

## Assessment of Undiagnosed Type II Diabetes Risk By Using IDRS In Urban Area Of Bhadradi Kothagudem

K.Harish Babu<sup>1\*</sup>, K.Thriveni<sup>1</sup>, Anjum<sup>1</sup>, V.Ramnarayana Reddy<sup>1</sup>, Rajani.G<sup>1</sup>,  
G.Nagarjuna Reddy<sup>2</sup>

Corresponding Author: K.Harish Babu

1. Department of Pharmacy Practice, KLR Pharmacy College, Kakatiya University, Warangal, India.

2. Department of Pharmaceutical Chemistry, KLR Pharmacy College, Kakatiya University, Warangal, India.

---

**Abstract: Objective:** To estimate the usefulness of the Indian diabetes risk score for detecting undiagnosed diabetes in the rural area of Bhadradi Kothagudem, Telangana. **Materials and Methods:** The present study was conducted in the field practice area of The Sigareni Collieries Company Ltd Main Hospital, Kothagudem, Telangana, covering a population of 300 from Dec 2017 to May 2018 by using a predesigned and pretested protocol to find out the prevalence and the risk of diabetes mellitus in general population by using Indian diabetes risk score tool. **Results:** 300 respondents comprising 152 (50.66%) females and 148 (49.39%) males were studied. Most of the respondents 202(67%) indulged in mild to moderate physical activity. 149(49.64%) individuals were in the overweight category (>25BMI). Out of these overweight persons, 25% had high diabetic risk score. It is observed that chances of high diabetic score increase with the increase in BMI. Prevalence of diabetes in studied population was 5.99%; out of these, 25% known cases of diabetes mellitus had high (>60) IDRS. Co-relation between BMI and IDRS shows that, if BMI increases from less than 18.50 to more than 30, chances of high risk for developing diabetes mellitus also significantly increase. **Conclusions:** This study estimates the usefulness of simplified Indian diabetes risk score for identifying undiagnosed high risk diabetic subjects in India. This simplified diabetes risk score has categorized the risk factors based on their severity. Utilization of the IDRS can make mass screening for undiscovered diabetes in India more practical. **Keywords:** Diabetes mellitus, Indian diabetes risk score, rural area, risk factors, obesity.

---

Date of Submission:30-10-2018

Date of Acceptance: 15-11-2018

---

### I. Introduction :

The Indian diabetic risk score is a tool, which was developed by the Madras Diabetic research foundation to know people risk for developing emergent Diabetes Mellitus; it comprises of family history, abdominal circumference, age and physical activity.

India is diabetic headquarters of world, with top figure digit of diabetic patients. Near is hereby burden of concealed diabetic belongings in community. Near is mounting danger of diabetes in city slum, for the reason that of illiteracy, be short of awareness, muted socioeconomic grade and unhealthy sparkle style. Madras Diabetes exploration Foundation (MDRF) has urban Indian Diabetes danger grade (IDRS) to spot undiagnosed type 2 diabetes. The ambition of this article is to research the thing of IDRS as transmission tool for undiagnosed belongings of type face 2 diabetes and to get hold of the frequency of undiagnosed sort 2 diabetes in an metropolitan area.

The Indian diabetic run the risk of do (IDRS) is minimal and by a long way applicable for inspection of DM. (Mohan et al.,2012) from their Chennai Rural Epidemiology study(CURES) cohort, take residential a solo abuser affable Indian diabetic take a chance mark (IDRS). Its benefits are simplicity and low rate and it is without doubt applicable for collection test programmes .

### Indian Diabetic Risk Score (IDRS):

The Indian diabetic risk score is a tool, which was devised by the Madras Diabetic research foundation to screen people for the risk of developing Diabetes Mellitus; it comprises of the family history, the abdominal circumference, age and the physical activity.

Figure Indian Diabetic Risk Score(Idrs) Tool:

Indian Diabetes Risk Score		SCORE
<b>Age:</b>		
<35 years		0
35 - 49 years		20
≥ 50 years		30
<b>Waist circumference:</b>		
Waist < 80 cm (female), <90 cm (male)		0
Waist ≥ 80 - 89 cm (female), ≥ 90 - 99 cm (male)		10
Waist ≥ 90 cm (female), ≥ 100 cm (male)		20
<b>Physical activity:</b>		
Regular vigorous exercise or strenuous (manual) activities at home / work		0
Regular moderate exercise or moderate physical activity at home / work		10
Regular mild exercise or mild physical activity at home / work		20
No exercise and/or sedentary activities at home / work		30
<b>Family history of diabetes:</b>		
No diabetes in parents		0
One parent is diabetic		10
Both parents are diabetic		20

Minimum Score: 0, Maximal Score: 100, Positive Score: ≥60 / 100  
 \* Modified from reference 59 and reprinted from JAPI with permission.

## II. Methodology:

### Ethical considerations:

**Study design:** Prospective study design .

**Study site:** Singareni Collieries Company Pvt Ltd., Kothagudem, Telengana,India.

**Study duration :** 6 Months

### Study criteria:

- ❖ **Inclusive criteria** Male and female patients above 20 years of age, Unknown Type 2 Diabetes Mellitus with or without co-morbidities , Patients who are able to give written informed consent for study participation.
- ❖ **Exclusive criteria:** Male and female patients below 20 years of age, Pregnancy and lactating women.

### Study procedure:

**Patient consent:** Study details were explained to the patients and written informed consent form was obtained. Study procedure divided into two phases;

**Source of data:** Patient data relevant to the study was obtained from following sources, Patient data collection form, Case sheet, Direct patient interview

### Data collection:

All the relevant information was collected by one-to-one interaction with the subjects and also by direct measurement of the physical parameters. The assessment of risk factors followed in three steps:

STEP 1: A predesigned, pretested document was used to collect data from in the study subjects. In this included information on socio-demographic characteristics, family history of diabetes and physical activity, etc.

STEP 2: Anthropometric measurements were taken for all study participants. Measurements included height, weight, waist circumference and hip circumference.

STEP 3: biochemical testing, i.e. random capillary blood glucose was done for high-risk participants (IDRS ≥60) who were screened in steps 1 and 2.

### Description of variables

- **Height :** Height in centimetres was measured using a stadiometer. Before measuring patient was asked to stand on the front of the wall. Their hair was pressed with a writing pad and they were also advised to remove their shoes.
- **Weight :** Weight in kilograms was recorded using Krupp’s weighing machine. Before recording, it was ensured that the mark should be at the zero level. This was standardized every week by checking against a beam balance.
- **Waist circumference:** Waist circumference was measured to the nearest 0.1 cm at the midpoint between the tip of the iliac crest and the last costal margin in the back and at the umbilicus in the front, using a non-stretchable tape, at the end of normal expiration, with the subject standing erect in a relaxed position.

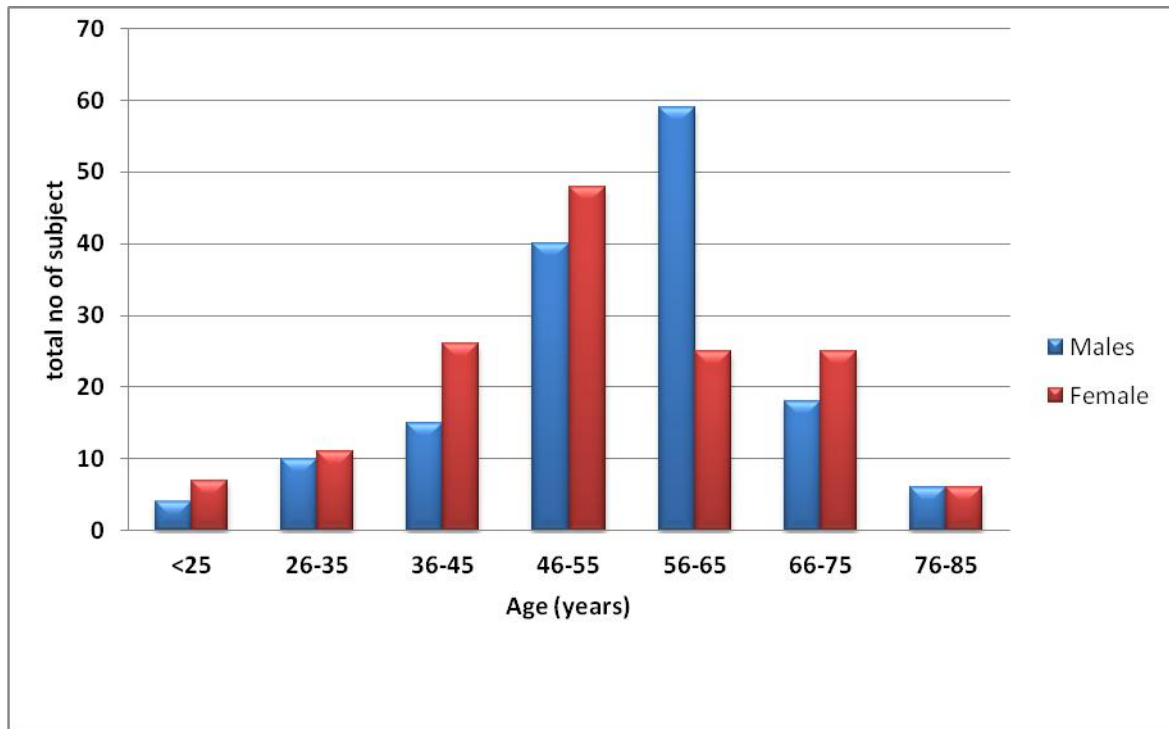
Abdominal/central obesity was considered to be present when the waist circumference was  $\geq 80$  cm in women and  $\geq 90$  cm in men.

- **Body mass index:** Body mass index was calculated using Adolphe Quetelet formulae and weight in kilograms divided by the square of the height in meters. According to WHO reported, the BMI was considered  $\leq 18.5$  as underweight, 18.5-24.99 as normal, 25.0 – 29.99 as overweight and  $\geq 30$  as obese.
- **Literacy status:** Literacy status was categorized as less than high school, high school and more than high school
- **Smokers:** Generally Smokers were considered as at least 100 cigarettes in life time and those currently smoking every day or occasional days.
- **Alcoholics:** Alcoholic consumers were defined as those who consumed  $\geq 12$  drinks a year.
- **Diet type:** Patient was enquired about diet type i.e. vegetarian or mixed vegetarian
- **Family history of diabetes:**
- Family history was enquired to know whether there is any family member who had diabetes i.e. Mother, father, and siblings. In the present study only first degree relatives were considered.
- **Blood glucose:** Blood glucose estimation of random capillary blood glucose was done only for those found to be at high risk for diabetes (IDRS  $\geq 60$ ), using a standardized digital glucometer (Accu-Check, Roche diagnostics, Germany). Participants with known diabetes were not tested for blood
- **Physical activity:** A history of physical activity of individuals was taken and this was classified as sedentary or light, moderate and severe or vigorous activity by using the World Health Organization (WHO) validated Global Physical Activity Questionnaire (GPAQ).
- **Statistical analysis:** The data was analyzed using Graph Pad Prism statistical software version 6.04 and SPSS statistical package version 22. Mean and standard deviation for continuous variables and percentage for categorical variables are reported relevant.

**Age wise distribution in study population:**

Age(years)	Males	Female	Total no of subjects	Percentage
<25	4	7	11	3.6%
26-35	10	11	21	6.6%
36-45	15	26	41	13.6%
46-55	40	48	88	29.3%
56-65	59	25	84	28%
66-75	18	25	43	14.3%
76-85	6	6	12	4%
<b>Mean</b>	<b>21.7(<math>\pm 18.8</math>SD)</b>	<b>21.1(<math>\pm 13.6</math>SD)</b>		

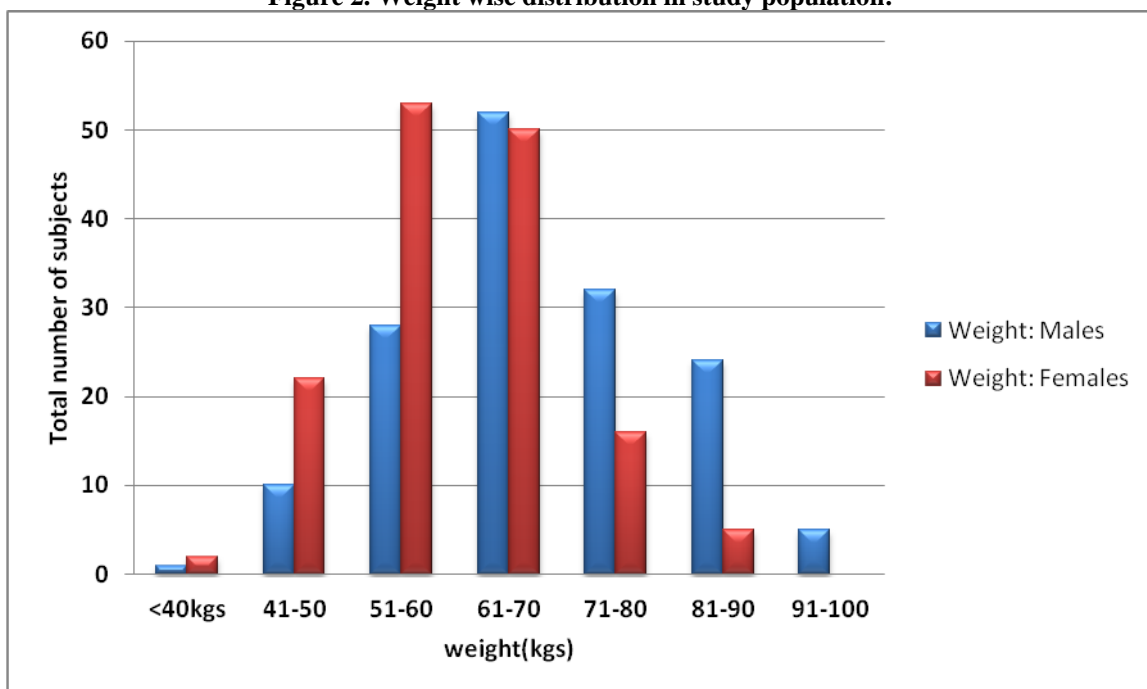
**Figure 1 : Age wise distribution in study population:**



Weight wise distribution in study population:

Weight(kgs)	Males	Females	Total no subjects	Percentage
<40	1	2	3	1%
41-50	10	22	32	10.6%
51-60	28	53	82	27%
61-70	52	50	102	34%
71-80	32	16	48	16%
81-90	24	5	29	9.6%
91-100	5	0	5	1.6%
MEAN	21.7(±16.5SD)	21.1(±20.5SD)		

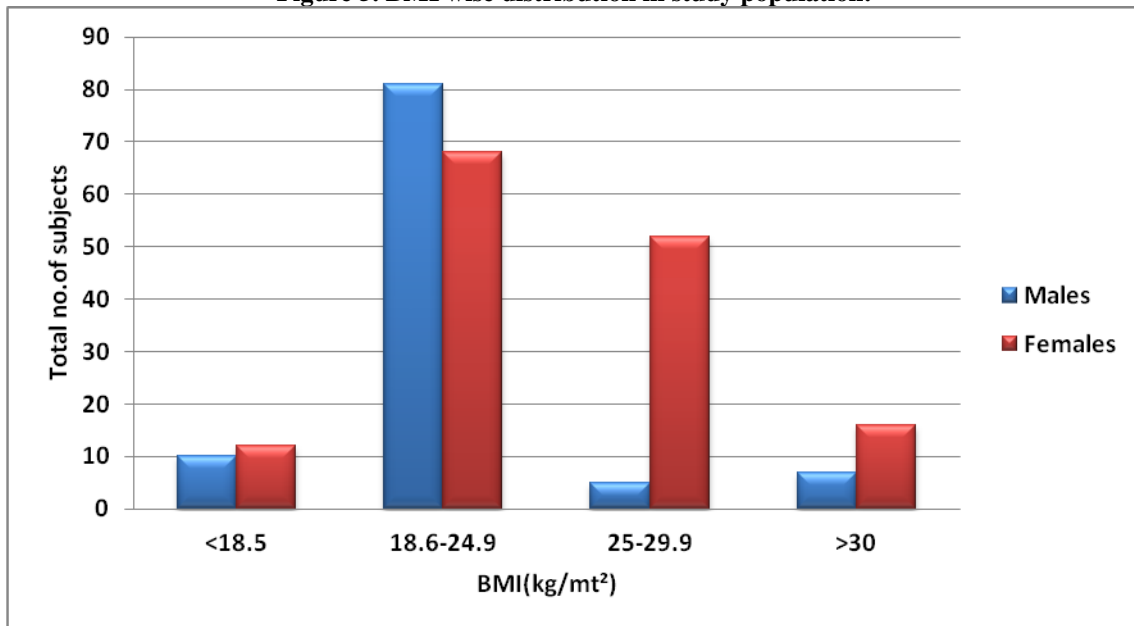
Figure 2. Weight wise distribution in study population:



BMI wise distribution in study population:

BMI(kg/mt <sup>2</sup> )	Males	Females	Total no of subjects	Percentage
<18.5	10	12	22	7.3%
18.6-24.9	81	68	149	49.6%
25-29.9	5	52	57	35.3%
>30	7	16	23	7.6%
MEAN	25.7(±31.9SD)	37(±23.7SD)		

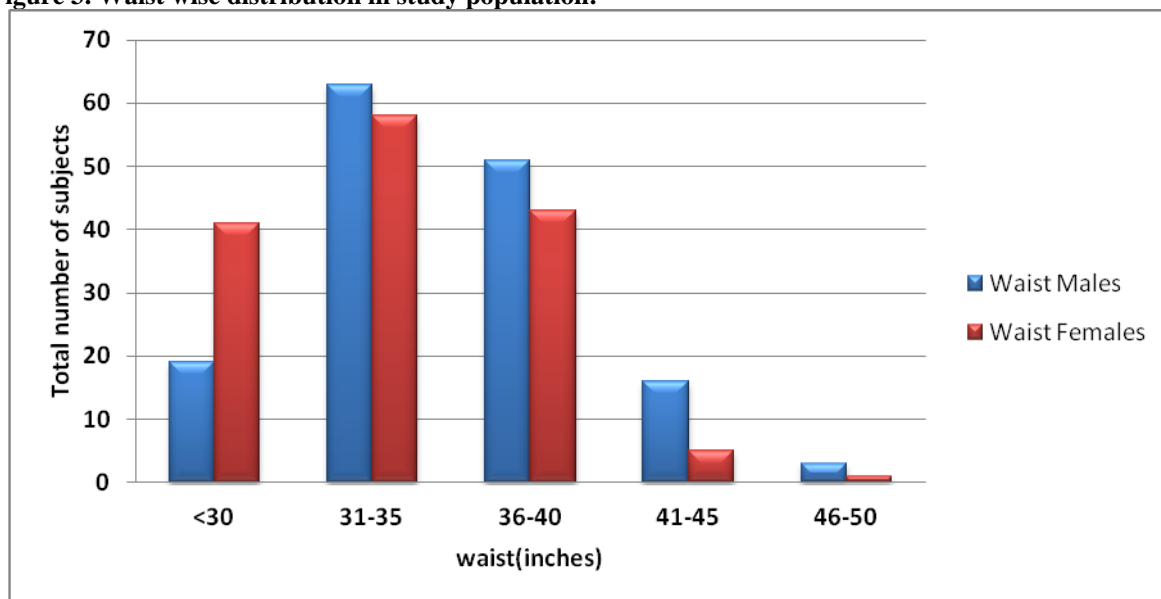
Figure 5. BMI wise distribution in study population:



Waist wise distribution in study population:

Ranges	Males	Females	Total no of subjects	Percentage
<30	19	41	60	20%
31-35	63	58	121	40.3%
36-40	51	43	94	31.3%
41-45	16	5	21	7%
46-50	3	1	4	1.3%
MEAN	30.4(±22.6SD)	29.6(±22.5SD)		

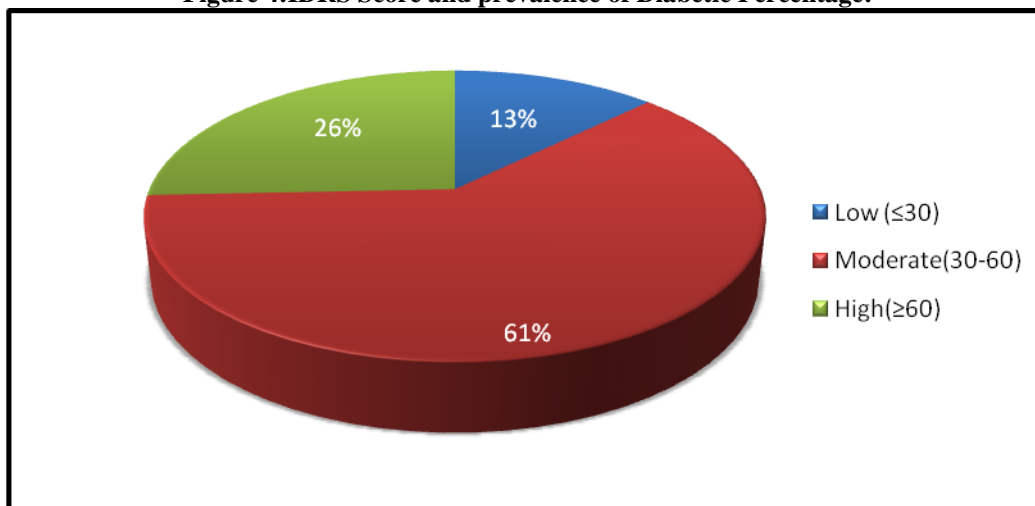
Figure 3. Waist wise distribution in study population:



IDRS Score and prevalence of Diabetic Percentage:

IDRS SCORE	No.of SUBJECTS	PERCENTAGE
Low ( $\leq 30$ )	38	12%
Moderate(30-60)	185	61.6%
High( $\geq 60$ )	77	25%

Figure 4:IDRS Score and prevalence of Diabetic Percentage:



### III. Discussion:

The Indian Diabetes Risk Score (IDRS) which was developed by Mohan V et al is a simple, reliable and inexpensive tool to identify individuals at high risk of diabetes. IDRS is most widely used tool in India which is used by most researchers in India. In this study screening for diabetes was conducted for 300 subjects >20 years of age in SCCL Hospital. IDRS comprises of four risk factors including Age, Family history of diabetes, Physical activity and Waist circumference. We studied the association of Body mass index, Dietary and other factors such as Height, Weight, and Hip ratio with IDRS in the study subjects. In Our study 300 subjects have been included, out of which about 50.6% were males and 49.3% females. Other studies also found higher prevalence among women but difference was statistically not significant. Subjects above 20 years of age are included in our study. From the above Table 29.3% out of total subjects are between 46-55 years, 28% out of total subjects are between 56-65 years,, 14.3% out of total subjects are between 66-75 years, 13.6% out of total

subjects are between 36-45 years, 6.6% out of total subjects are between 26-35 years, 4% out of total subjects are between 76-85 years, 3.6% out of total subjects are >25years.

#### **IV. Conclusion:**

This study is a prospective based observational study conducted in Singereni Collieries Company Limited Main Hospital; Kothagudem ,300 bedded multispeciality hospital attached to KLR Pharmacy College, Palvoncha. A total of 300 people both men and women were enrolled in this study.

Type 2 DM is a metabolic disease that can be prevented through lifestyle modification, diet control, control of overweight and obesity. Education of the population is still key to the control of this emerging epidemic disease. Novel drugs are being developed, yet no cure is available in sight for the disease, despite new insight into the Pathophysiology of the disease. Management should be tailored to improve the quality of life of individuals with type 2 DM.

Among the modifiable risk factors that played a substantial role are BMI, WC, physical activity and dietary pattern. If modifiable risk factors are altered, the risk-assessment score can be considerably reduced. People with high risk of DM should be referred for early intervention and changes to a healthy lifestyle and primary prevention to prevent or delay the onset of T2DM.

Prevalence of diabetes is almost equal in both men and women and it can be assessed from demographic details, BMI, WC, physical activity, family history and dietary pattern.

In this study a simple, feasible, non-invasive and convenient screening Indian Diabetic Risk Assessment (IDRS) tool that identifies individuals at risk of having T2DM has been used. The Indian diabetic risk score questionnaire designed by Madras diabetic research federation is a useful screening tool to identify unknown Type 2 diabetes mellitus. The questionnaire is reliable, valuable and easy to use screening tool which can be used in a primary care setup.

The IDRS is a simple tool used in a community-based study to detect individuals at high risk for diabetes. Non-modifiable risk factors like increasing age and family history of diabetes, and modifiable risk factors like lack of physical activity and central obesity were the most common factors found in participants who were at high risk for diabetes. Use of a cost-effective tool like the IDRS for routine screening of people aged over 35 years is advisable for identification of participants at high risk for development of diabetes. Definitive testing by oral glucose tolerance test is recommended to detect the status of diabetes in participants with a random capillary blood glucose above 110 mg/dL. Development of suitable primary and secondary preventive approaches, including lifestyle and dietary modifications, is recommended for these high-risk participants.

#### **References:**

- [1]. Ahmed A M. History of diabetes mellitus. Saudi Medicine journal, 2002; 23: 373-378.
- [2]. Patlak M. New weapons to combat an ancient disease: Treating diabetes. Federation of American Society for Experimental Biology, 2002; 16(14):1853-1857.
- [3]. Votey SR. and Peters AL. Diabetes mellitus type 2. A review, 2014; 4(40) 133-136.
- [4]. Fekadu Alemu. Prevalence of Diabetes Mellitus Disease and its Association with Level of Education Among Adult Patients Attending at Dilla Referral Hospital, Ethiopia, 2015; 6(4): 1-5.
- [5]. Wild S, Roglic G, Green a, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care, 2004; 27: 1047-1053.
- [6]. Raouf M. Afifi, Ashraf E. Saad, Ahmed Al Shehri. Prevalence and Correlates of Pre diabetes and Diabetes Results-I: A Screening Plan in a Selected Military Community in Central Saudi Arabia, 2017; 7: 12-30.
- [7]. Danaei G, Finucane MM, Lu Y, Singh GM, Cowan MJ, et al. National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies ,2011; 378: 31-40.
- [8]. Himsworth HP. Diabetes mellitus: its differentiation into insulin-sensitive and insulin-insensitive types. Lancet, Diabet Med. 2011 ;28(12):1440-4.
- [9]. Banting, F.G., C.H. Best, J.B. Collip, W.R. Campbell, and A.A. Fletcher. Pancreatic extracts in the treatment of diabetes mellitus. Preliminary report. Canadian Medical Association Journal, 1922; 145(10):1281-1286.
- [10]. Sicree R, Shaw J and Zimmet P. The Global Burden. Diabetes and Impaired Glucose Tolerance. Prevalence and Projections, 2006; 3: 16-103.
- [11]. V. Mohan, S. Sandeep, R. Deepa, B. Shah, C. Varghese. Epidemiology of type 2 diabetes: Indian scenario, 2007; 125(3), 217-230.
- [12]. Ahuja MMS. Epidemiological studies on diabetes mellitus in India, 1979: 29-38.
- [13]. Ramachandran A, Jali MV, Mohan V, Snehalatha C, Viswanathan M. High prevalence of diabetes in an urban population in south India, 1988; 297 : 587-590.
- [14]. Sridhar GR, Rao PV, Ahuja MMS. Epidemiology of diabetes and its complications. In: RSSDI textbook of diabetes mellitus. Hyderabad: Research Society for the Study of Diabetes in India; 2002; 95-112.