Estimation and Evaluation of Pre-Diabetes and Body Mass Index in Teaching and Non-Teaching Pharmacy Professionals of Nellore

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ABSTRACT

Prediabetes is the precursor stage before diabetes mellitus in which not all of the symptoms required to diagnose diabetes are present, but blood sugar is abnormally high. This stage is often referred to as the "grey area". "Prediabetes should not be viewed as a clinical entity in its own right but rather as an increased risk for diabetes and cardiovascular disease (CVD). Prediabetes is associated with obesity (especially abdominal or visceral obesity), dyslipidemia with high triglycerides and/or low HDL cholesterol, and hypertension. A prospective observational study conducted on teaching and non-teaching professionals. The study was conducted by collecting the information from the people for estimation of Prediabetes. It was a prospective observational study carried out in the Pharmacy College. In our study, the male people were 135 (54.87 %) found to be maximum and females were 111 (45.12 %) less likely present, the age group of the people carried out in our study were maximum between 37-45 that is 72 (29.26%) and minimum between 55-60 that is 18 (7.31%). Marital status showed that married were maximum of 180 (73.17%) and an unmarried minimum of were 66 (26.82 %). Employment includes teaching were found to be less 60 (24.39%), non-teaching were 75(30.48%) and Daily wise labor was found to be more 111 (45.12%)   and family history having diabetes were 190 (77.23%) not having diabetes were 56 (22.76%). Our study concluded that most of the males are having the Prediabetes range was more. Due to stress and irregular timing in food habits, family burden, and financial disturbances, if the awareness is created to the public we can eradicate further diabetes and Prediabetes symptoms and further complications of diabetes.

INTRODUCTION:

Pre-diabetes is the precursor stage before diabetes mellitus in which not all of the symptoms required to diagnose diabetes are present, but blood sugar is abnormally high. [1] This stage is often referred to as the "grey area". "Prediabetes should not be viewed as a clinical entity in its own right but rather as an increased risk for diabetes and cardiovascular disease (CVD). [2]Prediabetes is associated with obesity (especially abdominal or visceral obesity), dyslipidemia with high triglycerides and/or low HDL cholesterol, and hypertension. It is thus a metabolic diathesis or syndrome, and it usually involves no symptoms and only high blood sugar as the sole sign. Impaired fasting blood sugar and impaired glucose tolerance are two forms of Prediabetes that are similar in the clinical definition (glucose levels too high for their context) but are physiologically distinct.[3, 4] Insulin resistance, the insulin resistance syndrome (metabolic syndrome or syndrome X), and Prediabetes are closely related to one another and have overlapping aspects.[5]

Impaired fasting glycemia or impaired fasting glucose (IFG) refers to a condition in which the fasting blood glucose or the 3-month average blood glucose (A1C) is elevated above what is considered normal levels but is not high enough to be classified as diabetes mellitus. [6, 7]It is considered a pre-diabetic state, associated with insulin resistance and increased risk of cardiovascular pathology, although of lesser risk than impaired glucose tolerance (IGT). IFG sometimes progresses to type 2 diabetes mellitus. There is a 50% risk over 10 years of progressing to overt diabetes. Many newly identified IFG patient's progress to diabetes in less than three years. [8, 9] IFG is also a risk factor for mortality.

Impaired glucose tolerance (IGT) is a pre-diabetic state of dysglycemia that is associated with insulin resistance and increased risk of cardiovascular pathology. IGT may precede type 2 diabetes mellitus by many years. IGT is also a risk factor for mortality. [10]

Prediabetes develops when the body becomes insulin resistant or unable to use insulin.

Some risk factors that cause diabetes

A family history of diabetes

Cardiovascular disease

Increased triglycerides levels

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Low levels of good cholesterol (HDL)

Overweight or obesity

Elevated blood pressure

Elevated fasting plasma glucose[11]

Usually, Prediabetes is diagnosed with a blood test:

Fasting blood sugar (glucose) level of:

110 to 125 mg/dL (6.1 mM/L to 6.9 mM/L) – WHO criteria

100 to 125 mg/dL (5.6 mM/L to 6.9 mM/L) – ADA criteria

Oral Glucose Tolerance Test:

Two-hour glucose tolerance test after ingesting the standardized 75 Gm glucose solution the blood sugar level of 140 to 199 mg/dL (7.8 to 11.0 mM)

Glycated hemoglobin:

Glycated hemoglobin is between 5.7 and 6.4 percent, however, of questionable accuracy and while fasting glucose can indicate the diagnosis when positive if it is negative it is not very accurate. A 2016 review found worse outcomes when blood sugar levels were over 100 mg/dL and Glycated hemoglobin over 5.7%[12]

Screening

Fasting plasma glucose screening should begin at age 30–45 and be repeated at least every three years. Earlier and more frequent screening should be conducted in at-risk individuals. The risk factors for which are listed below:

Family history (parent or sibling)

Dyslipidaemia (triglycerides > 200 or HDL < 35)

Overweight or obesity (body mass index > 25)

History of gestational diabetes or infant born with birth weight greater than 9 lb (4 kg)

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High-risk ethnic group

Hypertension (systolic blood pressure >140 mmHg or diastolic blood pressure > 90 mmHg)

Prior to fasting blood glucose > 99

Known vascular disease

Markers of insulin resistance (PCOS, acanthosis nigricans)

There is evidence that Prediabetes is a curable disease state. Intensive weight loss and lifestyle intervention, if sustained, may improve glucose tolerance substantially and prevent progression from IGT to type 2 diabetes. [22, 24] The Diabetes Prevention Program (DPP)study found a 16% reduction in diabetes risk for every kilogram of weight loss. Reducing weight by 7% through a low-fat diet and performing 150 minutes of exercise a week is the goal. In observational studies, individuals following vegetarian diets are about half as likely to develop diabetes, compared with non-vegetarians. The ADA guidelines recommend modest weight loss (5–10% body weight), moderate-intensity exercise (30 minutes daily), and smoking cessation.[25]

MATERIALS AND METHODS:

Study procedure: A prospective observational study conducted on teaching and non-teaching professionals.

Study settings: The study was conducted by collecting the information from the people for estimation of prediabetes.

Study methods: It was a prospective observational study carried out in the Pharmacy College.

Study sites: The study was conducted in Pharmacy College in Nellore with having a minimum of 246 people.

Study procedure: Study was done by collecting information based on the American Diabetic Association (ADA) screening guidelines. Nearly considered 246 people to give their information and about health conditions and the knowledge on DM.

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Study material: consent form was collected by using self-design consent form and was made into two languages.

Ethical approval: The study was approved by the institutional ethical committee.

Data analysis: The data was analyzed by different statistical software's in which the information is analyzed by using Microsoft Excel 2007 and results are given in percentages.

RESULTS AND DISCUSSION:

RESULTS:

Table 1: Demographic details

Demographic details	No of patients	Frequency [%]
Age (yrs)		
18-27	60	24.39
28-36	72	29.26
37-45	45	18.29
46-54	51	20.73
55-60	18	73.17
Sex		
Male	135	54.87
Female	111	45.12
Marital status		
Unmarried	66	26.82
Married	180	73.17
Educational level		
Primary	13	5.28
Secondary	25	10.16
Tertiary	208	84.55
Nutritional status		
Poor	36	14.63
Average	72	29.26
Above average	48	19.51
Excellent	100	40.65
Employment		
Teaching	60	24.39
Non-Teaching	75	30.48
Daily wise labor	111	45.12
Family History		
Yes	190	77.23
No	56	22.76

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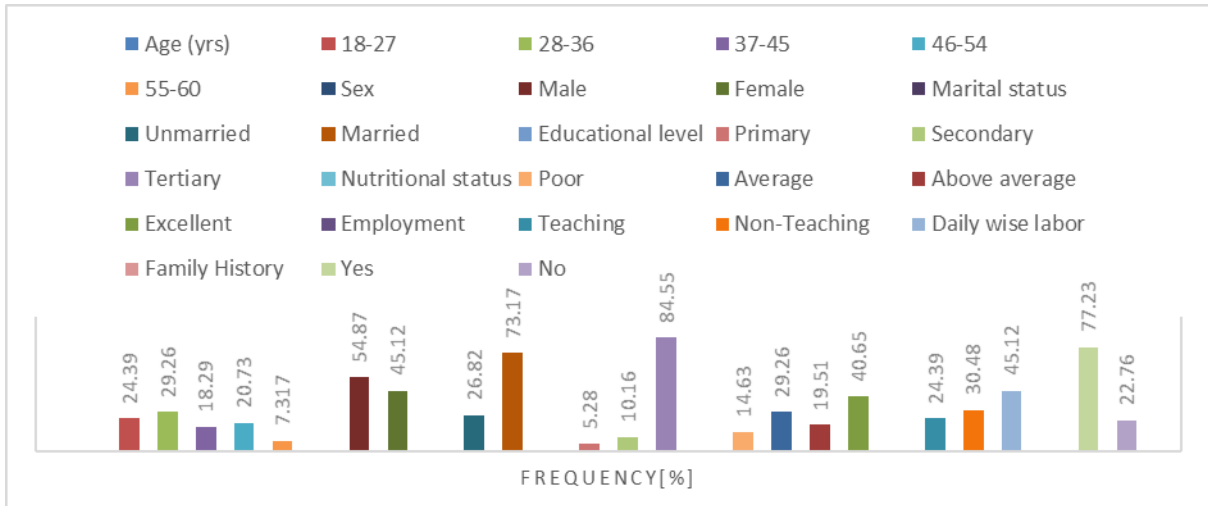
Fig. 1: Demographic details

Height and weight:

Table 2: Height and weight:

Height (cms)	No. Of people	Percentage
140 - 150	65	26.42
151 - 160	106	43.09
161 - 170	65	26.42
171 - 180	10	4.06
Weight (kg)	**No. Of people**	**Percentage**
40 - 50	45	18.29
51 - 60	50	20.32
61 - 70	55	22.36
71 - 80	44	17.89
81 - 90	40	16.26
91 - 100	12	4.88

Fig. 2: Height and weight

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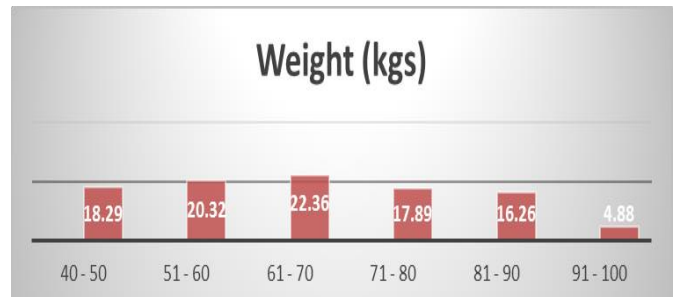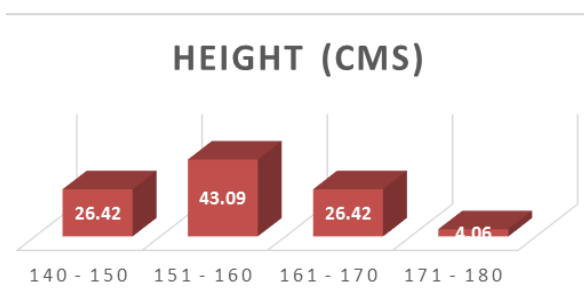**Body mass index estimation and evaluation using WHO BMI calculator**

Table 3: Body mass index

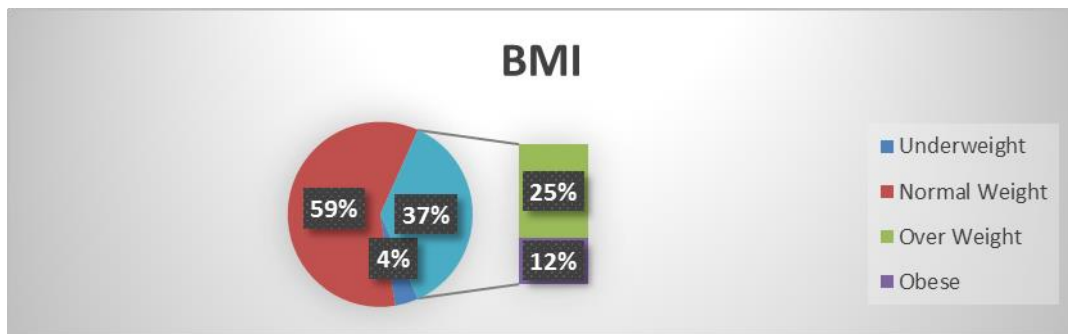| BMI Range	Underweight (Less than 18.5)	Normal weight (18.5 – 25)	overweight (25 – 30)	obese (More than 30)
No. of people	10	146	60	30
Percent of people	4.065	59.35	24.39	12.21

Fig. 3: Body mass index

Fasting blood sugar levels and OGTT readings

Table 4: Fasting blood sugar levels and OGTT readings

Fasting Blood Glucose level (ranges) (mg/dl)	No. of people	Percentage of people
<90	70	28.46
90- 100	59	23.98
>100-140	40	16.26
>140-200	30	12.19
>200-240	25	10.16
Above 240	22	8.94
OGTT (ranges) (mg/dl)	**No. of people**	**Percentage of people**
<140	160	65.04
>140-200	49	19.91
>200-250	25	10.16
Above 250	12	4.87

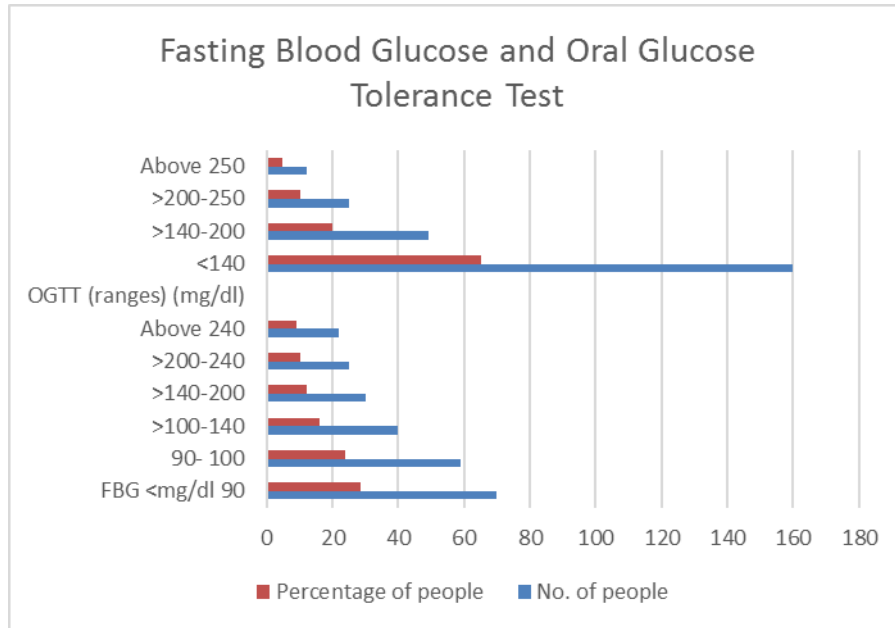*Citation: M. Queeni Sharoon et al. Ijppr.Human, 2019; Vol. 14 (2): 181-193.*

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Fig. 4: Fasting blood sugar levels and OGTT readings

Table 5: No of people with Pre-diabetes

No of people with Pre-diabetes	Percentage of people
117 fasting	47.56
86 OGTT	34.96

Fig. 5: No of people with Pre-diabetes

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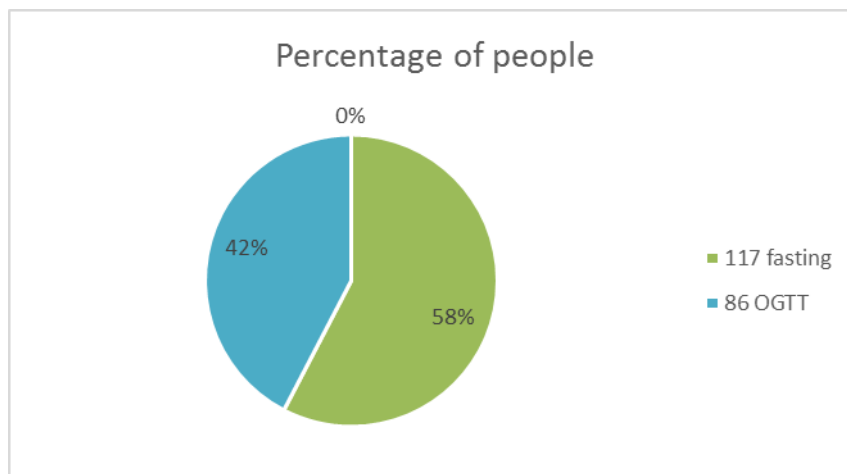
Estimation of blood pressure

Table 6: Estimation of blood pressure

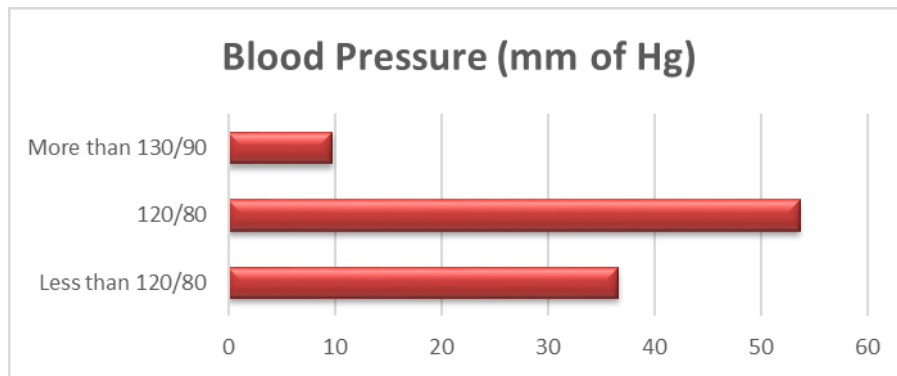| Blood Pressure range (mm of Hg)	No. of people	Percentage of People
Less than 120/80	90	36.59
120/80	132	53.66
More than 130/90	24	9.75

Fig. 6: Estimation of blood pressure

Estimation of saturation point of oxygen by normal pulse oximetry:

Table 7: Estimation of saturation point of oxygen by normal pulse oximetry

Saturation of oxygen ranges (mm of Hg)	No. of people	Percentage of People
91 - 95	104	42.28
96 - 100	142	57.72
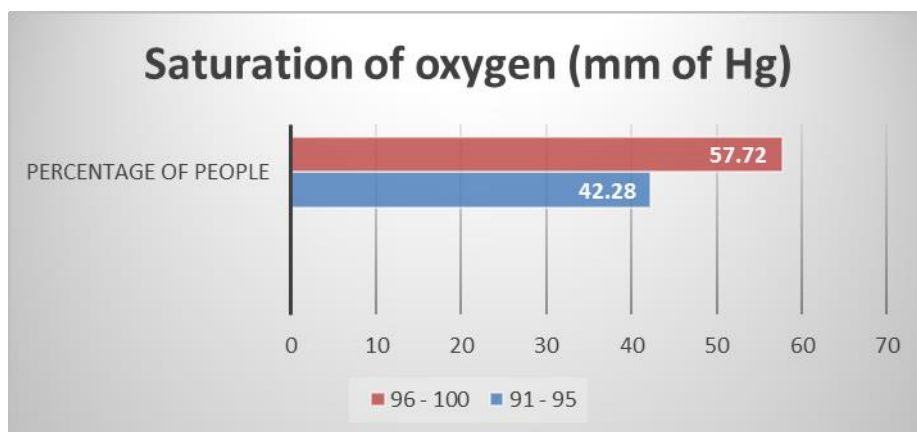
Fig. 7: Estimation of saturation point of oxygen by normal pulse oximetry

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Risk Factors for developing Pre-Diabetes:

Table 8: Risk Factors for developing Pre-Diabetes

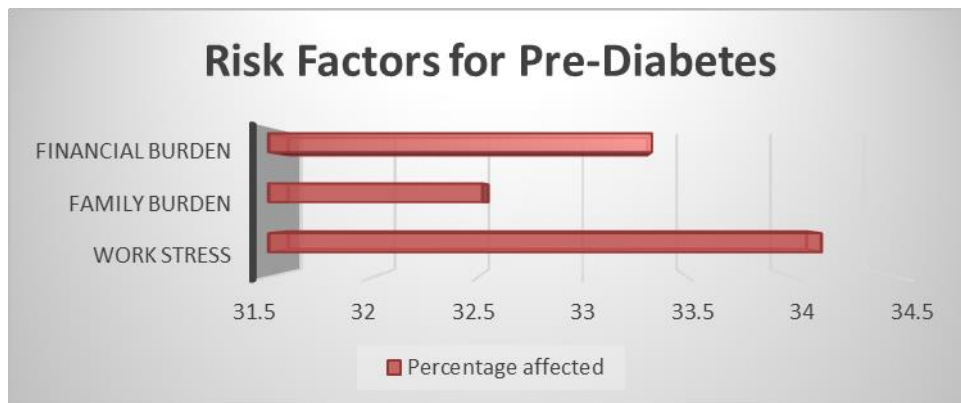| Risk Factors	No. Of people	Percentage affected
Work Stress	84	34.14
Family Burden	80	32.52
Financial Burden	82	33.33

Fig. 8: Risk Factors for developing Pre-Diabetes

DISCUSSION:

In our study, the male people were 135 (54.87 %) found to be maximum and females were 111(45.12 %) less likely present, the age group of the people carried out in our study were maximum between 37-45 that is 72 (29.26%) and minimum between 55-60 that is 18 (7.31%). Marital status showed that married were maximum of 180 (73.17%) and an unmarried minimum of were66 (26.82 %). Employment includes teaching were found to be less 60 (24.39%), non-teaching were 75(30.48%) and Daily wise labor was found to be more 111(45.12%)   and family history having diabetes were 190 (77.23%) not having diabetes were 56 (22.76%). The Maximum number of people included in the height group of 151-160 that of 106 (43.09%) and minimum in 171 – 180 were 10 (4.06%). The weight was found to be maximum in between 61-70 about 55 (22.36%) and minimum for 91-100 group about 12 (4.88%). The tertiary educational level people were more likely present that is 208 (84.55%) and primary education level people were found to be 13 (5.28%). About 100 people (40.65%) were taking excellent nutritional status, Average was 72 (29.26%) Above average was 48 (19.51%) and poor were 36 (14.63%). BMI is normal in a maximum number of people about 146 people (59.35%), 60 (24.39%) were overweight, 30 (12.21%) were obese and 10 (4.065%) were underweight. FBG results showed maximum below 90mg/dl were 70

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(28.46%) and a minimum of above 240mg/dl were 22 (8.94%). OGTT showed maximum below 140mg/dl were 160 (65.04%) and minimum in between 140-200mg/dl were 49 (19.91%). A number of people with Pre-Diabetes based on FBG were 117 (47.56%) and OGTT were 86 (34.96%). Blood Pressure found to be normal in 132 (53.66%) of people and 24 people (9.75%) showed more than 130/90 mm of Hg. The saturation point of oxygen is maximum in between 91-95 were 104 people (42.28%) and minimum in between 96-100 were 142 (57.72%). Risk factors for developing pre-diabetes found to be work stress, family burden, and financial burden were found to be nearly distributed that is 84, 80 and 82 people, with the percentage of 34.14, 32.52 and 33.33 respectively.

CONCLUSION:

Our study concluded that most of the males are having more Prediabetes range. Due to stress, irregular timing in food habits, family burden, and financial disturbances, if the awareness is created to the public we can eradicate further diabetes, Prediabetes symptoms and further complications of diabetes. We the clinical pharmacist play a major role in educating patients about the lifestyle modifications and care about the health by this we can create a better effect on the society and public.

ACKNOWLEDGMENT:

CONFLICT OF INTEREST: Yes.

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