.7
	No	366	89.3
Chronic diseases Comorbidities	Hypertension	98	23.9
	Coronary heart diseases	26	6.3
	Others	15	3.7
Patient activation stage	1	114	27.8
	2	192	46.8
	3	98	23.9
	4	6	1.5
Glycemic control	Good	73	17.8
	Poor	337	82.2

### 3.3 Association between patient activation and Glycemic control in type II diabetic patients

Among 306 patients with low activation, 272(88.9%) of them had poor glycemic control and only 34(11.1%) had good glycemic control. Among 104 patients with high activation, 65(62.5%) had poor glycemic control and 39(37.5%) of them had good glycemic control. Proportion of patients with poor glycemic control was significantly higher among patients with low activation ( $X^2$ - value=35.5, P-value< 0.001). (Table 3).

**Table 3.** Association between patient activation and Glycemic control among type II diabetic patients in Addis Ababa, 2019

		Glycemic control		X <sup>2</sup> - value	P- Values
		Good Number (%)	Poor Number (%)		
Patient activation	Low	34(11.1)	272(88.9)	35.5	0.001
	High	39(37.5)	65(62.5)		

### 3.4 Factors associated with patient activation in Type 2 Diabetes

On bivariate logistics regression analysis, factors associated with lower activation were older age, illiterate and primary educational status, low physical activity, low meal planning knowledge, smoking, chronic comorbidities, obese nutritional status and poor glycemic control. On multivariate logistics regression analysis, Illiterate educational status, low physical activity, low meal planning knowledge, chronic comorbidities and poor glycemic control were independently associated with lower activation (Table 4).

Illiterate type II diabetic patients had 2.4 times lower activation level compared to type II diabetic patients completed post-secondary education(AOR=2.4, 95% CI:1.5-3.3). Similarly, Type II diabetes patients involved in low physical activity had 1.4 times significantly lower activation than those participated in high physical activity (AOR=1.8, 95% CI:1.4-2.9). Likewise, low meal planning knowledge was significantly associated with low level of patient activation among patients with type II diabetes (AOR=1.5, 95% CI: 1.3-2.4). Type II diabetic patients with chronic comorbidities had significantly lower patient activation levels than their counterparts (AOR=2.1, 95% CI: 1.6-3.9). In addition, patients with poor glycemic control had significantly lower patient activation levels compared to patients with good glycemic control (AOR = 4.2, 95% CI: 2.4–7.5) (Table4).

**Table 4.** Factors associated with patient activation in people living with Type 2 Diabetes in Addis Ababa, Ethiopia, 2019

Variables	Patient activation level		COR (95% CI)	AOR (95% CI)
	Low Number (%)	High Number (%)		

Age	<50 years	87(69.1)	39(30.9)	1	1
	≥50 years	219(77.1)	65(22.9)	1.5(1.2-2.2)*	1.3(0.8-1.5)
Sex	Male	139(73.5)	50(26.5)	1	-
	Female	167(75.6)	54(24.4)	1.1(0.8-1.4)	-
Educational status	Illiterate	30(83.3)	6(16.7)	2.4(1.5-3.3)*	2.4(1.5-3.3)*
	Primary	73(79.3)	19(20.7)	1.9(1.4-2.5)*	1.5(0.9-2.2)
	Secondary	131(74.9)	44(25.1)	1.4(0.8-1.9)	1.3(0.7-1.8)
	Post-secondary	72(67.3)	35(32.7)	1	1
Occupational status	Employed	185(73.1)	69(26.9)	1	-
	Unemployed	121(77.1)	36(22.9)	1.3(0.7-1.8)	-
Physical activity	Low	202(78.9)	54(21.1)	2.1(1.5-3.1)*	1.8(1.4-2.9)*
	Moderate	88(68.2)	41(31.8)	1.2(0.9-1.6)	1.1(0.8-1.7)
	High	16(64.0)	9 (36.0)	1	1
Meal planning Knowledge	Low	247(77.4)	72(22.6)	1.9(1.4-2.9)*	1.5(1.3-2.4)*
	High	59(64.8)	32(35.2)	1	1
Follow-up duration	< 10years	199(72.4)	76(27.6)	1.5(0.9-2.3)	-
	≥10 years	107(79.3)	28(20.7)	1	-
Chronic Comorbidity	Yes	115(82.7)	24(17.3)	2.0(1.5-3.7)*	2.1(1.6-3.9)*
	No	191(70.5)	80(29.5)	1	1
Number of Medications	≤2	116(73.4)	42(26.6)	1	-
	3	171(74.7)	58(25.3)	1.1(0.7-2.1)	-
	≥4	17(79.9)	4(19.1)	1.5(0.9-3.5)	-
Smoking status	Yes	37(84.1)	7(15.9)	1.9(1.2-3.2)*	1.4(0.9-1.8)
	No	269(73.5)	97(26.5)	1	1
Body mass Index(BMI)	Underweight	4(66.7)	2(33.3)	0.9(0.6-3.4))	0.8(0.7-3.6))
	Healthy weight	101(68.2)	47(31.8)	1	1
	Overweight	132(76.7)	40(23.3)	1.5(0.9-3.0)	1.3(0.8-2.5)

	Obese	69(82.1)	15(17.9)	2.1(1.4-2.8)*	1.5(0.9-3.1)
Glycemic control	Good	34(46.6)	39(53.4)	1	1
	Poor	272(80.7)	65(19.3)	4.8(2.6-8.3)*	4.2(2.4-7.5)*

#### 4. Discussion

This investigation uncovered significant data about patient initiation levels and factors related with patient actuation in individuals living with Type 2 Diabetes in Addis Ababa, Ethiopia. The extent of sort 2 diabetes patients with low initiation was 75.6%. This finding was marginally lower than an investigation directed in Ethiopia where 80.3% patients with diabetes announced low initiation [18]. In any case, it was higher contrasted with studies led in created nations where 17% to 46% low initiation were accounted for in patients with diabetes [16]. These distinctions might be because of contrasts in clinical and socio-statistic attributes of the populaces contemplated.

Studies demonstrated that PAM scores are prescient of wellbeing practices, including anticipation practices like acquiring screenings, sound practices, for example, solid eating regimen and standard exercise, self-administration practices like checking, prescription administration and wellbeing data looking for [17,18]. People with more elevated amounts of enactment have better wellbeing results and lower rates of crisis division use and hospitalization [19] However, dominant part of the members had lower levels initiation, demonstrating patients had low information and comprehension in regards to the impact of way of life in the board of sort 2 diabetes. They come up short on the certainty and abilities to help their self-administration practices, to act to improve and keep up their wellbeing status. This may be identified with generally poor instructive, low pay, weakness care quality, high comorbidities and diabetes intricacies.

The investigation demonstrated that patients with low training dimension had lower tolerant initiation levels. Steady to this finding, past investigations led among sort 2 diabetes patients likewise discovered huge relationship between instructive dimension and patient actuation scores that patients with advanced education level had higher patient enactment scores [20] There may be a few reasons. Zimmerman et al. have proposed that people with low training have restricted chances or assets to find out about wellbeing [21] Mandpe et al. recommended that less taught patients with diabetes will in general have less learning of ailment [22], and Jackson et al. proposed that less taught patients with diabetes would in general have less learning of diabetes self-care [23]. Since lower actuation level may result in more terrible wellbeing related results [24]. The requirement for sufficient patient training ought to be offered accentuation to expand initiation levels with instruction and proper intercession [25].

Type II diabetes patients engaged with low physical movement had lower PAM than those taking part in high physical action, showing members associated with low physical action have low information and comprehension in regards to the impact of way of life in the administration of the sickness. An examination done by Rask et al. among patients with diabetes likewise discovered that high enactment related with more prominent commitment in exercise [16]. In this examination, dominant part 62.4% of members associated with low physical movement. This may be because of absence of adequate guidance and because of deficiency of clear data given by doctors [26]. It may likewise be because of absence of training and

inspiration [27]. Furthermore, it may be because of absence of having talk about physical exercise among doctor and type 2 diabetes patients [28].

Supper arranging is a basic segment of diabetes training and ideal glycemic control is upgraded by learning in the zone of dinner getting ready for patients with sort 2 diabetes [29]. Low feast arranging information was essentially connected with low dimension of patient enactment among patients with sort II diabetes. The finding showed that dominant part 77.8% of study members had low supper information. Way of life intercessions as supper arranging and exercise assume a significant job in a diabetes self-administration instruction program. Achievement in the self-administration of sort 2 diabetes requires a learning base on the infection course, a comprehension of the impact of significant way of life intercessions, and a patient who is effectively occupied with the administration of their wellbeing [29, 30, and 31].

Persistent actuation was low in those sort 2 diabetes patients with comorbidities. Essentially, in past examinations number of comorbidities and number of confusions were adversely connected with patient enactment level [32]. This could be because of patients with comorbid infection having less capacity to adapt to numerous conditions bringing about lower dimensions of initiation [33]. Moreover, because of the unpredictability of diabetes and comorbidities, there is constrained time to address every single patient need bringing about lower quality therapeutic consideration [34]. Patients with lower actuation scores are likewise more averse to practice all the time, eat a low fat eating regimen with more products of the soil, and refrain from smoking that could result weakness status, comorbidities and intricacies [35].

Poor glycemic control was altogether connected with lower quiet actuation. Extent of patients with poor glycemic control was essentially higher among patients with low actuation (88.8%) than patients with high enactment (62.5%). Remmers et al. likewise discovered patient initiation emphatically connected with glycemic control [36]. Studies have additionally exhibited that patients at lower initiation levels don't assume responsibility for their very own wellbeing and frequently need fundamental information about their condition, while patients with high actuation scores will in general have the learning, abilities, and certainty to self-deal with their sickness under unfriendly conditions [19]. This may be because of poor learning, low physical exercise, absence of feast arranging, high comorbidities, and diabetic entanglements and poor medicine adherence among patients with lower tolerant initiation bringing about poor glycemic control.

## **5. Conclusions**

The finding uncovered that lion's share of the diabetic II patients took an interest in low physical exercise and had low meal planning information. Greater part of patients had low initiation, demonstrating patients had low information and comprehension in regards to the impact of way of life in the administration of sort II diabetes and extent of patients with poor glycemic control was essentially higher among patients with low enactment. Uneducated instructive status, low physical action, low supper arranging learning, unending comorbidities and poor glycemic control were essentially connected with lower enactment.

## **6. Recommendations**

Powerful training systems ought to be structured and reinforced to raise their insight and adjust or change their way of life conduct, concentrating on the brief and appropriate treatment of sort II diabetes mellitus. Medicinal services suppliers ought to fortify arrangement of adequate guidelines and instruction to upgrade

the learning of Type 2 diabetes mellitus patients on their diabetes supper arranging and exercise. Due accentuation ought to be additionally given to type 2 diabetes patients with constant comorbid ailment and upgrade coordinated early discovery and the executives of comorbidities and complexities

### **Ethical considerations**

Ethical clearance for the study was obtained from the institutional review board of SPHMMC. The objective of the study and advantages obtained from the study were made understood for the director of each hospital and the patient. A written permission was obtained from the director of each hospital and from the patients to undertake the study and to maintain confidentiality.

### **Reference**

1. ParchmanML,ZeberJE,PalmerRF.ParticipatoryDecisionMaking,PatientActivation,MedicationAdherence,andIntermediateClinicalOutcomesinType2Diabetes:ASTARNetStudy.TheAnnalsofFamilyMedicine.2010;8(5):410–417.
2. Good, C.B. Polypharmacy in Elderly Patients with Diabetes. (2002). *Diabetes Spectrum*, 15, 240-244.
3. American Diabetes Association. (2004). Diabetes nutrition recommendations for health care institutions. *Diabetes Care*, 27, S35-37.
4. Cagliero, E., Levina, E.V., & Nathan, D.M. (1999). Immediate feedback of HbA1c levels improves glycemic control in type 1 and insulin treated type 2 diabetic patients. *Diabetes Care*, 22, 1785-1789.
5. American Diabetes Association. (1994). Self-monitoring of blood glucose. *Diabetes Care*, 17, 81-86.
6. Franz, M.J., Bantle, J.P., & Beebe, C.A. (2002). Evidence-based nutrition principles and recommendations for the treatment and recommendations for the prevention of diabetes and related complications. *Diabetes Care*, 25, 148-198.
7. HibbardJH,MahoneyER,StockR,TuslerM.DoIncreasesinPatientActivationResultinImproved Self-ManagementBehaviors?HealthServicesResearch.2007;42(4):1443–1463.PMID:17610432 3
8. Hibbard, Judith H., et al. (2013). Patient Activation and Improved Outcomes in Hiv-Infected Patients. *J Gen Intern Med*, 28(5), 668-674. doi:10.1007/s11606012-2307-y
9. Wagner, E.H. (1998). Chronic disease management: What will it take to improve care for chronic illness? *Effective Clinical Practice*, 1, 2-4. Retrieved March 18, 2007 from <http://www.improvingchroniccare.org>
10. Bayliss, E.A., Steiner, J.F., & Fernald, D.H., (2003). Crane, L.A. Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann. Fam. Med.*, 1, 15-21.
11. Wei, M., Gibbons, L.W., Kampert, J.B., Nichaman, M.Z., & Blair, S.N. (2000). Low cardiorespiratory fitness and physical inactivity as predictors of mortality in men with type 2 diabetes. *Ann Intern Med*, 132, 605–611.
12. Hibbard, J.H., Stockard, J., Mahoney, E.R., & Tusler, M. (2004). Development of the patient

- activation measure (PAM): conceptualizing and measuring activation in patients and consumers. *Health Services Research*, 39, 1005-1026.
13. Glasgow, R.E., Toobert, D.J., & Riddle, M. (1989). Diabetes-specific social learning variables and self-care behaviors among persons with type II diabetes. *Health Psychol.*, 8(3), 285-303.
  14. Fitzgerald, J.T., Davis, W.K., Connell, C.M., Hess, G.E., Funnell, M.M., & Hiss, R.G. (1996). Development and validation of the diabetes care profile. *Evaluation and the Health Professions*, 19(2), 209-231.
  15. American Diabetes Association (January 2013) Standards of Medical Care in Diabetes. *Journal of diabetes Care: American Diabetic Association*. pp. S11–S66.
  16. Tewodros GM., Yinebeb M, Andualem M. Determine the influence of patient activation on exercise, meal planning knowledge, and polypharmacy among type II diabetic patients in Ethiopia, 2012. Unpublished.
  17. Rask KJ, Ziemer DC, Kohler SA, Hawley JN, Arinde FJ, Barnes CS. Patient activation is associated with healthy behaviors and ease in managing diabetes in an indigent populations. *Diabetes Education*. 2009;35(4):622–630.
  18. RemmersC,HibbardJ,MosenDM,WagenfieldM,HoyeRE,JonesC.Ispatientactivationassociated withfuturehealthoutcomesandhealthcareutilizationamongpatientswithdiabetes?TheJournalof ambulatorycaremanagement.2009;32(4):320–327.doi:10.1097/JAC.0b013e3181ba6e77PMID
  19. GreeneJ,HibbardJ.WhyDoesPatientActivationMatter?Anexaminationoftherelationshipsbetween patientactivationandhealth-elatedoutcomes.*JournalofGeneralInternalMedicine*.2012;27(5):520– 526.
  20. Hendriks, Michelle, & Rademakers, Jany. (2014). Relationships between Patient Activation, Disease-Specific Knowledge and Health Outcomes among People with Diabetes; a Survey Study.
  21. Zimmerman, Emily B., Woolf, Steven H., & Haley, Amber (2015). *Population Health: Behavioral and Social Science Insights. Understanding the Relationship between Education and Health*.
  22. Mandpe, Amruta Sumedh , Pandit, Vijaya A. , Dawane, Jayshree S. , & Patel, Hardik R. . (2014). Correlation of Disease Knowledge with Adherence to Drug Therapy, Blood Sugar Levels and Complications Associated with Disease among Type 2 Diabetic Patients. *Journal of Diabetes Metabolism*, 05(05).
  23. Jackson, Idongesit L., Adibe, Maxwell O., Okonta, Matthew J., & Ukwue, Chinwe V. (2014). Knowledge of Self-Care among Type 2 Diabetes Patients in Two States of Nigeria. *Pharm Pract (Granada)*, 12(3), 404
  24. Sacks RM, Greene J, Hibbard J, Overton V, Parrotta CD. Does patient activation predict the course of type 2 diabetes? A longitudinal study. *Patient Educ Couns*. 2017;100(7):1268–1275.
  25. Terry PE, Fowles JB,XiM, HarveyL. The ACTIVATE study: results from a group randomized controlled trial comparing a traditional worksite health promotion program with an activated consumer program.*American Journal of Health Promotion*.2011;26(2):e64–73.doi:10.4278/ajhp.091029-QUAN348PMID:22040398
  26. Leatherman, S., Berwick, D., & Iles, D., et al. (2003). The business case for quality: case studies and an analysis. *Health Aff*, 22(2), 17-30.
  27. Kirk, A., Mutrie, N., MacIntyre, P. D., Fisher, M. B. (2004). Promoting and maintaining physical activity in people with type 2 diabetes. *American Journal of Preventive Medicine*, 27 (4), 289-296
  28. Hendrey, J. (2007, March). Associations join efforts to prevent cardiovascular disease.

29. Mahan, K.L., & Escott-Stump, S. (2004). *Krause's Food Nutrition and Diet Therapy*. Philadelphia, PA: Elsevier, 798
30. Hibbard JH, Greene J, Tusler M. Improving the outcomes of disease management by tailoring care to the patient's level of activation. *American Journal of Managed Care*. 2009;15(6):353–360. PMID: 19514801
31. Aung E, Donald M, Coll JR, et al. Association between patient activation and patient-assessed quality of care in type 2 diabetes: results of a longitudinal study. *Health Expect* 2016;19:356–66.
32. Blakemore A, Hann M, Howells K, et al. Patient activation in older people with long-term conditions and multimorbidity: correlates and change in a cohort study in the United Kingdom. *BMC Health Serv Res* 2016;16:582.
33. Piette JD, Kerr EA. The impact of comorbid chronic conditions on diabetes care. *Diabetes Care* 2006;29:725–31
34. Mayberry R, Willock RJ, Boone L, Lopez P, Qin H, Nicewander D. A high level of patient activation is observed but unrelated to glycemic control among adults with Type 2 Diabetes. *Diabetes Spectrum* Volume, 2010;23(3):171–176.
35. Remmers C, Hibbard J, Mosen DM, Wagenfield M, Hoyer RE, Jones C. Is patient activation associated with future health outcomes and health care utilization among patients with diabetes? *The Journal of ambulatory care management*. 2009;32(4):320–327. doi:10.1097/JAC.0b013e3181ba6e77 PMID: