

Secular trends in prevalence of diabetes, prediabetes and its association with lifestyle factors in a rural south Indian population

Presenter: Lakshmi Karthikeyan



Study Supervisors:

[Madras Diabetes Research Foundation, India](#)

Dr.R.Guha Pradeepa, Dr.R.M.Anjana and Dr.V.Mohan

[University of Dundee, Scotland](#)

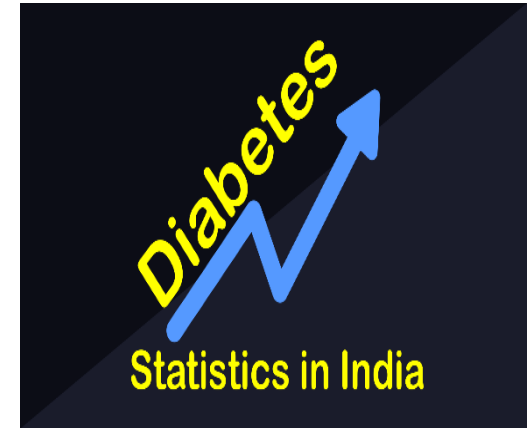
Prof.Colin Palmer

Registered at:
University of Madras,
Chennai, India

Study period:
2019- 2023

BACKGROUND OF THE STUDY

- The IDF estimates, around 463 million people (20-79 yrs) had diabetes (DM) and 373.9 million had IGT in 2019 and this is expected to rise to 700 million and 548.4 million by 2045. (IDF, 2019)
- India has a large rural population (>70%) and the prevalence of diabetes in rural areas is rising rapidly. The **ICMR-INDIAB** study reported the prevalence of diabetes in rural areas based on 15 states of India is 5.2% (Anjana et al., 2017)
- The **ICMR-INDIAB** study also reported that the ratio of undiagnosed to diagnosed diabetes is higher in rural areas compared to the urban areas.



COUNTRY DIABETES REPORT

Select country data by click on the map or select from the search box.

Select country...



Prevalence of Diabetes in rural areas

Study	Year	Prevalence %
The Prevalence of Diabetes in India Study (PODIS)- Sadikot et al., 2004	2004	2.7 %
The WHO-ICMR NCD Risk Factor Surveillance Study Mohan et al., 2008	2005	3.1%
The ICMR-INDIAB study (Anjana et al., 2017)	2017	5.2%



OBJECTIVES

1. To study the secular trends in the prevalence of diabetes and pre-diabetes in a rural south Indian population.
2. To evaluate the factors contributing to the burden of diabetes among rural Indians.
3. To identify the real -life challenges in the screening for diabetes and its complications in a rural setting.
4. To study the perceptions about diabetes prevention and control through focus group discussions among the rural population.

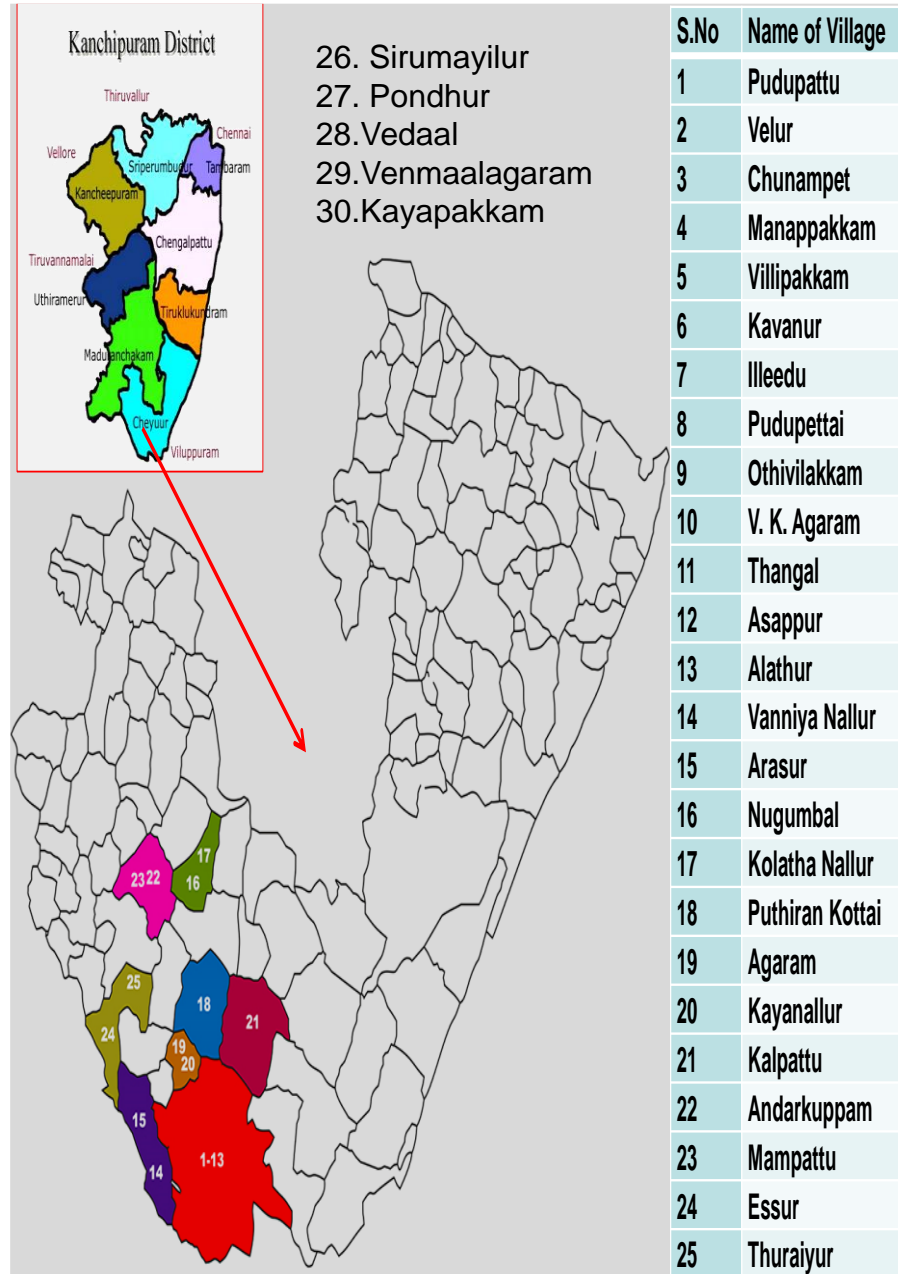
STUDY METHODOLOGY

Study Design- Population based cross-sectional study with mixed –method approaches (Quantitative and Qualitative)

Sample size-Total population of 30 villages consists of approximately 29,000 -30,000 individuals. Assuming that 50% would be adult population and hence 15,000 individuals will be surveyed.

Study Area: 30 selected villages in Kancheepuram and Chengalpet districts of Tamil Nadu state in southern India

Study Duration: 3 years (2018-2021)



TREND RECRUITMENT UPDATE

Nov' 2018 – March' 2021



FIELD ACTIVITIES IN TREND

Data collection & Clinical assessment



TREND study update Nov 28th '2018- Mar 20th'2020

SURVEY RESULTS (29 villages)

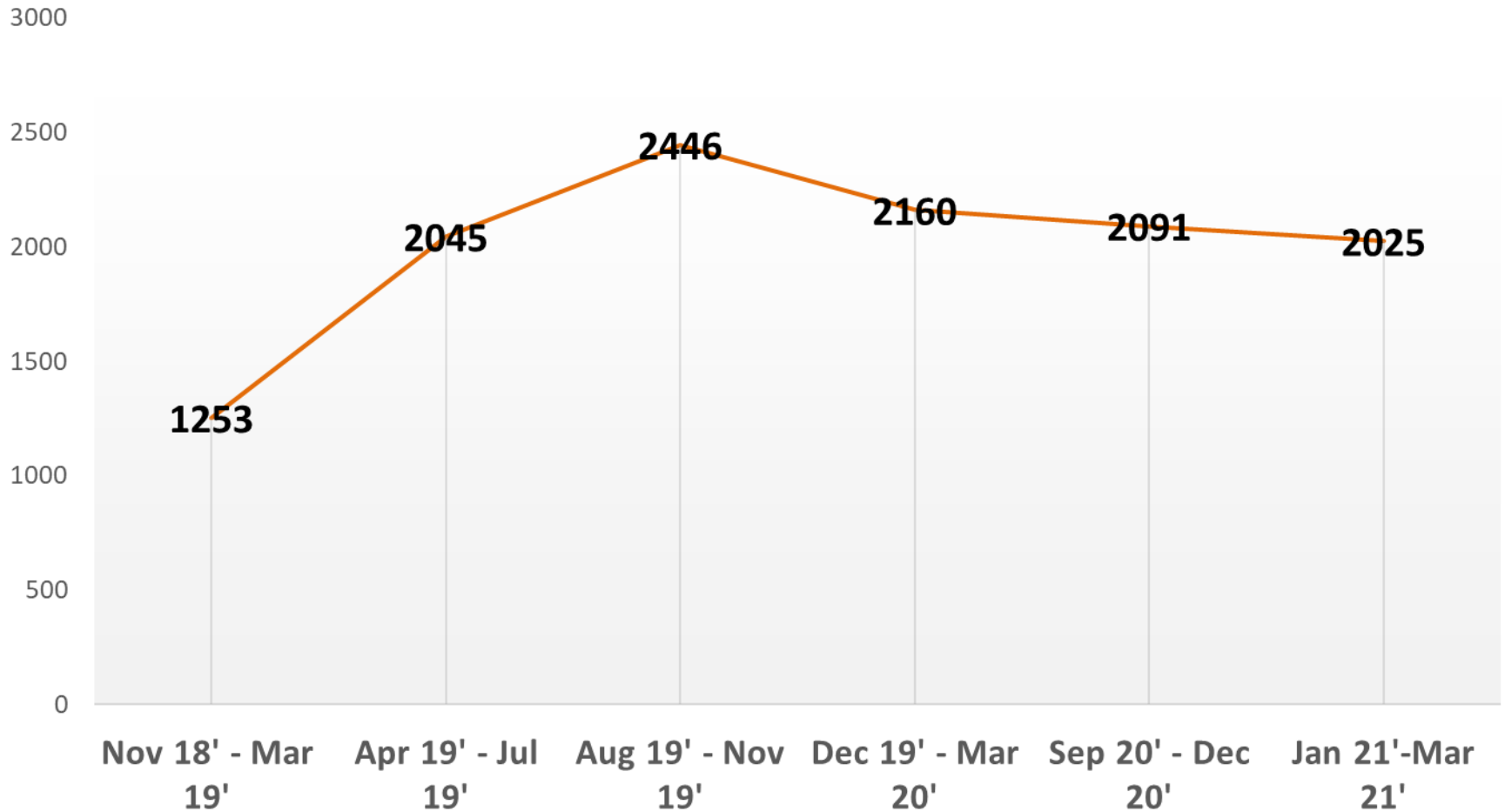
Eligible (n)	16074
Survey completed n(%)	13,174 (82%)
Response for blood samples (n)	12,020 (91%)

DIABETES STATUS (n=1655)

Self reported diabetes (n)	1158/12020 (9.7%)
Newly diagnosed diabetes (n)	497/12020 (4.1%)
Overall	1655 (13.8%)

TREND RECRUITMENT STATUS (Nov' 2018 to Mar' 2021)

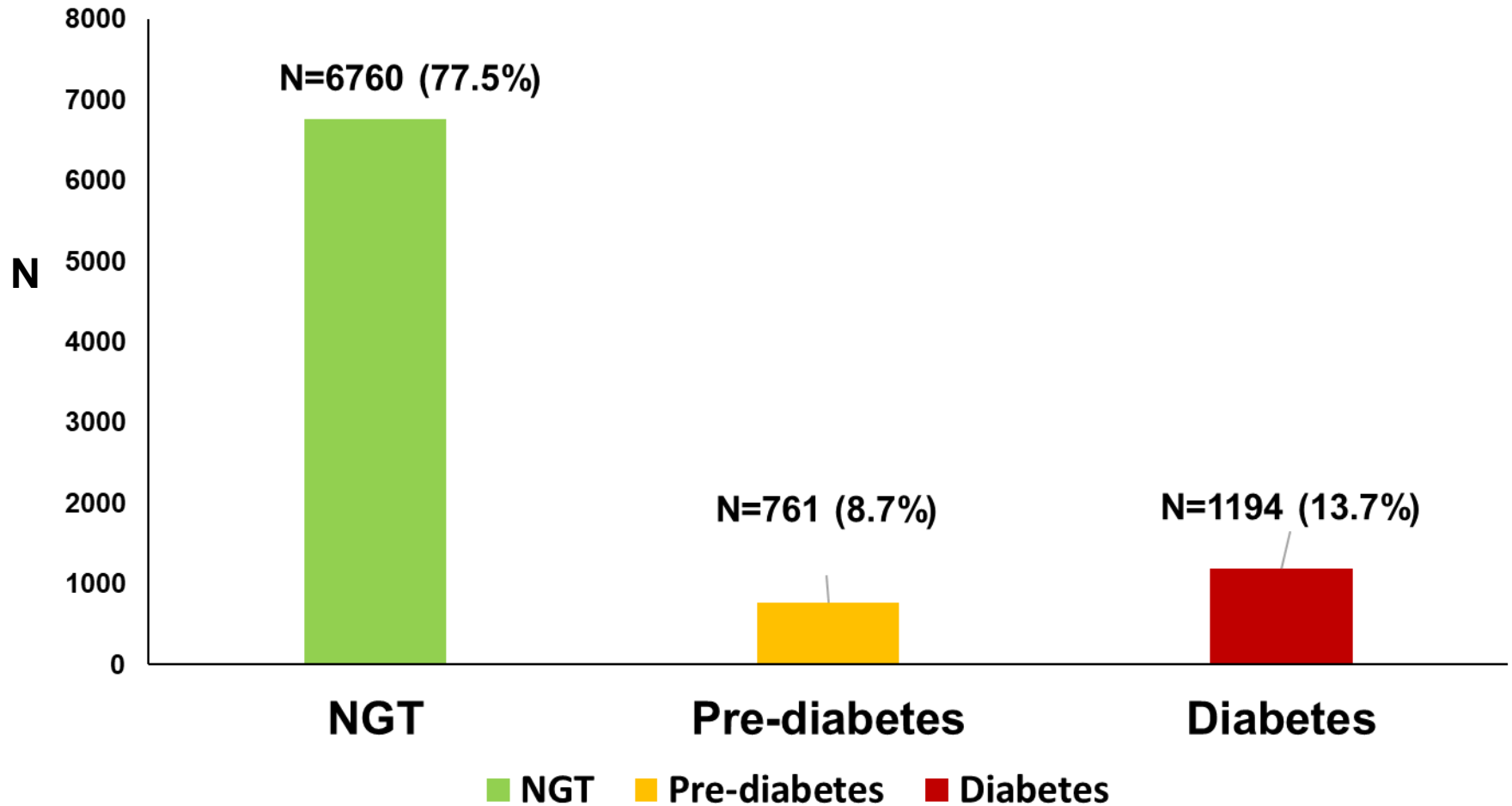
N=12020



Interim Results

Interim analysis was performed for N=9582 (Data) & N=8715 (with Blood samples)

TREND study population distribution based on glycemic status (n=8715)



Phenotype details of the TREND study individuals (N=9582)

Variables	<u>Male (n=4078)</u> Mean \pm SD	<u>Female (n=5504)</u> Mean \pm SD	Overall (N=9582) Mean \pm SD
Age (yrs)	44 \pm 16*	43 \pm 14*	44 \pm 15
Waist (cms)	85 \pm 11	81 \pm 12	83 \pm 12
BMI	23 \pm 4.1*	24 \pm 4.8*	23 \pm 4.6
Body fat (%)	21 \pm 6.9*	34 \pm 8.2*	29 \pm 10.1
Systolic Blood Pressure (mm Hg)	128 \pm 17*	122 \pm 18*	125 \pm 17
Diastolic Blood Pressure (mm Hg)	79 \pm 11*	75 \pm 10*	77 \pm 11

*p<0.05

Biochemical characteristics of the TREND study individuals (n=8715)

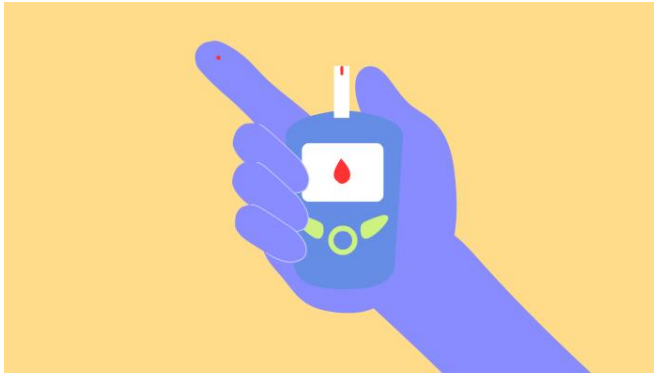
Variables	NGT Mean \pm SD (n=6760)	Pre-Diabetes (IFG/IGT or IFG+IGT) Mean \pm SD (n=761)	Self reported /Newly diagnosed diabetes Mean \pm SD (n=1194)
Age	41.4 \pm 14.6	47.4 \pm 13.6	52.8 \pm 12.3
BMI	22.8 \pm 4.4*	24.7 \pm 4.8*	25.4 \pm 4.4*
FBS (mg/dL)	82 \pm 10.1*	98.4 \pm 14.9*	167 \pm 80.1*
PGBS(mg/dL)	97 \pm 18.2*	149.9 \pm 27.8*	289 \pm 100.5*
HbA1c (%)	-		8.8 \pm 2.5

*p<0.05

Study 1

To study the secular trends in the prevalence of diabetes and pre-diabetes in a rural south Indian population.

Secular trends will be obtained by comparing the prevalence rates of diabetes and prediabetes from the Telemedicine Project For Screening Diabetes And its Complications in Rural Tamil nadu (TREND) Project (2020) with the CRDPP-Chunampet Rural Diabetes Prevention Project conducted earlier in 2010.

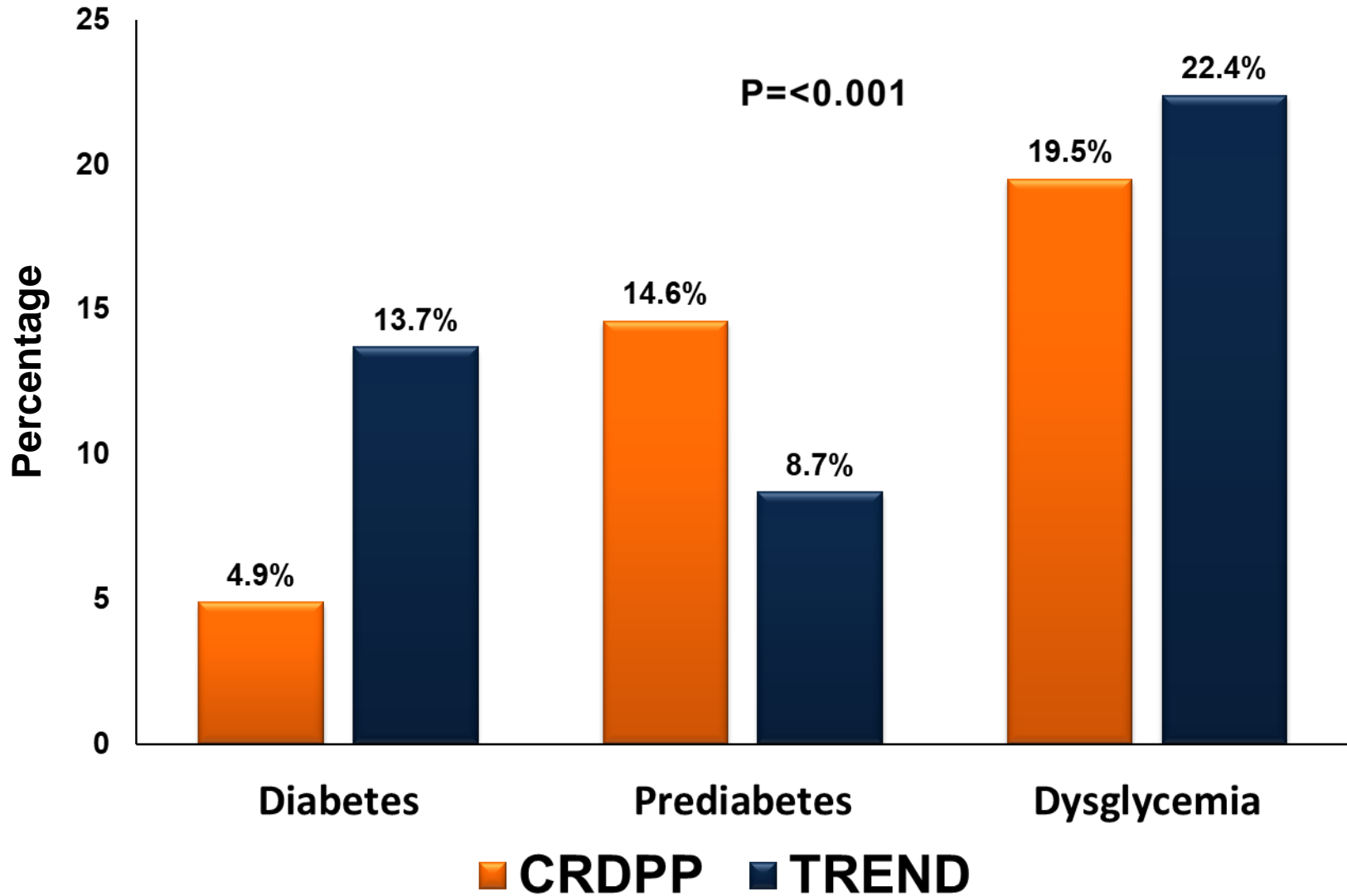


Trends in
prevalence of
diabetes and
prediabetes

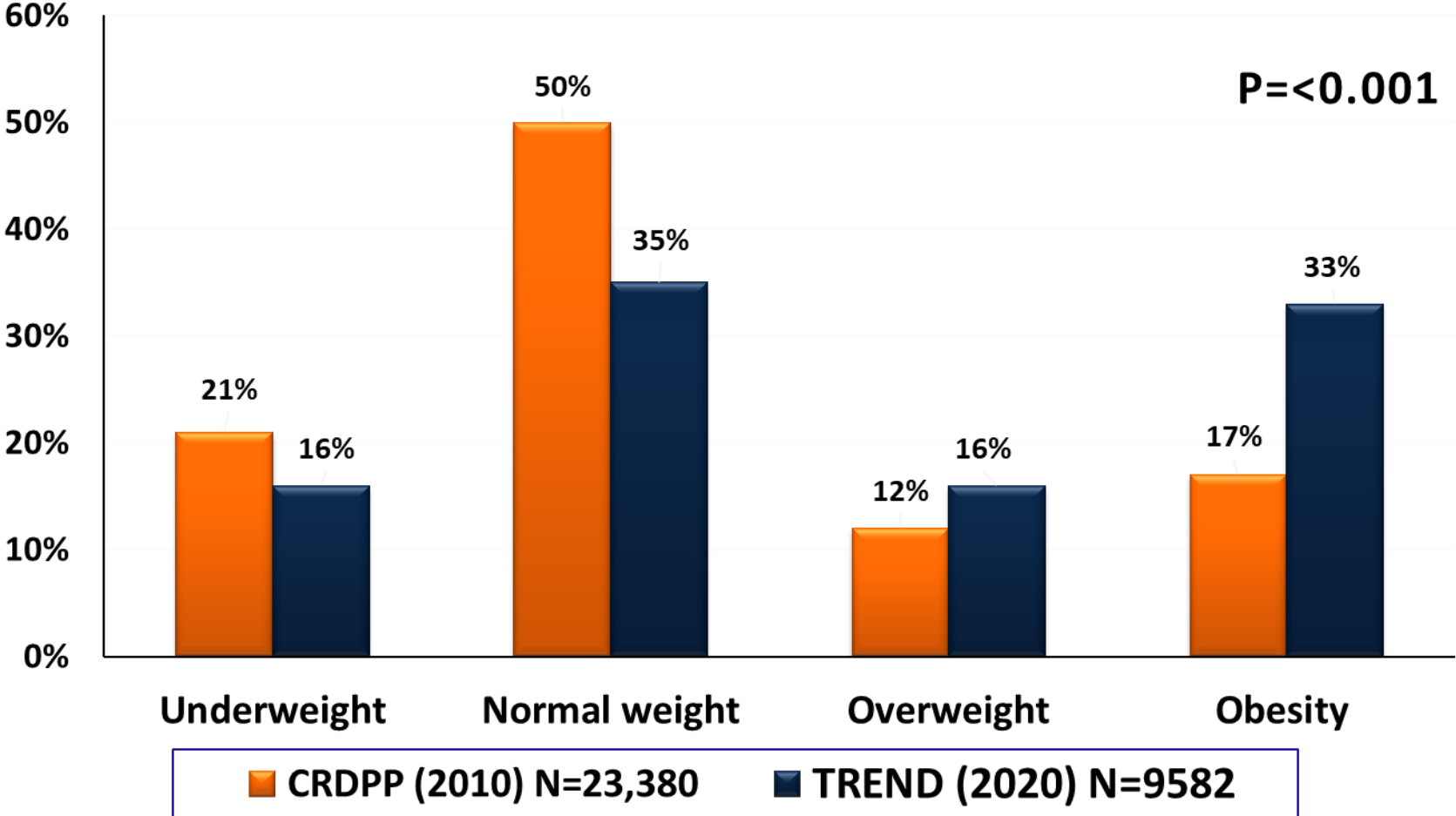


Trends in
prevalence of
Obesity

Prevalence of Diabetes in rural south India before (CRDPP) and after 10 years (TREND)



Prevalence of Obesity in rural south India before (CRDPP) and after 10 years (TREND)



Underweight : BMI <math>< 18.5 \text{ kg/m}^2</math>; Normal weight: BMI 18.5-22.9 $\text{kg/m}^2</math>; Overweight: BMI 23- 24.9 $\text{kg/m}^2</math>; Generalized obesity: BMI $\geq 25 \text{ kg/m}^2$ (Asia-Pacific guidelines)$$

STUDY 2

- To evaluate the factors contributing to the burden of diabetes among rural Indians.



❖ Questionnaire

Household details: Demography, migration, medical history, behaviour changes, diet, physical activity, perception & knowledge

❖ Anthropometric measurements

Height, Weight, Body fat, Waist circumference

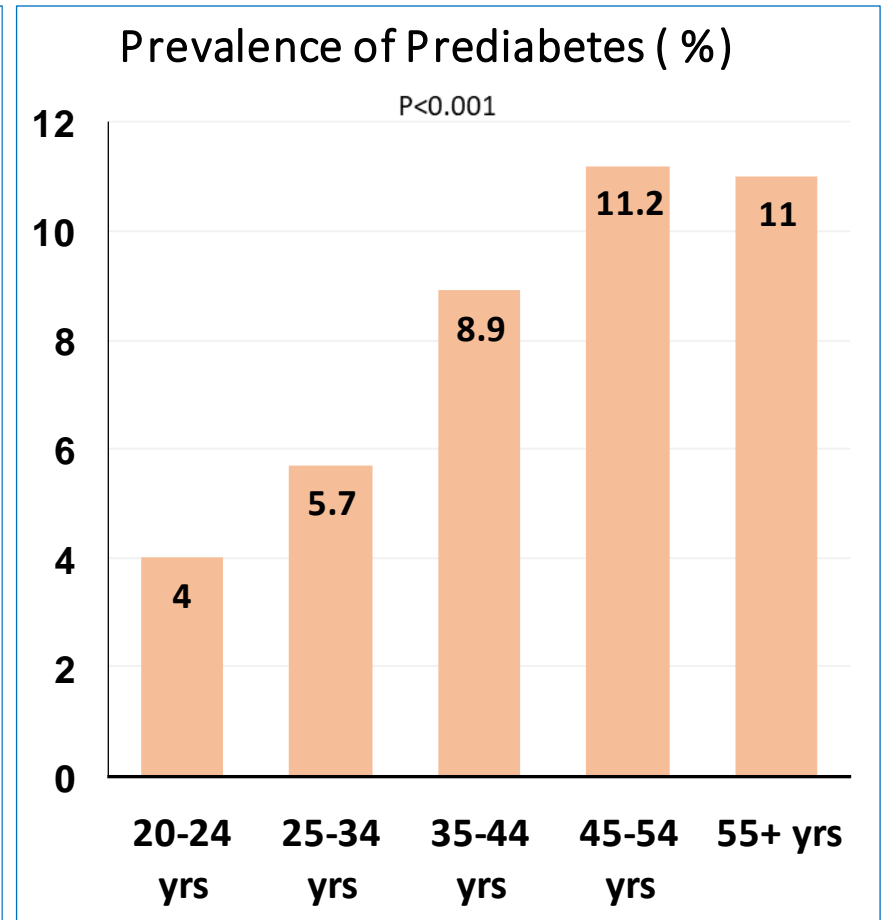
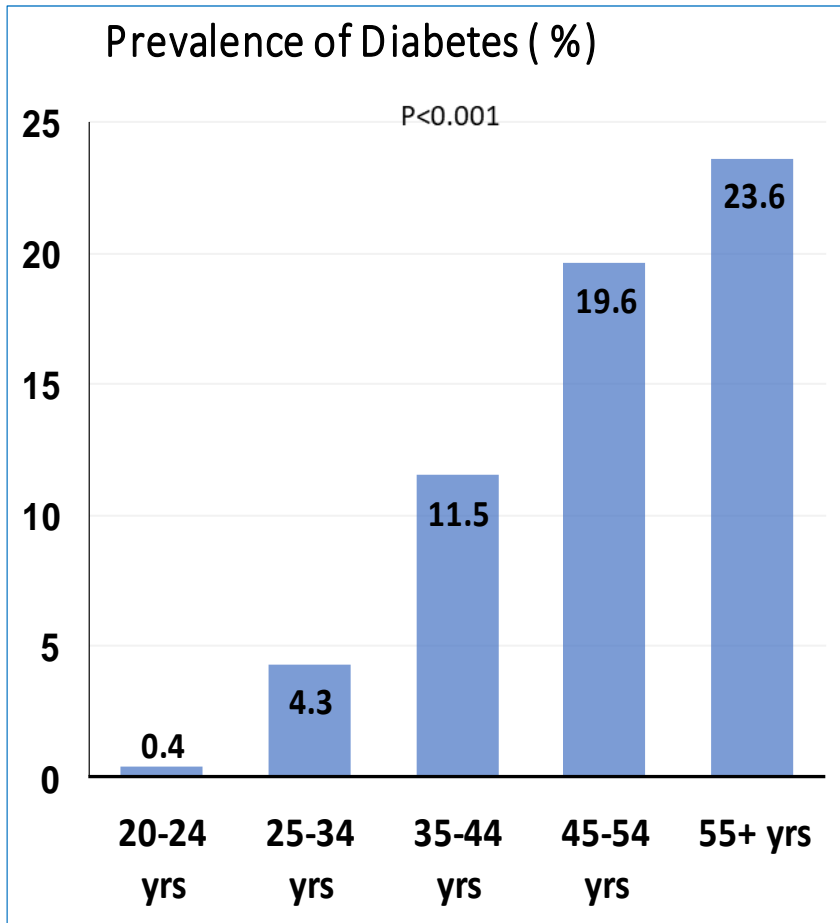
❖ Clinical measurements

Blood pressure

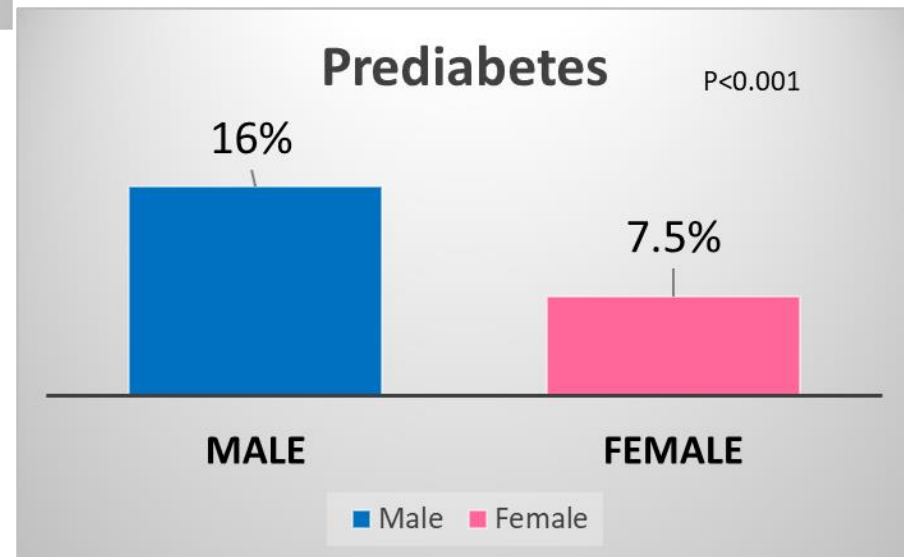
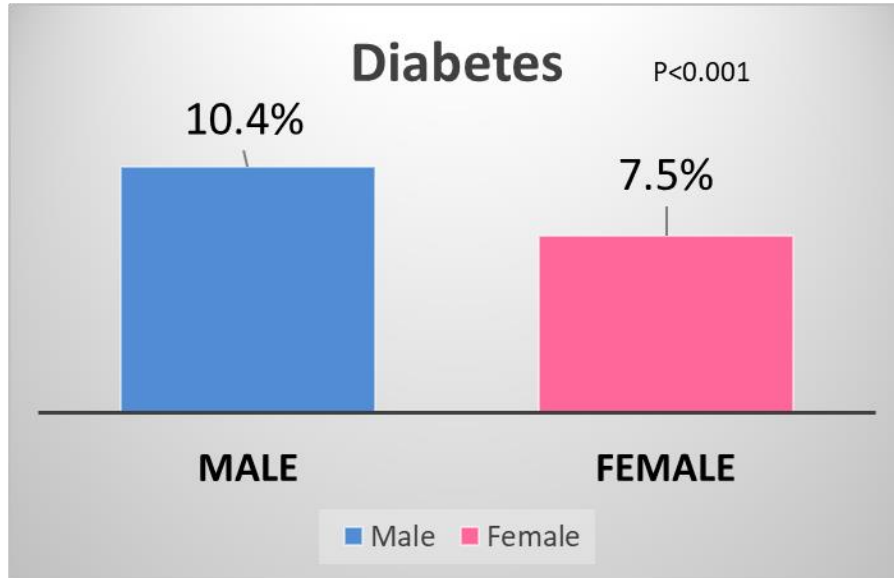
❖ Biochemical assays

Venous Fasting blood glucose and, 2hr blood glucose [post glucose load - excluding self-reported diabetic individuals]

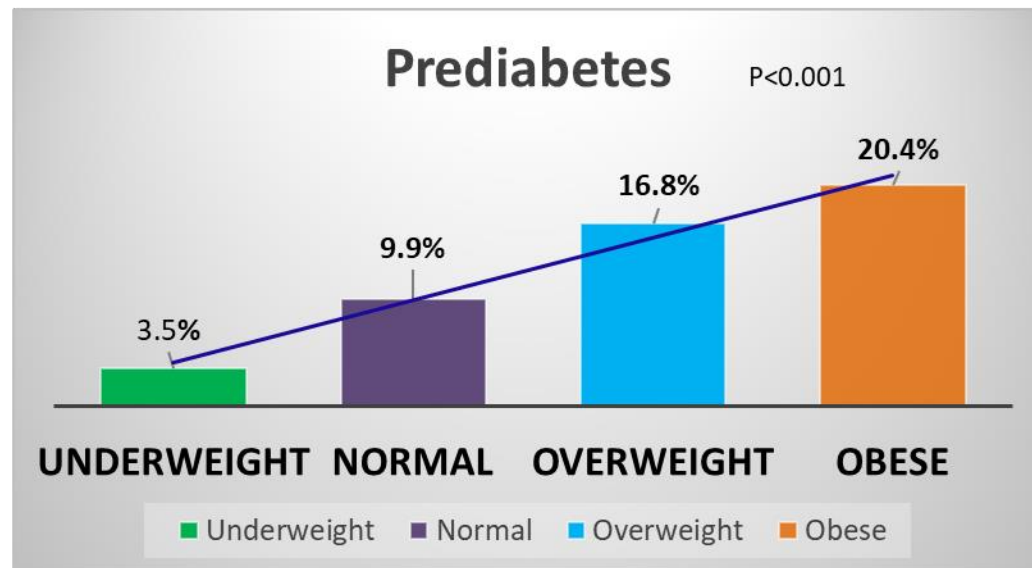
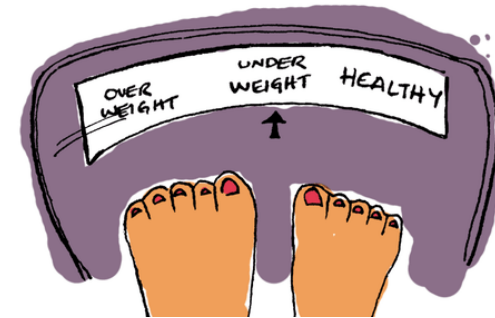
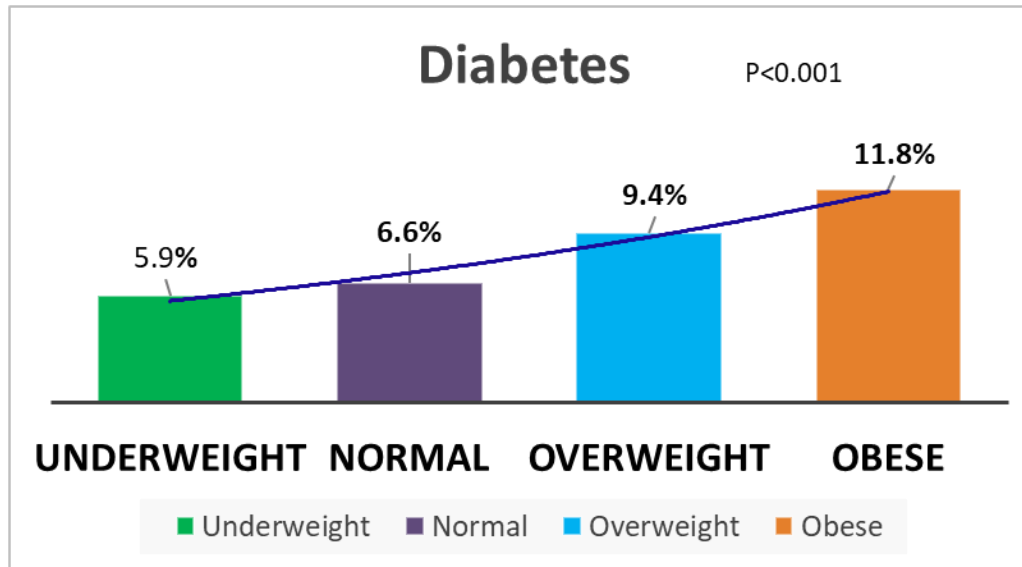
Age-wise prevalence of diabetes (n=8715)



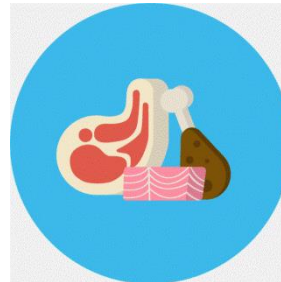
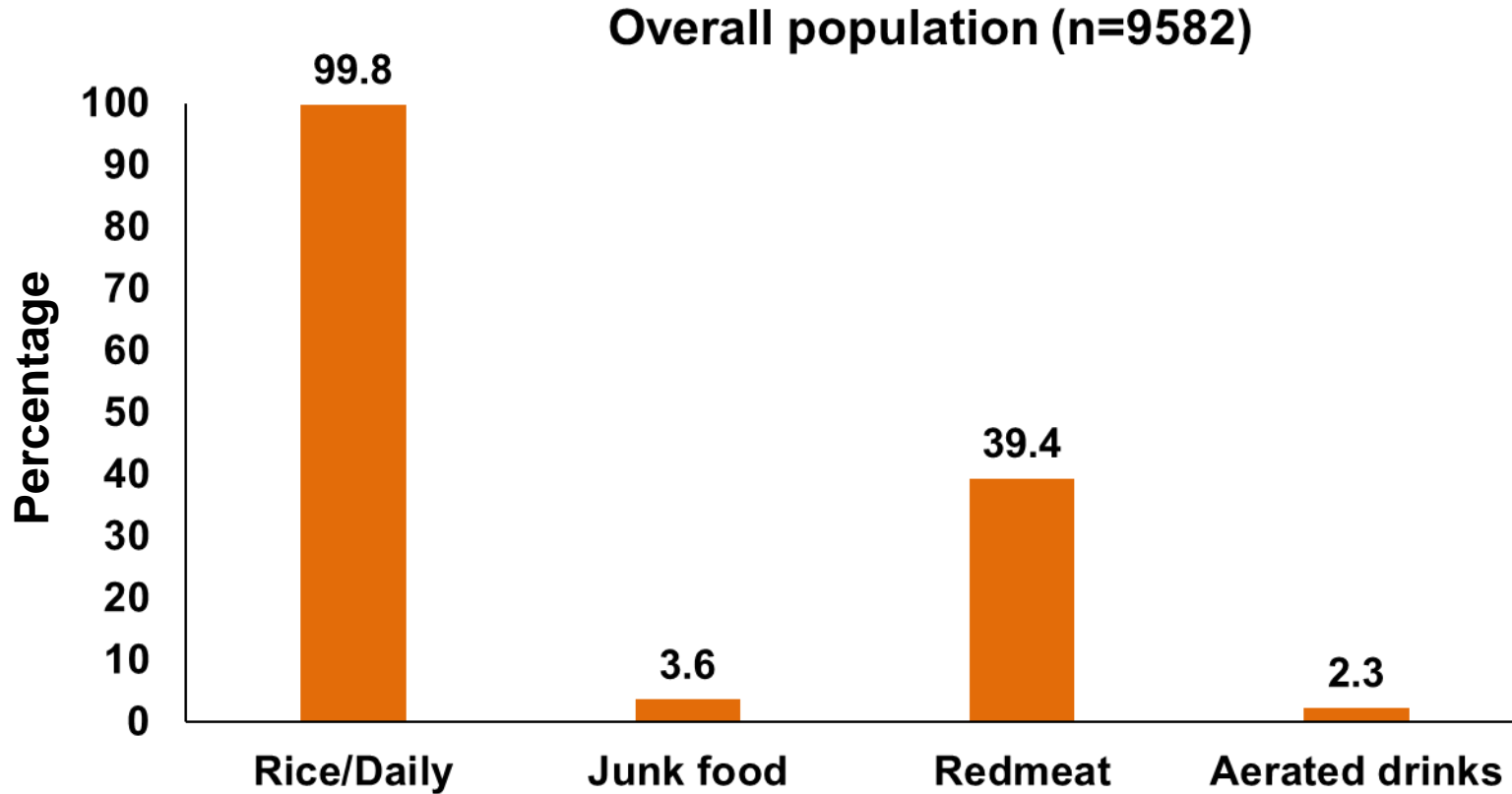
Gender-wise prevalence of diabetes (n=8715)



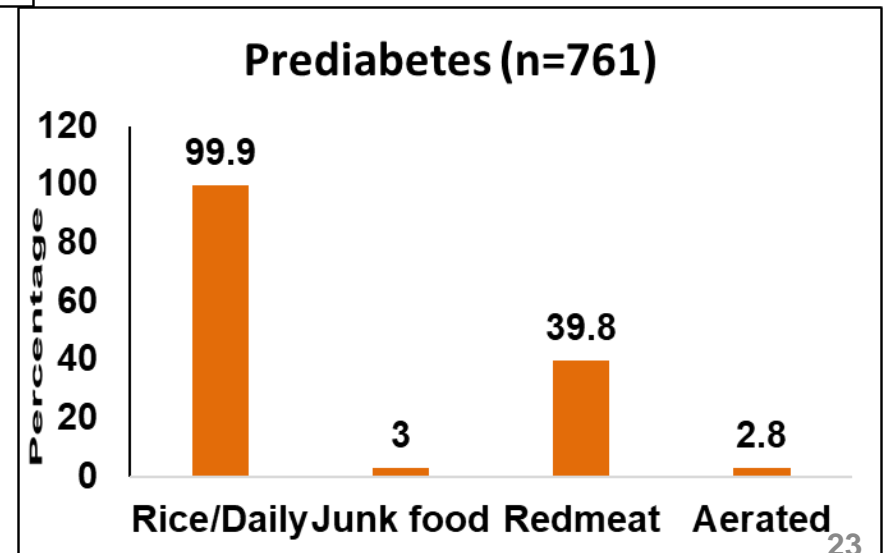
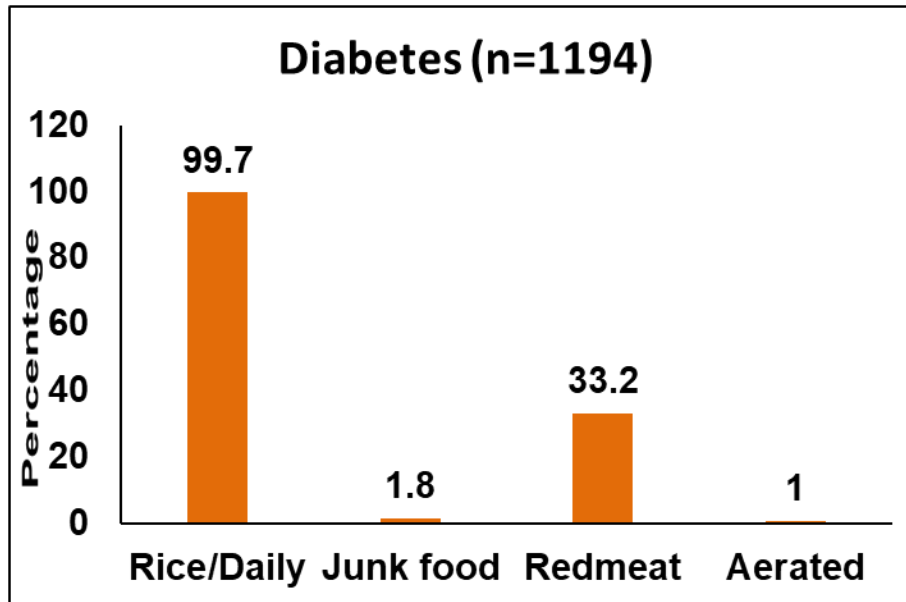
BMI-wise prevalence of diabetes (n=8715)



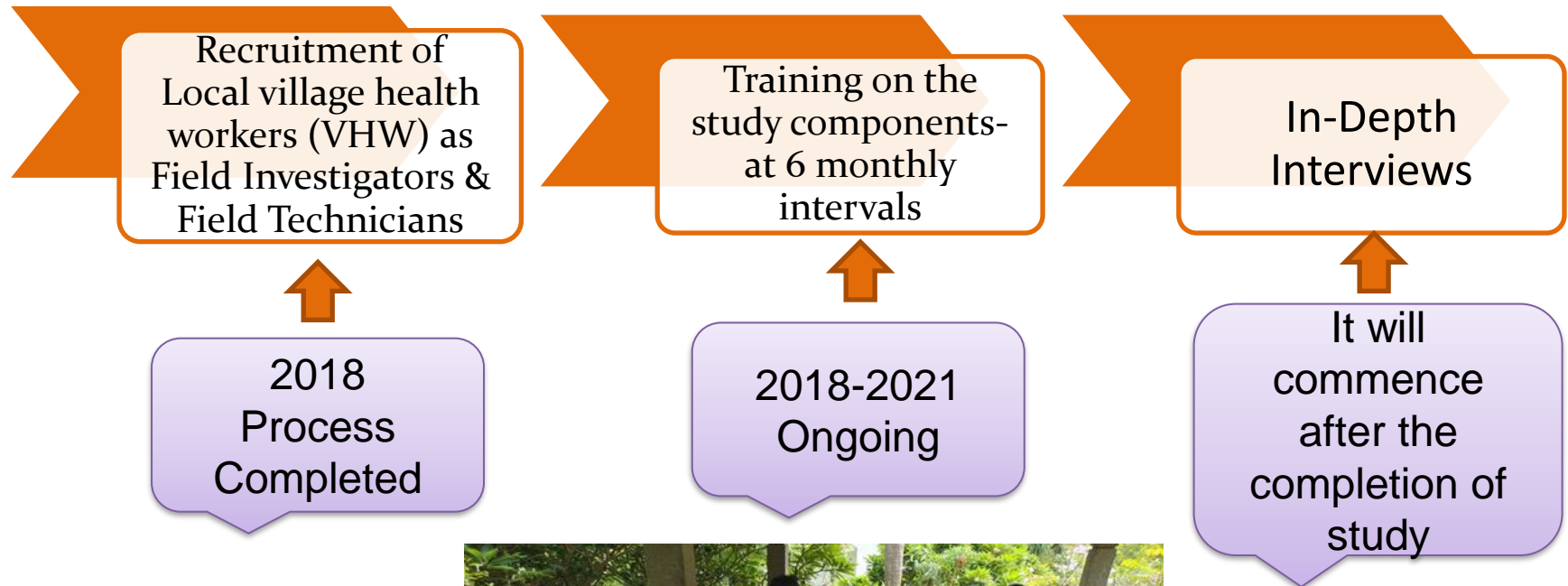
Dietary pattern of the study population (Weekly)



Dietary pattern among individuals with diabetes/prediabetes



STUDY 3-To identify the real -life challenges in the screening for diabetes and its complications in a rural setting



Strategies followed to improve recruitment status

1. Screening camps at Government Co-operative societies and Public distribution systems



2. Door-to-door reconvincing of non-respondents



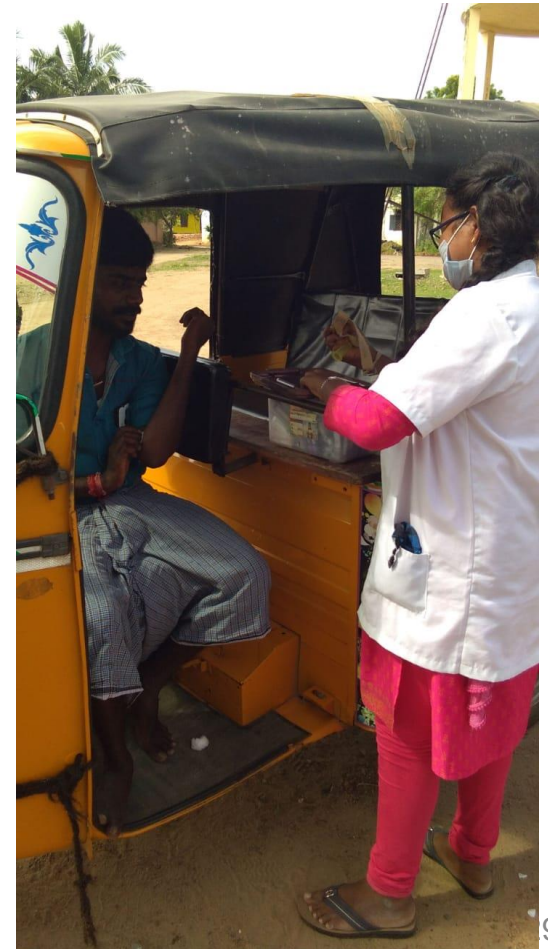
3. Public awareness talks



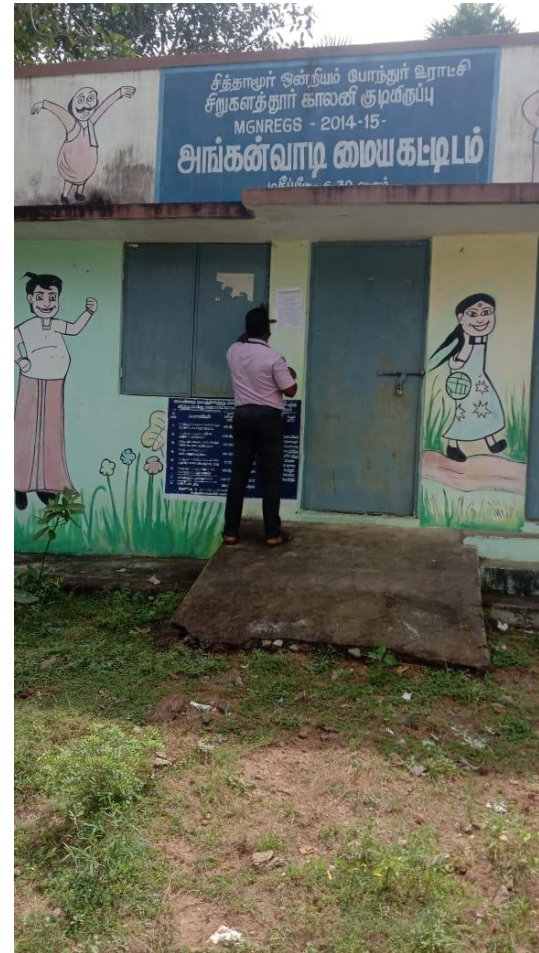
4. Seeking support from local village heads



5. Collecting blood samples at individual's convenient work places



6. Sticking permission notices of screening from local village head at common places



Periodic team meeting



Team meeting with field investigators and field technicians



Quality checks



STUDY 4-To study the perceptions about diabetes prevention and control through focus group discussion among the rural population.



Development of interview guide for focus group discussion



Focus group discussion will be conducted (10 to 12 groups) in selected Diabetes and Prediabetes individuals until the discussion reaches a saturation point



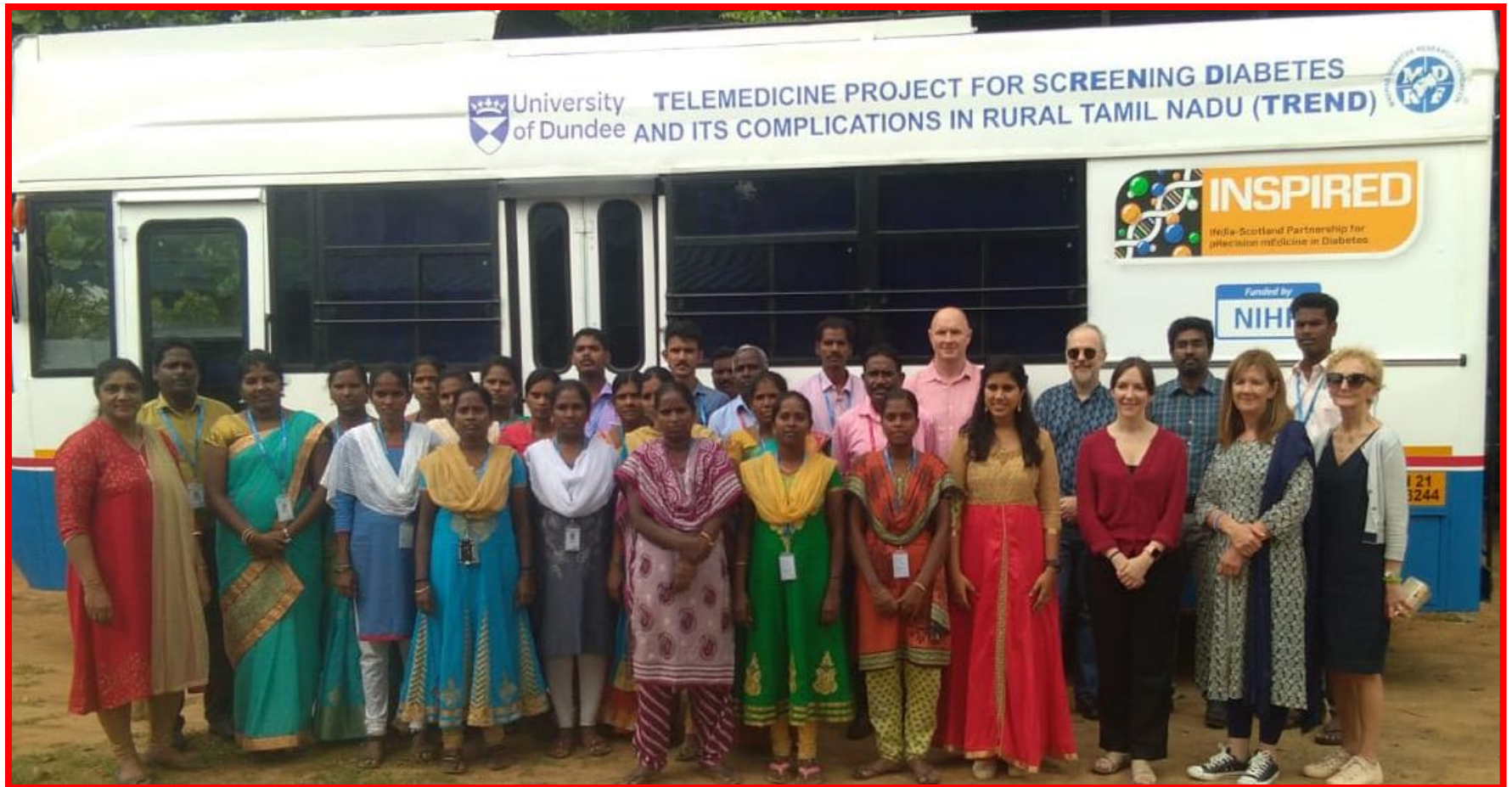
A qualitative Data will be collected, transcribed , coded and analyzed to study the perceptions about diabetes prevention and control.

It will commence after the completion of study recruitment

Future timelines

- To write a review titled “A review on the prevalence of prediabetes and diabetes among rural Indian population”-
In preparation
- To publish a study methodology paper-In preparation
- To develop structured interview guide for Study 3
- To develop structured focus group discussion guides for Study 4

TREND TEAM



THANK YOU