ORIGINAL RESEARCH

Awareness regarding diabetes and its management amongst general Kashmiri population and its impact on treatment compliance

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ABSTRACT

Background: In the past few decades, diabetes has increased many folds due to increase in prevalence of obesity and physical inactivity. Educating the masses regarding diabetes and its management can improve their blood sugars. Treatment outcome is directly proportional to the self-awareness of this chronic condition. In a set up where, public demands outnumber the health care facilities, it is important that the common masses should be well versed with their condition, so that high risk individuals can be easily identified and resources can be properly allocated to them. **Aim:** To determine the baseline awareness among general Kashmiri masses regarding diabetes and its complications and its effect on treatment compliance. **Methods:** An electronic questionnaire to determine the baseline awareness among general Kashmiri masses regarding diabetes and its complications and its effect on treatment compliance was prepared using Google forms and circulated through social media platform (whats app). The questionnaire had 26 questions divided into four sections and was prepared in English language. We received responses from 651 participants which were then included in the study. **Results and conclusion**: Among our participants only 27% were diabetic. 55% participants in our study had positive family history of diabetes. Among diabetic individuals (96%) majority had positive family history of diabetes (p=0.000). Majority of diabetic participants (39%) were aged above 60 years (p =0.000). 68% diabetic subjects had non sedentary life style (p=0.000). %). Among our diabetic participants only 56% were adherent to their anti-diabetic medications. Being chronic in nature people often lose contact with their treating physician, but if they maintain their regular doctor visits their adherence rates will 1

Key words: Diabetes mellitus, knowledge, sedentary life style, family history, treatment adherence.

INTRODUCTION

Diabetes is a chronic, metabolic disorder characterized by elevated blood sugar levels associated with high risk of chronic complications and comorbidities[1].Due to its chronic nature and comorbidities which accompany the disease, diabetes has put enormous burden on the economy of third world countries[2]. Diabetes is considered as an impending public health problem and may foist sizeable challenges on health care system of most under developed countries in the upcoming years. This is because a remarkable percentage of population who experience this condition in these countries are young age peoplewho are actually expected to contribute to the economy of these countries to achieve the Millennium development goal[3-5]. Being one of the four major non communicable diseases, it has evolved as a pandemic for the world today.It has engulfed around 422 million people across the world, majority being from low- and middle-income countries[6]. Every year almost 1.5 million people succumb to diabetes worldwide[6]. As for India the estimate in 2019 revealed that 77 million people had

diabetes and the number is expected to increase to 134 million by 2045[7].

In the past few decades, diabetes has increased many folds due to increase in prevalence of obesity and physical inactivity[8].Changes in dietary habits with easy availability of highly processed foods, causes an individual to fall prey to this debilitating illness[9]. Treatment strategy of diabetes includes life style modification and a variety of antidiabetic drugs[10]. These measures have to be continued lifelong.Diabetes being a chronic illness requires multiple and sustained approach for its management where patient has an important part to play[11]. Hence it is important to keep the patients motivated all the time so that they adhere to the treatment modalities. This helps in achieving good glycemic control and prevention in developmentof complications. Un checked diabetes can lead to blindness, kidney failure, neurological complications, diabetic foot, increased risk of stroke, cardiovascular diseases etc. These complications are not only irreversible but also very expensive to manage as they require highly advanced infrastructure and extremely competent staff[12]. There is sufficient data to suggest that educating the masses regarding diabetes and its management can improve their blood sugars[13].Previous studies have shown that improved knowledge regarding diabetes and its complications has beneficial effects in achieving good treatment compliance[14-16].

Treatment outcome is directly proportional to the self-awareness of the chronic condition[17,18].People should have elaborate understanding about the nature of their illness, risk factors, complications and various treatment options to alleviate the complications[19,20]. The doctor patient ratio in our state is 1:2000 as against 1:1000 set by the W.H.O[21]. Thusin such set up where public demands outnumber the health care facilities, it is important that the common masses should be well versed with their condition,so that high risk individuals can be easily identified and resources can be properly allocated to them.Several studies to check the awareness regarding diabetes have been conducted across India. Since no such study has been conducted in our Kashmiri population,we designed the current studyto determine the baseline awareness among general Kashmiri masses regarding diabetes and its complications and its effect on treatment compliance.

METHODS

Our study was conducted in the Department of Pharmacology, Government Medical College Srinagarfrom 1stJanuary 2023 to 1st March 2023,after getting approval from Institutional Ethics Committee. An electronic questionnaire to determine the baseline awareness among general Kashmiri masses regarding diabetes and its complications and its effect on treatment compliancewas prepared using Google forms and circulated through social media platform (whatsapp).Identity of the respondents was kept highly confidential.The questionnaire was prepared based on previous studies.

The questionnaire had 26 questions divided into four sections and was prepared in English language. The first section consisted of basic demographic profile of respondents like age, sex etc. The second section consisted of questions where the respondents were asked about their diabetic status (whether they had diabetes or not, their fasting blood sugar ranges, duration of diabetes). The third section dealt with the awareness of the participants regarding diabetes. The fourth section was designed to confirm their treatment adherence. Options of questions in section three and four were framed on 5-point Likert scale.

Some of the participants were given validated questionnaire forms physically. Nature and purpose of the study was explained to them in local language. Informed consent was then taken from them. Those participants who faced any difficulty in filling the forms were helped accordingly. Properly filled forms were then collected and included in the study.

INCLUSION CRITERIA

All individuals above 18 years of age and who were capable of filling the google form were included in the study.

EXCLUSION CRITERIA

People who did not give consent and those who were mentally unwell were excluded from the study.

We received responses from 651 participants which were then included in the study. Responses were compiled using Microsoft Excel Sheet and then analyzed. Statistical analysis was done using SPSS version 25.0 software. Demographic characteristics were analyzed using descriptive statistics. Categorical variables were measured as percentages.

Table 1: Demographic characteristics if study participants.

Parameter		Do you have diabetes			
		Yes	No	Don't know	p-value
Age	Number				
20-40	481 (74%)	16 (24%)	458 (79%)	5 (100%)	
40-60	124 (19%)	26 (37%)	98 (17%)	0 (0%)	0.000
>60	48 (7%)	27 (39%)	21 (4%)	0 (0%)	
Gender					
Male	314 (48%)	52 (75%)	259 (45%)	2 (40%)	0.000
Female	339 (52%)	17 (25%)	318 (55%)	3 (60%)	

Marital status					
Single	241 (37%)	3 (4%)	235 (41%)	2 (40%)	
Married	412 (63%)	66 (96%)	342 (59%)	3 (60%)	0.000
Divorced	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Residence					
Urban	427 (68%)	56 (81%)	366 (63%)	5 (100%)	0.004
Rural	226 (35%)	13 (19%)	211 (37%)	0 (0%)	
Education					
Primary school	12 (2%)	9 (13%)	3 (1%)	0 (0%)	
Middle school	6 (1%)	3 (5%)	3 (1%)	0 (0%)	
High school	35 (5%)	9 (13%)	24 (4%)	2 (40%)	0.000
Graduate	281 (43%)	18 (26%)	262 (45%)	0 (0%)	
Post graduate	319 (49%)	30 (43%)	285 (49%)	3 (60%)	
Occupation					
Unemployed	56 (9%)	0 (0%)	53 (9%)	3 (60%)	
Home maker	38 (6%)	20 (29%)	18 (3%)	0 (0%)	
Retired	27 (4%)	9 (13%)	18 (3%)	0 (0%)	0.000
Self employed	80 (12%)	14 (20%)	66 (11%)	0 (0%)	
Professional	452 (69%)	26 (38%)	422 (73%)	2 (40%)	
Monthly income					
<20,000	108 (17%)	20 (29%)	83(14%)	5 (100%)	
20,000-50,000	270 (40%)	11 (16%)	258 (45%)	0 (0%)	
50,000-1 lakhs	167 (26%)	21 (30%)	145 (25%)	0 (0%)	0.000
>1 lakh	108 (17%)	17 (25%)	91 (16%)	0 (0%)	
Life style					
Sedentary	259 (40%)	22 (32%)	232 (40%)	5 (100%)	
Non sedentary	394 (60%)	47 (68%)	345 (60%)	0 (0%)	0.009

Figure 1: Diabetic status of study participants.

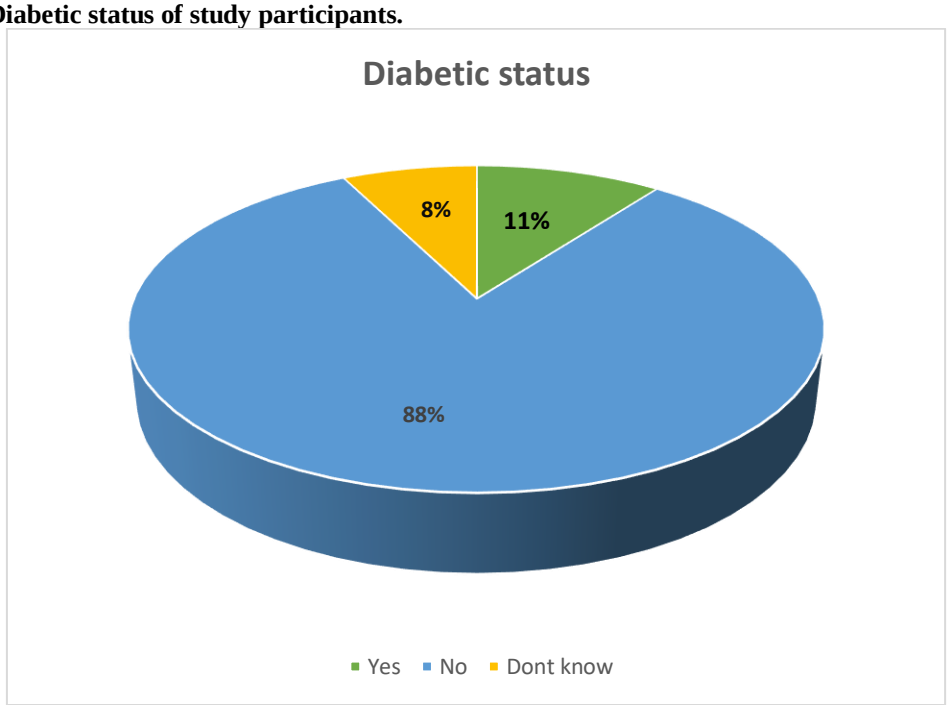


Figure 2: Family history of diabetes

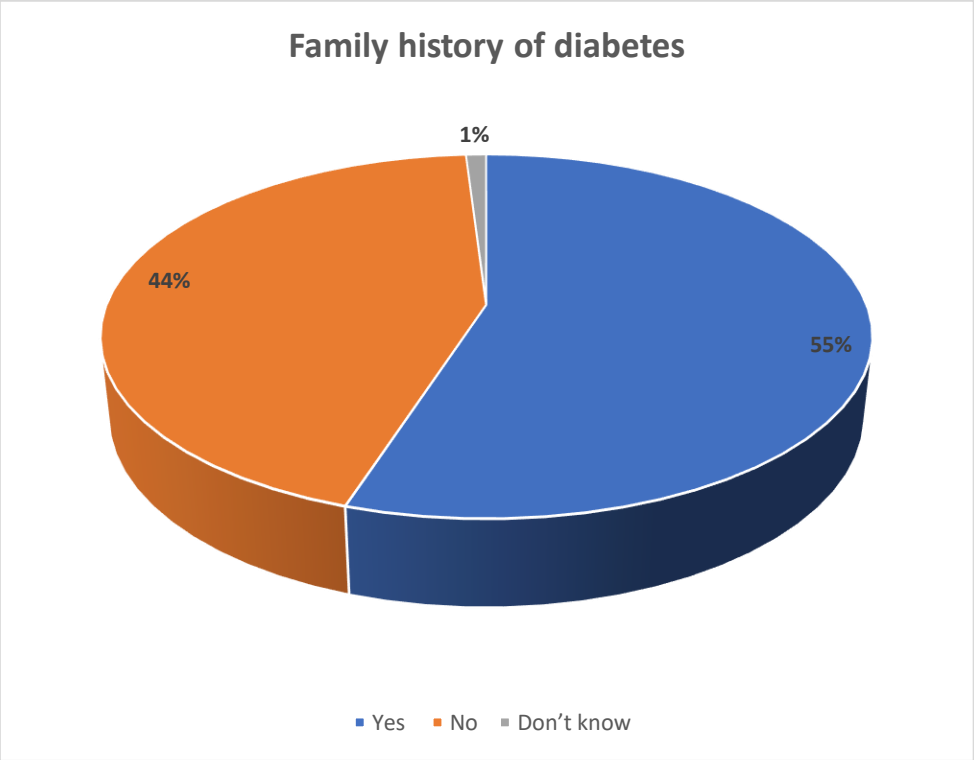


Table 2: Distribution of participants about diabetic status and family history.

Parameter		Do you have diabetes			
		Yes	No	Don't know	p value
Do you have family history of diabetes	Number				
Yes	360 (55%)	66 (96%)	289 (50%)	5 (100%)	
No	285 (44%)	0 (0%)	285 (49%)	0 (0%)	0.000
Don't know	6 (1%)	3 (4%)	3 (1%)	0 (0%)	

Table 3: Awareness regarding diabetes and its complications among study participants.

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Do you know that diabetes is increase in blood sugar levels	327 (50%)	289 (41%)	23 (3%)	11 (1%)	3 (5%)
Are you aware of the fact that diabetes runs in families	268 (41%)	325 (50%)	46 (7%)	13 (2%)	0 (0%)
Do you believe that diabetes can cause complications if left untreated	497 (76%)	140 (21%)	7 (1%)	0 (0%)	9 (2%)
Do you think that regular monitoring of blood sugars and doctor check ups will help to keep diabetes under control	423 (65%)	187 (30%)	17 (4%)	0 (0%)	7 (1%)
Do you believe that life style modifications (diet, weight loss, regular exercise) will help to keep diabetes under control.	495 (75%)	148 (23%)	7 (1%)	0 (0%)	3 (1%)

Figure3: Awareness regarding risk factors of diabetes among study participants.

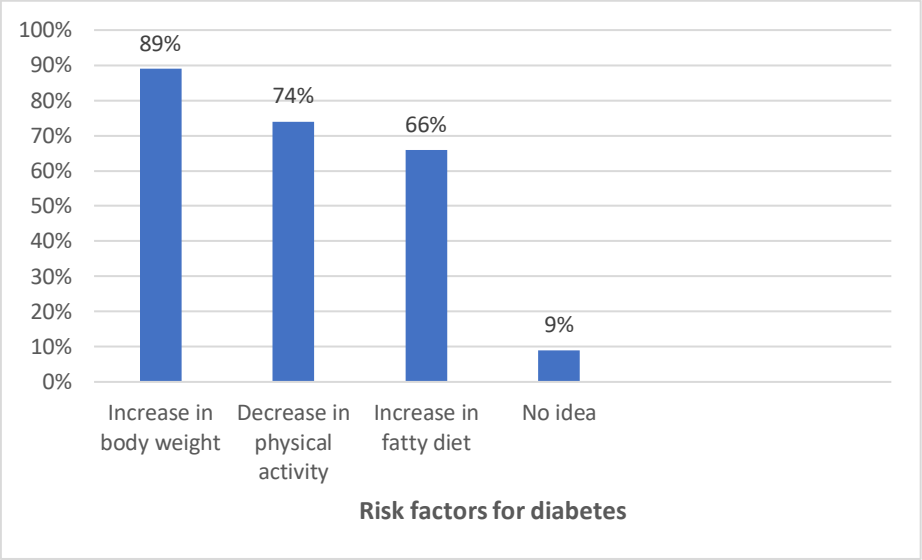


Figure 4: Awareness about the various symptoms of diabetes.

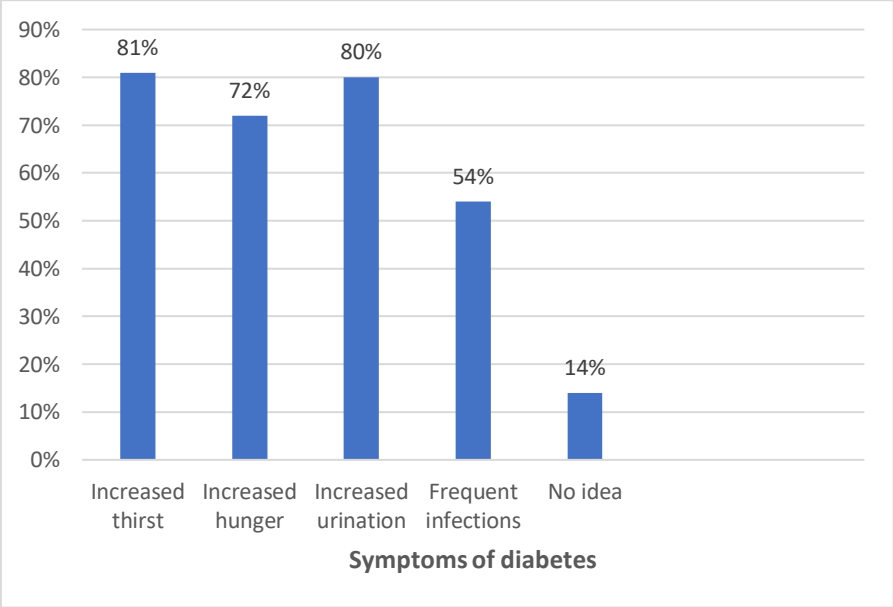


Figure 5: Awareness regarding complications of diabetes.

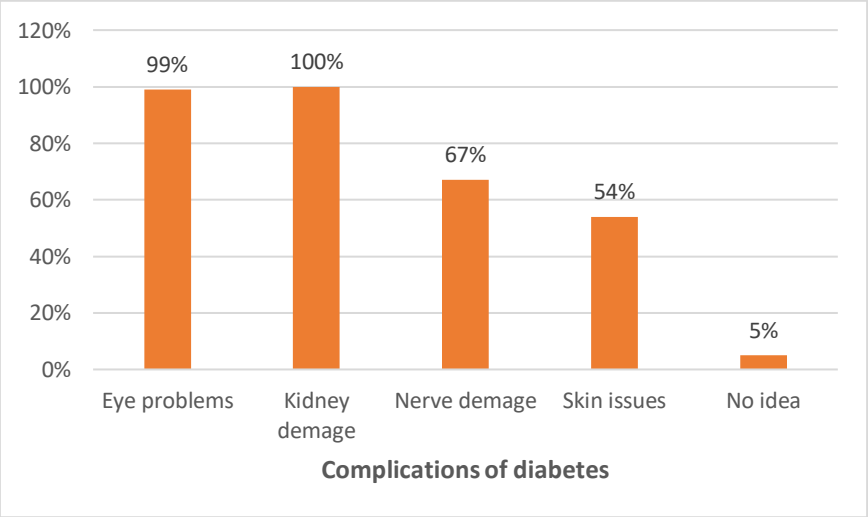


Figure 6: Awareness regarding different treatment strategies for diabetes.

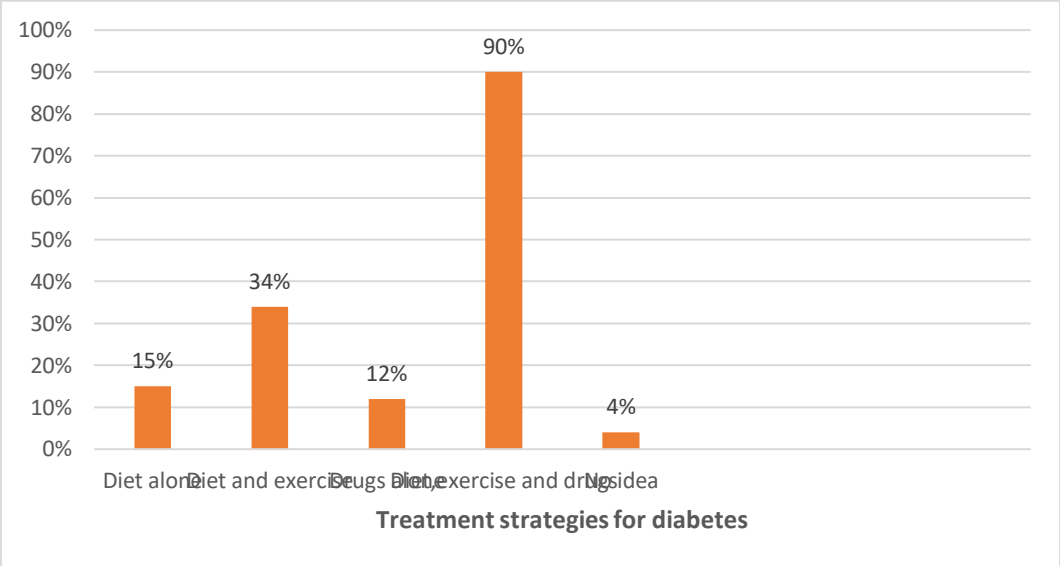


Figure 7: Awareness regarding signs of hypoglycemia.

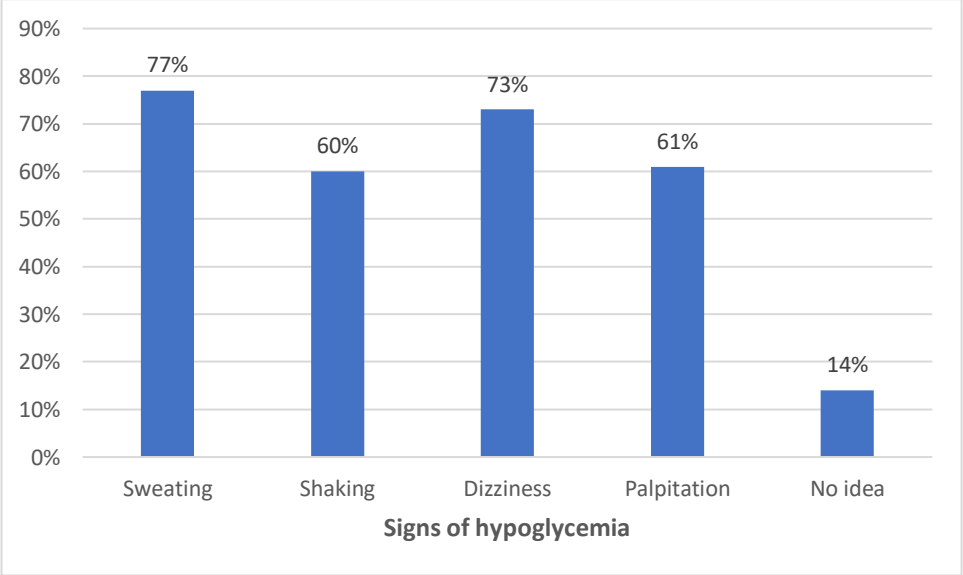
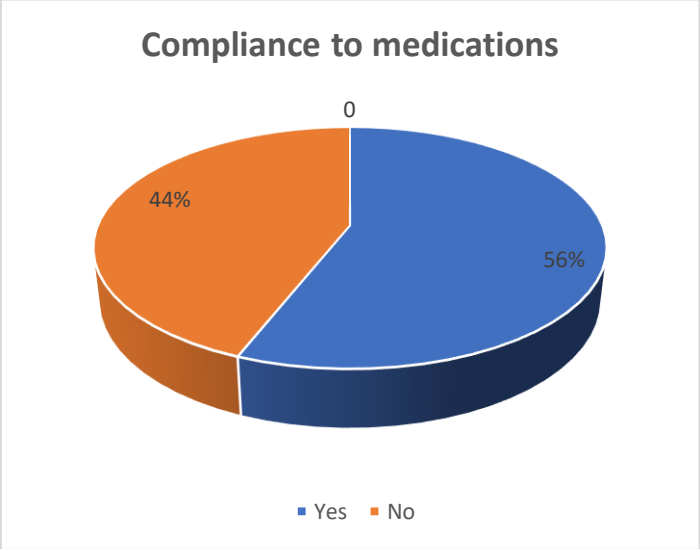


Figure 8: Adherence to medications among diabetics



DISCUSSION

Due to the rising prevalence of diabetes in emerging nations, India will soon become the world's diabetic capital[22].As diabetes is a chronic disease and can cause complications, it is important to educate the masses about the nature of the disease so that early detection of the disease can be done and steps can be taken to slow down its progression. Our study was aimed to assess the awareness regarding diabetes and its complications among common masses and to see its impact on treatment adherence.

Majority participants in our study were in the age group of 20-40 years (74%), with female predominance (52%).68% participants lived in urban areas, 49% subjects were post graduates, 69% were professionals and 40% having sedentary life style (Table 1). Regarding the diabetic status,27% subjects were diabetic (Figure 1). 55% participants in our study had positive family history of diabetes (Figure 2).

When the correlation between diabetic status and family history of diabetes was analyzed in our study participants, it was seen that majority of diabetic individuals (96%) had positive family history of diabetes,p=0.000 (Table 2). Similarly in the study conducted by Annis AM et al[23], it was seen that the prevalence of diabetes was revelatory higher (14%) in individuals with positive family of diabetes.

When the correlation between demographic characteristics and diabetic status was analyzed, it was seen that majority of diabetic participants (39%) were aged above 60 years, p =0.000. This can be probably due to the fact that blood sugar concentrations tend to rise with age[24].Studies have shown that onset of diabetes is common after 45 years[25].Our results were comparable to the results reported by Alanazi NH et al[26] from their study, where majority of the diabetic participants (43%) were aged between 35-65 years. Regarding the gender predisposition, more males were diabetic in our study (75%) as compared to females (p=0.000).81% diabetics participants in our study belonged to urban areas (p=0.000). Our results were supported by another study conducted by Anjana RM et al[27] where higher diabetic population belonged to urban areas.

Lifestyle is an important contributor to the development of chronic diseases like diabetes. In fact, diabetes is known as a life style disease. Among our study participants 68% diabetic subjects had non sedentary life style, p=0.000 (Table 1).

When the study participants were asked about diabetes and its complications, 91% knew that diabetes is increase in blood sugar levels. In a study conducted by Joshi S et al[9],75% participants knew what is diabetes. Again, in our study 91% participants knew that it has a familial predisposition. Our findings were much better than that reported by Forma MA et al[28] where only 33% were aware of the fact that diabetes runs in families. In another study conducted by Hashmi NR et al [29]most of the participants were unaware about this fact. This could probably be attributed to better awareness regarding diabetes among our study participants. 97% participants in our study believed that if diabetes is not treated properly, it can lead to complications. In another study conducted by AhmedIB et al [30]only 41% subjects were aware that if left untreated diabetes can cause complications. 95% subjects in our study believed that regular doctor checkups and blood sugar monitoring can help to keep diabetes under control. 98% subjects in our study believed that life style modifications can help to keep diabetes under control (Table 3). Ahmed IB [30]reported from his study that 40% participants believe that a key component of maintaining diabetes under control is changing one's way of lifestyle and diet. Smaller fraction of participants in the study conducted by Avi B et al[31]knew that life style modifications are important in keeping diabetes under check.

Risk factor, also known as a determinant, is a variable connected to a higher chance of illness or infection. Knowledge regarding the risk factors of any particular disease can go a long way in helping the individual to prevent the occurrence of that disease. Our study participants had fairly good knowledge regarding the risk factors of diabetes. Increase in body weight (89%) was considered as an important risk factor for diabetes by our study participants, followed by decrease in physical activity (74%) and increase in fatty diet (66%) (Figure 3). In the study conducted by Danish PV[32]participants considered family history as the most important risk factor (71%) followed by obesity (64%) and low physical activity (49%).Sekowski K et al[33]reported from his study that obesity (80%) and unhealthy diet (74%) were most commonly recognized risk factors by his study participants.

Symptoms are important tools that help an individual as well as his treating physician to reach to a diagnosis. It is important that the common people should be acquainted with the symptoms of diabetes, so that they approach the health care professionals well in time and this in turn can prevent morbidity due to the disease. In our study, participants were well aware about the symptoms of diabetes and majority of them considered increased thirst (81%) and increased urination (80%) as important symptoms of diabetes, followed by increased hunger (72%) and increased incidence of infections (54%) (Figure 4). Gaikwad B et al[34] reported from his study that extreme fatigue, poor healing capacity, excessive perspiration and hunger were regarded as main symptoms of diabetes by 82%,74% and 73% of his participants respectively. In the study conducted by Kumar R et al[35]urinating several times, poor wound healing andincreased thirst were reported as common symptoms by 95%, 87% and 89% participants respectively.

Diabetes mellitus is notorious for causing various multi organ complications. Knowledge about these complications can aid the patients to strictly adhere to

their treatment regime. In our study, subjects were well aware about these complications. Almost all the participants (99%) knew that diabetes can cause kidney damage and eye problems. 67% said that it can cause nerve damage while 54% said that it can give rise to skin problems (Figure 5). Similar study was conducted by Dinesh PV et al[32]were 42% subjects considered renal dysfunction as the main complication of diabetes followed by ophthalmic changes (30%), neuropathy (25%) and skin infections (17%). AL Hammadi NA et al[36]reported from his study that his participants regarded eye problems (32%) as the main diabetic complication followed by kidney disease (20%) and diabetic foot (16%).

90% of our study participants considered diet, exercise and drugs as significant treatment strategy for diabetes and only 4% said that they had no idea (Figure 6). In research conducted by Foma M Aet al[28],67% participants regarded diet and medications as main treatment of diabetes followed by diet, exercise and medication (29%).

Hypoglycemia is a dangerous complication for those on anti-diabetic drugs. If the people are aware about its signs, its progression to seizures, coma and even death can be prevented. Our study participants considered sweating (77%) as the main sign, followed by dizziness (73%), palpitation and shaking (60%) (Figure 7). Our results were comparable to the study conducted by Dinesh PVet al[32], were almost all the participants were aware about one or another sign of hypoglycemia with maximum participants (77%) considering extreme fatigue as the main sign, followed by excessive sweating (68%), blurring of vision (56%).

Among our diabetic participants only 56% were adherent to their anti-diabetic medications (Figure 8). Mere knowledge about the disease and its various aspects is of no use unless put into practice which is evident from our findings. Almost similar results were reported by Aminde L N et al[37]from his study were only 46% took their anti diabetic drugs regularly. Higher anti diabetic medication adherence were reported by Siraj J et al [38] from his study were 68% participants were adherent to their treatment.

CONCLUSION

Even though diabetes is a chronic systemic disease, its onset and progression can be delayed if people are well aware about various aspects of this disease.Our study was designed to gauge the baseline information the common masses have about diabetes. Among our participants only 27%were diabetic. 55% participants in our study had positive family history of diabetes. Majority of our diabetic individuals (96%) had positive family history of diabetes (p=0.000).Majority of diabetic participants (39%) were aged above 60 years (p =0.000).68% diabetic subjects had non sedentary life style (p=0.000). Regarding the awareness about the disease, 91% knew that diabetes is increase in blood sugar levels.95%believed that regular doctor checkups and blood sugar monitoring can help to keep diabetes under control. 98%believed that life style modifications can help to keep diabetes under control. Increase in body weight (89%) was considered as an important risk factor for diabetes, followed by decrease in physical activity (74%) and increase in fatty diet (66%). Our participants were well aware about the symptoms of diabetes and majority of them considered increased thirst (81%) and increased urination (80%) as important symptoms of diabetes, followed by increased hunger (72%) and increased incidence of infections (54%).Almost all the participants (99%) knew that diabetes can cause kidney damage and eye problems. 67% said that it can cause nerve damage while 54% said that it can give rise to skin problems.90% considered diet, exercise and drugs as significant treatment strategy for diabetes and only 4% said that they had no idea.Our study participants considered sweating (77%) as the main sign of hypoglycemia, followed by dizziness (73%), palpitation and shaking (60%). Among our diabetic participants only 56% were adherent to their anti-diabetic medications. Being chronic in nature people often lose contact with their treating physician, but if they maintain their regular doctor visits their adherence rates will definitely improve.

CONFLICT OF INTEREST

There is no conflict of interest among the authors.

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