

A Dissertation on

**A COMPARATIVE CROSS-SECTIONAL STUDY ON SELF-CARE PRACTICES AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN RURAL AND URBAN AREAS IN SALEM DISTRICT, TAMILNADU**

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In partial fulfilment of the regulations

For the award of the Degree of

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**THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY  
CHENNAI, TAMIL NADU.**

**MAY – 2020**

## **CERTIFICATE**

This is to certify that dissertation titled “**A COMPARATIVE CROSS-SECTIONAL STUDY ON SELF-CARE PRACTICES AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN RURAL AND URBAN AREAS IN SALEM DISTRICT, TAMILNADU**” is a bonafide work carried out by **Dr P.V.SHARMILA**, Post Graduate Student in the Department of Community Medicine, Government Stanley Medical College, Chennai- 600 001, under the guidance of **Dr. P. SEENIVASAN, M.D**, towards partial fulfilment of the requirements for the degree of M.D. Branch XV Community Medicine and is being submitted to the Tamil Nadu Dr.M.G.R Medical University, Chennai

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## **DECLARATION**

I, solemnly declare that the dissertation titled “**A COMPARATIVE CROSS-SECTIONAL STUDY ON SELF-CARE PRACTICES AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN RURAL AND URBAN AREAS IN SALEM DISTRICT, TAMILNADU**” was done by me under the guidance and supervision of **Dr.P.SEENIVASAN M.D.**, Professor and Head Department of Community Medicine, Government Stanley Medical College, Chennai-01. The dissertation is submitted to The Tamilnadu Dr.M.G.R. Medical University, Chennai towards partial fulfilment of the requirement for the award of M.D. degree (Branch XV) Community Medicine.

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## **ABBREVIATIONS**

CVD	-	Cardio-vascular disease
DR	-	Diabetic Retinopathy
FSSAI	-	Food Safety and Standards Authority of India.
HbA1c	-	Haemoglobin A1C
HSC	-	Health Sub-Centre
HUD	-	Health Unit District
IDF	-	International Diabetes Federation
NCD	-	Non-Communicable Disease
NPCDCS	-	National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular disease and Stroke
NFHS	-	National Family Health Survey
NHM	-	National Health Mission
OHA	-	Oral Hypoglycaemic Agents
PHC	-	Primary Health Centre
SDSCA	-	Summary of Diabetes Self-Care Activities Measure
SD	-	Standard Deviation
SEA	-	South-East Asia
SPSS	-	Statistical Package for Social Science
TN	-	Tamil Nadu
WHO	-	World Health Organization



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## 1. INTRODUCTION

In the era of evidence-based medicine, the World is witnessing the transition of mortality rates from communicable disease to non-communicable disease <sup>1</sup>. Non-communicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and they result from combination of genetic, physiological, environmental and behavioral factors <sup>2</sup>.

Non-communicable diseases are collectively responsible for almost 70% of deaths worldwide. 82% of pre-mature death or death before age of 70 years occurring in low- and middle-income countries are due to non-communicable disease <sup>3</sup>.

Coronary artery disease, Stroke, Cancers, Chronic respiratory diseases such as chronic obstructive pulmonary disease, asthma and Diabetes mellitus are the major non-communicable disease that are of public health importance. These 4 groups of disease account for 80% of all pre-mature death by non-communicable disease <sup>2</sup>.

The rise of NCDs can be attributed mainly to change in lifestyle. Tobacco usage, physical inactivity, practice of unhealthy diet and harmful use of alcohol are identified as four major risk factors for NCDs.

NCDs being a Global Health challenge has also got its impact on the Nation's economic growth and sustainable development. They also pose a major challenge towards achieving the 2030 agenda for Sustainable Development which states a target of reducing premature deaths from NCDs by one-third by 2030 <sup>2</sup>.

NCDs also impede the progress made towards poverty alleviation. The poverty reduction initiatives in low-income countries are affected by NCDs by rising household costs associated with health care and also increasing the out of pocket expenditures.

Type 2 Diabetes mellitus, one of the non-communicable disease has been rising rapidly all over the world. In 1980, there were 108 million people with diabetes <sup>4</sup> and now this burden has been increased. Currently 425 million people across the world suffer from diabetes mellitus and this has been projected to increase to 629 million by the year 2045 if prompt actions are not taken <sup>5</sup>.

The prevalence of Diabetes was high in urban population with the prevalence of 10.2% when compared to rural area which has got prevalence of 6.9% globally. There is evidence from the previous studies that increasing prevalence of diabetes in rural areas is due to rapid urbanization and industrialization<sup>5</sup>.

Uncontrolled diabetes results in persistent hyperglycemia which in turn damages the blood vessel resulting in micro and macro vascular complications. Diabetes is the leading cause for Coronary artery disease, Chronic kidney disease, stroke, lower limb amputations and blindness <sup>5</sup>. Diabetes also exacerbates major infectious diseases such as TB, HIV/AIDS and malaria. This again results in increase in the health expenditure by the patients and also on the health care.

Diabetes - a silent killer, is also a global societal catastrophe due to its chronic nature causing devastating personal suffering, pushing families into poverty. In 2017, USD 727 billion of global healthcare expenditure is dedicated to Diabetes treatment

and related complications. This has been an 8% increase when compared to the year 2015<sup>5</sup>

In India,

Our nation ranks 2nd in the global burden of diabetes with 72.9 million people suffering from diabetes in 2017. If current trend continues, India may rank top among all countries by the year 2045<sup>5</sup>.

India being a lower middle-income country faces double burden of disease. While the nation fights against the threats posed by infectious diseases like HIV, Tuberculosis and Malaria it is also on the verge to tackle the rising tide of non-communicable disease.

In 2017, nearly 80 million people suffered from diabetes in India and among them half of the people i.e. 42.2 million remain undiagnosed which in turn derails the progress made towards reducing the burden <sup>5</sup>. Often people become aware of their diabetic status only after the occurrence of complications related to diabetes. <sup>6</sup>

Management of diabetes requires a multipronged and comprehensive approach. Both the treating physician and the patient must have an active participation for prompt management. Self-care being a secondary level of prevention has a major role in effective management of Diabetes.

Self-care activities are behaviors undertaken by people with or at risk of diabetes in order to successfully manage the disease on their own. Self-care practices include healthy eating, being physically active, regular monitoring of blood glucose,



adherence to drugs as prescribed, problem solving skills, risk reduction behaviors and healthy coping up skills <sup>7</sup>. All these practices have been found to be positively correlated with good glycemic control, delaying and reduction of complications and improvement in quality of life.<sup>8-11</sup>

Diabetes self-care requires the patient to make many lifestyle modifications in addition with the supportive role of healthcare staff for maintaining a higher level of self-confidence leading to a successful behavior change <sup>12</sup>. Individuals with diabetes have been shown to make a good impact in delaying the progression and development of their disease by participating in their own care <sup>13</sup>.

The importance of patients becoming active and knowledgeable participants in their own care has been emphasized by The American Association of Clinical Endocrinologists <sup>14</sup>. WHO has also recognized the importance of patients learning to manage their diabetes <sup>15</sup>. The American Diabetes Association had documented that there was a four-fold increase in diabetic complications among individuals with diabetes who had not received formal education concerning self-care practices<sup>16</sup>. Good adherence to self-care delays the development of complications, reduces hospital admission rate and thus improves outcome <sup>17</sup>.

India being a developing nation, adopting self-care practices in management of diabetes will be a cost-effective approach in reducing the economic burden due to disease and thus fasten the progress towards achieving the sustainable developmental goal.

## 2.OBJECTIVES

1. To assess and compare various self-care practices among patients with type2 diabetes mellitus residing in rural and urban areas of Salem, Tamil Nadu.
2. To determine various factors influencing the self-care practices among patients with type 2 Diabetes mellitus.

### 3. JUSTIFICATION

1. India being a second populous country, also ranks second next to China in the burden of Diabetes. This places our nation to face the risk of doubling the burden of Diabetes by the year 2045 <sup>5</sup>.
2. India being a Southeast Asian country, 12.2% of the total health care budget was spent on Diabetes in the year 2017 and in the same year our nation has spent 31 Billion International Dollars on the total healthcare expenditure for Diabetes<sup>5</sup>.
3. Self-care practices tend to be a promising cost-effective approach in the management of Diabetes<sup>7</sup>. Though our Government recommends self-care through counselling the patients under National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular disease and Stroke (NPCDCS) <sup>18</sup>, various studies showed poor adherence to self-care practices among Diabetic patients <sup>19-23</sup>
4. Various factors like gender, illiteracy, socioeconomic status, poor access to drugs, lack of health literacy, poor access to health care, family support, unequal distribution of health care providers, preference to health care system tend to influence self-care practices and these factors differ in rural and urban areas. <sup>24-26</sup>

5. As there is dearth of evidence to compare the self-care practices in rural and urban areas, this study was undertaken to minimize the gap and to help in planning self-care education activities that suits people residing in different localities.

## 4. REVIEW OF LITERATURE

Discoveries of Indians in various fields like mathematics, science, astronomy, and democracy has helped to shape the modern world. India has been in the forefront in contributing to the field of medicine. Knowledge of Indians in the field of medicine could be traced back to Vedic times when Charaka and Sushruta were involved in treating sick people. Ancient Indians were also expertise in Diabetes.

Literature provides evidence that in 1500 B.C Indians noted the sweetness of urine and blood of patients with Diabetes. Aretaeus of Cappadocia in 133 A.D coined the term 'Diabetes'. Later the word 'mellitus' (Latin, sweet like honey) was stated by British Surgeon General, Thomas wills in 1967<sup>27</sup>.

### 4.1 Diabetes mellitus

Diabetes Mellitus, an endocrine disorder is characterized by derangement of glucose homeostasis which results in cardinal symptoms like polyuria, polyphagia and polydipsia. Though the cause for Diabetes was initially considered to be deficiency of insulin secretion from pancreas, modern day discoveries has led to establishment of facts that there are numerous other reasons like genetic and environmental factors that play a role in the development of Diabetes<sup>28</sup>.

#### 4.1.1 Types of Diabetes Mellitus<sup>2</sup>

Diabetes mellitus can be classified into four basic types depending on its etiology namely,

1. Type 1 Diabetes
2. Type 2 Diabetes
3. Other specific type of Diabetes which includes genetic defect.
4. Gestational Diabetes mellitus.

Type 2 Diabetes is the most common among all the 4 types <sup>29</sup>.

#### 4.2 BURDEN OF THE DISEASE

##### 4.2.1 Global disease burden

According to International Diabetes Federation (IDF) , it was estimated in 2017 that 451 million people suffered from Diabetes Mellitus globally.<sup>5</sup> Diabetes has also resulted in 5 million deaths worldwide among people belonging to age group of 20 to 99 years in the same year. This burden of Diabetes was expected to raise to 693 million by the year 2045.<sup>4</sup>

Currently 1 in 11 people suffer from Diabetes Worldwide. Among them, 2/3 of the people reside in urban area and remaining 1/3 reside in rural area accounting for 279 million people in urban areas and 146 million people in rural area. In the total burden of Diabetes, 67% of people belong to Working sector, which in turn has an impact on country's economy.<sup>5</sup>

#### **4.2.2 Burden of Diabetes in South-East Asia (SEA)**

IDF report stated that 84 million adults aged 18 to 99 suffered from Diabetes in South-East Asia in the year 2017.<sup>30</sup> 99 % of this burden is due to type 2 Diabetes mellitus and this was projected to increase to 156 million by the year 2045.<sup>5</sup> Among them more than half of people were under diagnosed. The same report, stated that USD 9.7 billion has been spent on healthcare for the people with Diabetes.

In South-East Asia, the total annual costs for Diabetes care ranged from \$ 483-\$ 2637 per patient. Diabetes was responsible for catastrophic expenditure in 5.8% of the patients in 2017 <sup>31</sup> in SEA countries.

#### **4.2.2 Burden of Diabetes in India**

India ranked front among all the SEA countries with 72,946,400 people living with Diabetes i.e. the prevalence was 8.8% in the year 2017.<sup>5</sup>

This huge burden imposed economic burden on individual, families, society and also on the governing body to take care of their middle age citizens (major working force) who were the most common age group affected by type 2 Diabetes.

The direct costs involve medical and non-medical costs in people with Diabetes which imposed burden on individuals and families and the indirect costs would be borne by the society and the government, related to loss of productivity.

Bansode et al stated that the annual expenditure for Diabetes care by the patients in India was on average Rs.10,000 in urban area and Rs.6260 in rural area <sup>32</sup>.

#### 4.2.3 Burden of Diabetes in Tamil Nadu (TN)

A study conducted by India State Level Disease Burden Initiative Diabetes Collaborators showed that the prevalence of Diabetes in Tamil Nadu was more than 10.5% in 2016. The same study showed that there was more than 44% change in percentage prevalence from the year 1990 to 2016.<sup>33</sup>

According to National Family Health Survey-4 (NFHS)<sup>34</sup>, the prevalence of hyperglycemia among adults aged 15 to 49 years in TN has been shown in the following table.

Table:1 Prevalence of hyperglycemia in TN according to NFHS-4.

Gender	Blood sugar level mg/dl	Rural	Urban	Total
Men	High > 140	9.2%	10.2%	9.7%
	Very high > 160	5.3%	5.9%	5.6%
Women	High > 140	6.3%	8.0%	7.1%
	Very high > 160	3.4%	4.5%	3.9%

The above table clearly showed that, prevalence of hyperglycemia was more in urban area and the prevalence was higher in men aged 15 to 49 years.



There was also increase in burden of Diabetes among rural population due to rapid urbanization, change in dietary habits and adopting sedentary lifestyle.

#### **4.2.4 Burden due to Diabetes complications <sup>35</sup>.**

Cardio-vascular disease (CVD) are the leading cause of death Worldwide and it is the major cause of death and disability among Diabetes patients. Largest proportion of inpatient costs in Diabetes were due to consequences of CVD.

Leading cause of vision loss among working force (people aged 20 to 65) was found to be Diabetes. IDF stated that 1 in 3 people with Diabetes have some form of Diabetic Retinopathy (DR) and 1 in 10 developed a vision threatening form of disease which adversely affects the Quality of life. It also stated that 76% of DR can be prevented by good blood glucose control.

As a consequence of Diabetes, every 30 second a patient lost a lower limb or part of it which affects quality of life of people dramatically. Foot ulcer also increased the health expenditure by 5 times in Diabetic patients when compared with those without the disease.

Diabetes also increased the risk of periodontal disease. Various dental conditions like dental decay, candidiasis, lichen planus, neurosensory disorders (burning mouth syndrome), salivary dysfunction, xerostomia and taste impairment can also be seen in Diabetic patients.

### 4.3 Risk factors for type 2 Diabetes Mellitus <sup>28</sup>

The following were the risk factors for Type 2 Diabetes. Risk factors could be classified into modifiable and non-modifiable risk factors. Modifiable risk factors were those which can be changed by adopting healthy lifestyle while non-modifiable were those which could not be controlled.

Modifiable risk factors include,

- Obesity and overweight.
- Physical inactivity
- Hypertension (blood pressure  $\geq 140/90$  mmHg)
- Abnormal cholesterol level. High Density Lipoprotein level  $< 35$  mg/dl and/or a triglyceride level  $> 250$  mg/dl.
- History of cardiovascular disease.
- Previously identified with Impaired Fasting Glucose, Impaired Glucose Tolerance, or Hemoglobin A1c of 5.7–6.4%
- History of Polycystic ovary syndrome

Non-modifiable risk factors include,

- Age
- Family member suffering from Diabetes
- Race/ethnicity
- History of Gestational Diabetes Mellitus

Screening of these high-risk individuals can help to identify the disease and its complications at an earlier stage. Employing lifestyle modification at the earliest could delay them from developing complications which in turn leads to improvement in quality of life.

#### 4.4 Criteria for the diagnosis of Diabetes mellitus:

Diabetes could be diagnosed using anyone of the following criteria given by International Diabetes Federation <sup>5</sup>.

- Random blood glucose concentration  $\geq 200$  mg/dl with symptoms of Diabetes
- Fasting plasma glucose  $\geq 126$  mg/dL or
- Hemoglobin A1c  $\geq 6.5\%$  or
- Oral glucose tolerance test showing 2-hour plasma glucose  $\geq 200$  mg/L

#### 4.5 Management of diabetes <sup>28</sup>.

Management of Diabetes has been a comprehensive and multipronged approach which has to done lifelong. As there is increasing prevalence of obesity, physical inactivity and poor diet, diabetes once thought to affect older individual would not be applicable in today's scenario.

Concept of Self-care in Diabetes has been evolved into a most promising approach in management of Diabetes. Diabetes could be managed effectively if one follows healthy lifestyle by adopting good dietary practices and engaging in regular physical activity. If desired blood glucose control has not been achieved,

patient can be advised on Oral hypoglycemic agents along with lifestyle modification. Regular blood glucose monitoring and screening for complications could help patients to lead a good quality of life.

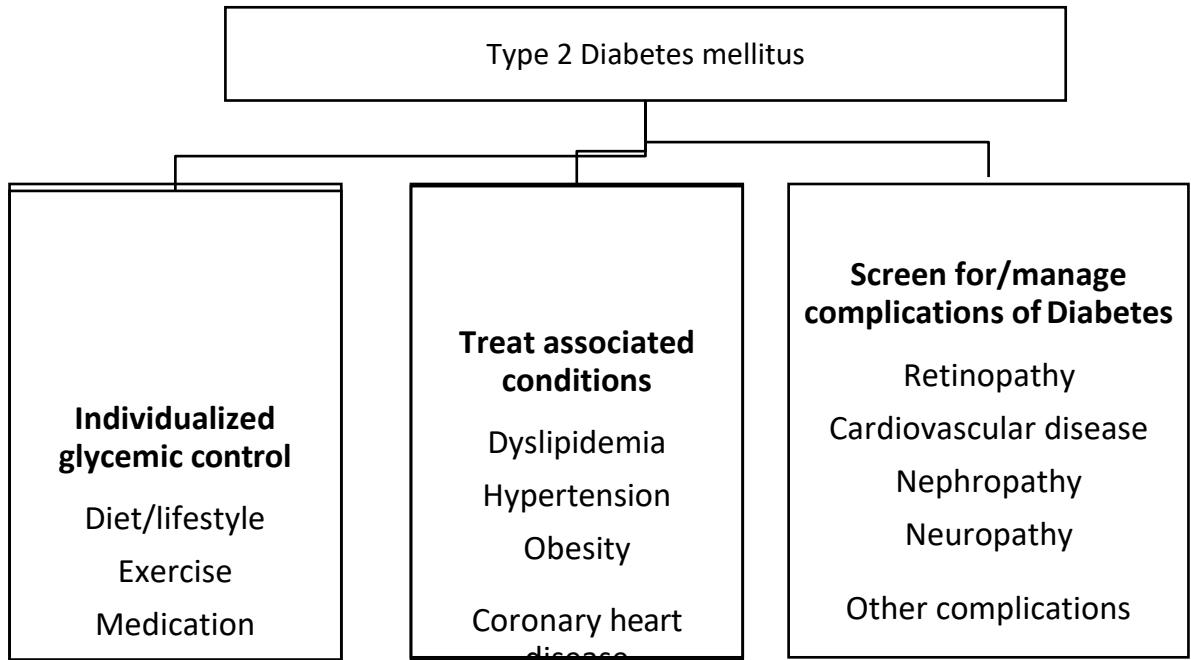


Figure:1 Management of type 2 Diabetes <sup>28</sup>.

#### 4.6 Complications of Diabetes <sup>28</sup>.

Uncontrolled Diabetes could end up in complications resulting in hospitalization and increasing the health expenditure. It results in lowering quality of life of people. Persistent hyperglycemia causes damage in vascular system thus affecting the vital organs of the body like heart, eyes, kidneys and nerves. Complications could be classified into microvascular, macrovascular depending on the blood vessel involved.

Microvascular complications include,

- Eye disease: Retinopathy & Macular edema
- Neuropathy: Sensory, Motor and Autonomic neuropathy
- Nephropathy (albuminuria and declining renal function)

Macrovascular complications include,

- Coronary heart disease
- Peripheral arterial disease
- Cerebrovascular disease

Other complications include,

- Gastrointestinal (gastroparesis, diarrhea)
- Genitourinary (uropathy/sexual dysfunction)
- Dermatologic manifestation
- Infections
- Cataracts
- Glaucoma
- Cheiroarthropathy a Periodontal disease
- Hearing loss

Periodical screening for complications should be emphasized among patients with Diabetes to lead a good quality of life.

#### **4.6.1 Awareness on complications of Diabetes:**

A study conducted by Indian Council of Medical Research <sup>36</sup>, among general population from 4 selected regions on India, showed that 51.5% of general public and 72.7% of diabetic patients were aware that diabetes could affect other organs.

A study conducted by Durgad et al <sup>37</sup>, in Karnataka among Diabetic patients attending Tertiary care hospital, showed that 55% were unaware of complications of Diabetes.

Another study conducted in Mumbai among type 2 Diabetes mellitus patients to assess awareness on diabetes and its complications showed that almost 63% of study participants were unaware that diabetes affects retina <sup>38</sup>.

#### **4.7 Self-care in diabetes mellitus**

Self-care in Diabetes has been defined as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the Diabetes in a social context.<sup>26</sup>

Self-care includes 7 domains namely healthy eating plan, increasing the physical activity, regular monitoring of blood glucose level, adherence to prescribed drugs, good problem-solving skills, practicing healthy coping up skills and adopting risk reduction behavior.<sup>26</sup>

## 4.8 Recommended level of self-care practices

The following are the recommendations of various domains of self-care given under NPCDCS program by Ministry of Health and Family Welfare <sup>18</sup>.

### 4.8.1 Diet

- Obese and overweight individuals must reduce their calorie intake by 500 to 600 calories / day.
- All patients are advised to add fruits and vegetables in diet (at least 400 gm/day).
- Sweets and foods with added sugar need to be avoided.
- Avoid foods with high glycemic index and to avoid deep fried items like bhajis, samosa, etc. Instead, food that are steamed and rich in fiber content like whole grains and green leafy vegetables can be chosen
- Daily consumption of salt should be restricted to <5gms /day/person.
- To split the food and eat as 3 meals and 2 snacks so that postprandial hyperglycemia can be avoided.
- Not to skip meals.
- Saturated fat consumption must be reduced.

### 4.8.2 Physical Activity

- Patients are advised to indulge in moderate physical activity like brisk walking, cycling and swimming for 150 mins/week.

- This can be done by engaging in any of the above-mentioned activities for at least 30 mins/day, for 5 days in a week.
- Patients should not stay without physical activity for more than 2 consecutive days.

#### **4.8.3 Foot care**

- To wash feet using warm water and mild soap & to dry the foot with clean towel, especially between toes. Soaking of foot and using hot water for washing should be discouraged as it may precipitate ulcers.
- To inspect foot daily for cracks, blisters, ulcers should be done. A mirror can be used for this purpose.
- To prevent dryness of the foot, oil can be applied leaving areas between toes.
- To Clip toenails straight across using nail cutter.
- To choose slippers/shoes made of soft material and appropriate size.
- To avoid walking bare foot. Good to use slippers even inside the home.
- To seek doctor's advice immediately, if there are any complaints in the foot
- To checking foot daily.

#### **4.8.4 Adherence to drugs**

- Patients are advised to take drugs/insulin as prescribed by the physician with self-modification of dose in all days in a week.



- There should not be any sharing of drugs by the patients as drugs are prescribed according to the individual needs.

#### **4.8.5 Smoking**

Cessation of smoking must be encouraged.

#### **4.8.6 Alcohol**

Patients must be encouraged to give up the habit of alcohol consumption.

#### **4.8.7 Screening for Complications**

Patients with Diabetes must undergo

- Ocular examination to evaluate Diabetic retinopathy.
- Dental check-up.
- Renal function test.
- Lipid profile.
- Electrocardiogram at least once in a year to detect complications at the earliest
- Blood pressure monitoring must be done at least once in 3 months.

#### **4.9 Diabetes education program for self-care**

International Diabetes Federation (IDF) recommends all patients with Type 2 Diabetes has to undergo Diabetes education program at the time of diagnosis itself. This should be established from the Primary care level. It should

be conducted by a trained program educator and in every primary health care level, one health care professional must be encouraged to become a diabetic educator.<sup>24</sup>

#### **4.9.1 Advantages of self-care in Diabetes patients<sup>17</sup>**

Teaching diabetics about Self-care/self-management and following it successfully has shown advantages like:

1. Reduction in the hospital admission rate and lifetime health care cost. Thus, it is a cost-effective approach.
2. Improvement in HbA1c level by 1%.
3. Postponement of the onset and the advancement of complications.
4. Improvement in coping up skills in Diabetic patients.
5. Reduction in Diabetes related stress and depression.
6. Positive effect on clinical, psychosocial and behavioral aspects of Diabetes. Thus, resulting in improving Quality of life.

#### **4.10 Scales to assess self-care in diabetes:**

##### Summary of Diabetes Self-Care Activities Measure<sup>39</sup>.

This scale was developed by Toobert. It has 11 items that are used assess self-care activities practiced by patients in previous week. It addresses general diet, specific diet, exercise, blood glucose testing, foot care and smoking. this scale has been used in various studies as it showed appropriate psychometric qualities but its correlation with HbA1c level was less than DSMQ scale.

Diabetes Self -Management Questionnaire (DSMQ) <sup>40</sup>.

This scale developed by Schmitt et al has 16 items assigned in 4 subscales namely glucose management, dietary control, physical activity, health care use and sum scale. The internal consistency of this scale was good (0.84) and consistencies of the sub-scales were under acceptable level. The correlation of this scale with HbA1c level was significantly stronger than SDSCA scale. This scale can be applied to both type 1 and type 2 diabetic patients.

The LMC Skills, Confidence & Preparedness Index (SCPI)<sup>41</sup>.

SCPI is an electronic tool which has 25 items measures of three domains – knowledge, confidence and preparedness. The instant scoring and specific feedback and its relationship to glycemic control provides a valuable information to assess patients instantly. This scale had been evaluated using 120 study participants from tertiary care hospital and the results showed good intraclass correlation of 0.94 and internal consistency for the sub-scales was very good.

The Personal Diabetes Questionnaire (PDQ) <sup>42</sup>.

It provides a brief and comprehensive measure of Diabetes self-care behaviors, perceptions and barriers which helps to guide the patients. The sub-scales used in this instrument demonstrated good internal consistency and demonstrated significant association with BMI and HbA1c level.

## Diabetes Self-management Assessment Report Tool (D-SMART) <sup>43</sup>.

It is an instrument which helps Diabetes educators to assess, facilitate, and track behavior change in the provision of Diabetes self-management education (DSME). This can be integrated in computer and telephonic system.

### **4.11 Knowledge on Self-care practices**

A facility-based study done by Jackson et al<sup>44</sup>, in Kenya among type 2 diabetic patients to assess knowledge on self-care by Diabetics showed nearly 80% of participants had good knowledge. The results also showed statistical significance with level of education, monthly income and duration of diabetes.

Sari Alhaik et al <sup>45</sup>, stated moderate (58.28%) knowledge on self-care practices among Diabetic patients recruited from 5 selected Primary Health Centers in Amman-Jordan. Participants had highest level of knowledge on meal planning and lowest knowledge on physical activity.

A facility based study conducted by Kassahun et al <sup>46</sup> among type 2 diabetics attending Jimma University Teaching Hospital, showed 34.9% of study participants had good knowledge on self-care to be adopted by diabetic patients.

A hospital based study conducted by Karam Padma et al in Karnataka among type 2 diabetics attending a tertiary care hospital in 2010, showed 61.68% of participants were aware of importance of exercise, 75.21% were aware of dietary modification <sup>47</sup>.

#### **4.12 Studies on Self-care practices globally**

A Study conducted in Western Ethiopia by Dadefo et al among diabetic patients attending DM clinic in Nekemte Referral Hospital during 2016, using SDSCA scale showed that satisfactory level of diet, exercise, foot care and Blood glucose monitoring was 69.4%, 63.5%, 82.9%, 15.1% respectively <sup>48</sup>.

Another study in Ethiopia conducted among Type 2 diabetics attending health facility in 2013 showed that there was poor adherence to diet, self-monitoring of blood glucose and adherence to prescribed drugs by 75.9%, 83.5%, 4.3 % of study participants respectively <sup>49</sup>.

Malaysian study among 126 diabetic adults in health care settings by Tan et al in 2008, showed that 80% of participants consumed more meals, 54 % were inactive, 46% were non-adherence to drug and only 15 % of study participants done self-monitoring of blood glucose <sup>50</sup>.

#### **4.13 Studies conducted in India on self-care practices among diabetic patients**

A study conducted among diabetic patient residing in resettlement Colony in East Delhi by Mohandas et al from 2014 to 2016 <sup>51</sup>, showed that 31% practiced diet control on all seven days,16.7% of the people practiced physical activity,19 % of the patients done foot care and only 7.7 % of the respondents checked their blood glucose value in the past one week.

A facility based cross sectional study conducted in Mangalore by Rajasekaran et al among diabetics attending Government Wenlock Hospital in 2012, showed that healthy eating plan, daily exercise, regular monitoring of blood glucose level, adherence to medication was 45.9 %, 43.4 %, 76.6 %,60.5% respectively <sup>52</sup>.

A community based cross-sectional study conducted in rural area Karnataka by Dinesh et al in 2014-2015 <sup>53</sup>, showed that dietary practice, exercising regularly, checking blood sugar once in three months, taking drugs every day and foot care was done by 24%, 20.5%, 62.25%, 48% and 0.5% of the study participants respectively.

Another community based cross-sectional study conducted in Anand district of Gujarat in 2010, showed results that dietary practice, physical activity, taking drugs regularly, self -monitoring of blood glucose level and level foot care was 70.42%, 24.33%, 88.1%, 16% and 42.3% for all 7 days in a week respectively <sup>54</sup>.

Following table shows Self-care practices followed by patients with type 2 Diabetes in various parts of Tamil Nadu and Pondicherry.

Table:2 Studies on Self-care in Diabetics in various parts of Tamil Nadu and Pondicherry.

Researcher	Area of study	Year	Type-of study	DP (%)	PA (%)	BGM (%)	FC (%)	ADH (%)
Kalaiselvi Selvaraj <sup>19</sup>	Pondicherry	2013	Facility based	32.8	33.3	78.8	8.6	95.6
Shrivastava <sup>20</sup>	Kancheepuram	2014	Camp based	78	29.3	76.2	17.2	72
Uma Maheshwari <sup>21</sup>	Tiruvallur	2016	Facility based	76.9	57.1	84.1	36.7*	89.7
Veerakumar <sup>22</sup>	Trichy	2016-17	Facility based	80**	65	94	48	-
Gopichandran <sup>23</sup>	Vellore	2009	Community based	29	19.5	70	-	79.8

\*- Drying skin between toes on all days in a week, \*\*- Avoided sugar on all days in a week

[DP-Dietary practice, PA- Physical activity, BGM- Blood glucose monitoring at least once in 3 months, FC-foot care, ADH-adherence to drug]

It was clearly seen from the above studies that dietary practices were adequate in more than half of them. Practices like foot care, monitoring blood glucose was comparatively poor in the study participants in all the above-mentioned studies.

#### 4.14 Barriers to self-care practices

A multinational study conducted by Adu et al to identify enablers and barriers to effective self-management among diabetes, identified frustration due to dynamic and chronic nature of Diabetes, financial constraints, unrealistic expectations and work and environment-related factors as barriers to adhere to self-care.<sup>24</sup>

Lack of knowledge, loss of wages, lack of family support, cultural constraints, lack of trust in public health care system, doctor patient communication gap are identified as barriers to adopt self-care among Diabetes patients by Chetan et al in Karnataka.<sup>25</sup>

Shrivastava et al has stated attitude, beliefs, knowledge about Diabetes, culture and language capabilities, health literacy, financial resources, co-morbidities and social support as patient factors responsible for poor self-care among Diabetic patients.<sup>26</sup>

#### 4.15 India's initiative to tackle raising burden of Diabetes:

##### **4.15.1 National program for the Prevention and control of Cancer, Diabetes, Cardiovascular Disease and Stroke.<sup>18</sup>**

Government of India came up with a program to control raising burden of Non-communicable disease in 2010. The program was named as National program for the Prevention and control of Cancer, Diabetes, Cardiovascular Disease and Stroke. Later in 2013 it was integrated with National Health Mission.



The main Non-communicable disease focused in this program include,

- ❖ Diabetes Mellitus,
- ❖ Hypertension,
- ❖ Breast Cancer,
- ❖ Cervical Cancer and
- ❖ Oral Cancer.

#### Objectives of NPCDCS

- ❖ Community participation for Health promotion
- ❖ Population based screening and Opportunistic screening at all levels of Health care.
- ❖ To prevent and control common NCD's.
- ❖ Cost-effective treatment and diagnosis for NCD's.
- ❖ Strengthening surveillance for development of database.

#### Principles of management of Type 2 Diabetes as per NPCDCS

- ❖ Lifestyle modification which includes dietary modification and physical activity.
- ❖ Reducing insulin resistance through weight reduction.
- ❖ Pharmacological treatment with Metformin and sulfonylureas.
- ❖ Treating high blood pressure with ACE inhibitors, calcium channel blockers and diuretics.
- ❖ Using statins for lipid control.

NPCDCS also provides guidelines for counselling patients with Diabetes.

At PHC level – staff nurse or multipurpose health worker should be trained to provide counselling and health education.

At sub-district and district level hospital - Dietician or Counsellor or staff nurse to be appointed to provide Diabetes education.

The following topics were addressed during health education session during initial and follow up visits as recommended under NPCDCS.

In initial visit:

- ❖ Information about diabetes
- ❖ Cause for diabetes mellitus
- ❖ Lifestyle modification
- ❖ Use of Oral Drugs and good adherence
- ❖ Advice on identifying signs and symptoms of hypoglycemia and hyperglycemia and their Management.
- ❖ Information about the importance of factors other than glucose control like control of Cholesterol, blood pressure, stopping smoking/tobacco, etc.

During follow-up visit

- ❖ Importance of Glycemic Control
- ❖ Prevention of Complications
- ❖ Foot Care

- ❖ Newer modalities of treatment
- ❖ Marriage Counseling Pre-conceptual counselling regarding the importance of glucose control prior to Pregnancy.

#### 4.15.2 mDiabetes<sup>55</sup>

WHO and The Ministry of Health and Family Welfare, India worked together and launched a mobile health initiative for the prevention and care of Diabetes. As India has got over a million mobile subscriptions, this opportunity has been utilized by the government to deliver health care.

People can register in mDiabetes using their phone number or email id or give a missed call to 011-22901701. On registering the participants, will receive a text message about diabetes, dietary modifications, physical activity etc. mDiabetes also provides information on Diabetes risk assessment. On providing information like age, sex, height, weight, family history of diabetes, waist circumference diabetes risk score is calculated and followed by advice for screening.

mDiabetes also contributes to

- ❖ improving awareness about diabetes
- ❖ promoting healthy diet and active lifestyle
- ❖ enhancing health care seeking behavior and early diagnosis
- ❖ contribute to better drug adherence, self-care and prevention of complications.

#### **4.15.3 Eat Right India<sup>56</sup>**

To combat negative nutritional trends prevailing in our country, which contributes to lifestyle disease, FSSAI has launched the 'Eat Right India Movement'. This initiative mainly focusses on nutrition and encourages people to make choices on nutritious food including green leafy vegetables and fruits.

Eat healthy campaign is covered under this movement to promote healthy dietary practices among Indians. It also provides dietary modifications necessary for Diabetics

## 5.MATERIALS AND METHODS

### 5.1 Study design

Community based Cross-Sectional Study.

### 5.2 Study area:

This study was conducted among selected villages in rural areas and selected wards in urban areas of Salem district, Tamil Nadu.

### 5.3 Study period

The study was carried out from January 2018 - February 2019 (13 months).

### 5.4 Study population

This study was conducted among patients with Type 2 Diabetes Mellitus residing in selected rural and urban areas in Salem, Tamil Nadu

#### 5.4.1 Inclusion criteria

1. Both men and women aged 30 years and above who have physician diagnosed type 2 Diabetes mellitus for at least 1 year and residing in the selected locality for at least 1 year.
2. Those who gave consent to participate in the study.

#### 5.4.2 Exclusion criteria

1. Patients with Type 2 Diabetes with acute febrile illness.
2. Patients with Type 2 Diabetes diagnosed with End stage renal disease, Cardiovascular and Cerebrovascular disease within 1 month from the date of interview.
3. Patients with Type 2 Diabetes who are bed-ridden and mentally challenged are excluded from the study.

#### 5.5 Sample size

The Sample size was calculated based on the study, "Self-Care Activities among patients with diabetes attending a Tertiary care hospital in Mangalore Karnataka, India" by D. Rajasekaran et al <sup>52</sup>. In that study 13.4% of participants examined the inner surface of their footwear for blood or other discharges (one of the self-care practices) on all days of the week. Considering Confidence level of 95 %, absolute precision of 5 % and 10 % to account for non-response, the sample size was derived as follows,

Sample size was calculated using the formula:

$$N = Z_{1-\alpha}^2 pq/d^2$$

Where,  $Z_{1-\alpha}^2$  = standard normal deviant at 95% confidence level i.e. 1.96

p = prevalence = 13.4,

q = 100 – p = 86.6,

$d = \text{absolute precision of } 5 \%$ ,

$$N = 1.96 * 1.96 * 13.4 * 86.6 / 5 * 5 = 178.3.$$

Allowing a 10 % non-response rate the sample size was 196 and on rounding of the sample size is 200.

Being a comparative cross-sectional study, 200 participants were selected from rural area and another 200 participants were selected from urban area.

## 5.6 Sampling method

The study participants were selected by Multi-stage random sampling.

### 5.6.1 For Rural area:

- ❖ Salem Health Unit District (HUD) consists of 20 Blocks. (**Annexure-5**)
- ❖ Veerapandy block was chosen by simple random sampling using lots method.
- ❖ In Veerapandy block there are 5 Primary Health Centers (PHC) and among them Murungapatty Primary Health center was chosen by simple random sampling using lots method.
- ❖ Murungapatty Primary Health center has 4 Health Sub-Centers (Murungapatty, Ariyagoundampatty, Perumampatty, Maramangalathupatty) under it.
- ❖ Among them Murungapatty Health sub-center was chosen by simple random sampling using lots method. Murungapatty HSC has 1487

households and serves a population of 7,395.

- ❖ The details of households were obtained from Village Health Nurse. With the sample size of 200, and a sampling interval of 7, a random number of 5 was chosen and study was started with 5<sup>th</sup> household from the HSC and there after every 7<sup>th</sup> house was chosen till sample size of 200 was obtained.
- ❖ If selected household had no participants satisfying inclusion criteria, the next household was included in the study. As the required sample size was not reached, repeated systematic sampling was done till the required sample size was attained.

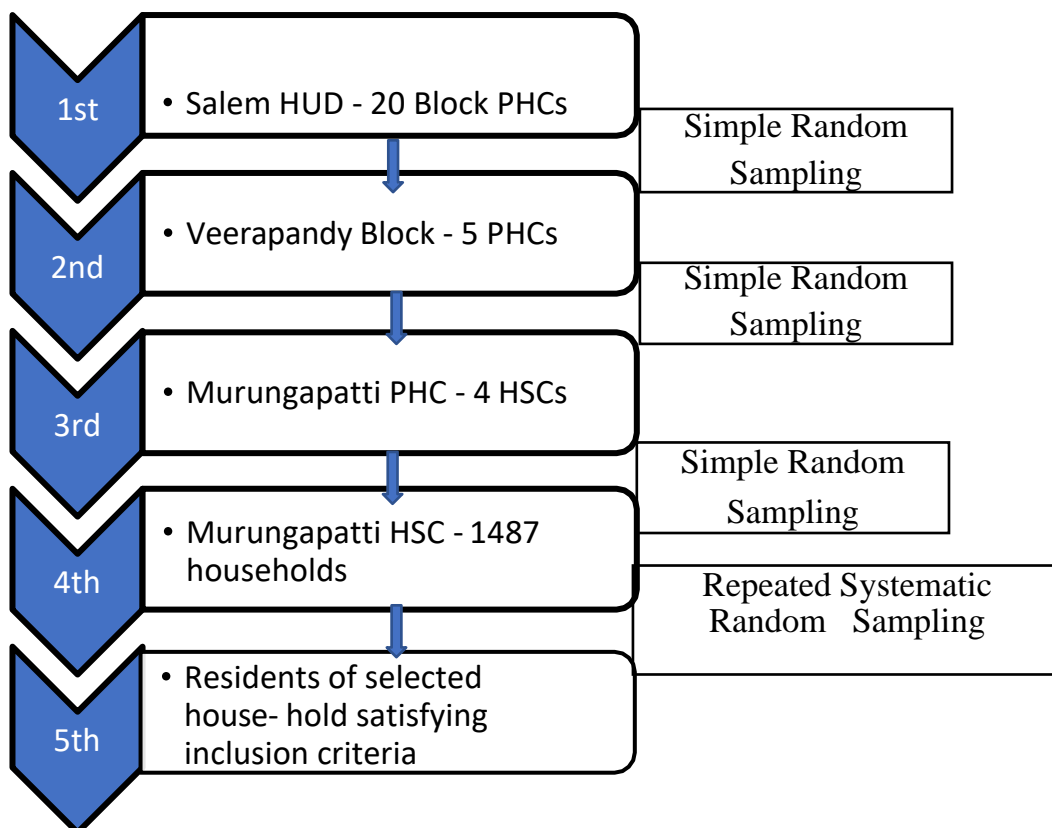


Figure:2 Selection of study participants through Multistage sampling in Rural area.



### 5.6.2 For Urban area:

- ❖ Salem corporation consists of 60 wards. (**Annexure-6**)
- ❖ Ward 33 was chosen by simple random sampling using lots method.
- ❖ The details of households were obtained from Urban Health Nurse. Ward 33 has 4037 households. As the sample size was 200 and sampling interval was 20, a random number of 5 was chosen and study was started with 5<sup>th</sup> household from the Urban PHC and there after every 20<sup>th</sup> house was chosen till sample size of 200 was obtained.
- ❖ If selected household had no participants satisfying inclusion criteria, the next household was included in the study. As the required sample size was not reached, repeated systematic sampling was done till the required sample size was attained.

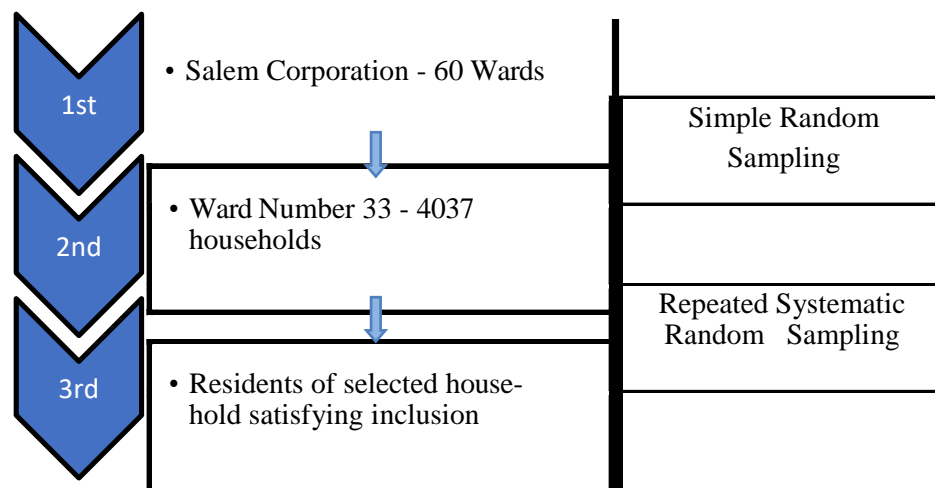


Figure:3 Selection of study participants through Multistage sampling in Urban area.

### **5.6.3 Selection of sampling unit:**

In the selected houses, residents were verified if they were present in the same locality for 1 year and were enquired about the health status of the family members. If any member satisfied the inclusion criteria and gave consent, they were enrolled in the study.

If selected house was a multi-storied building, the households to be selected for the study was chosen randomly. When selected house had more than one eligible person satisfying inclusion criteria, the study participant was chosen randomly among them using lots method. If the selected house was locked even after 2 visits, that household was excluded, and the adjacent household was selected as the sample.

### **5.7 Data collection tool:**

The information regarding self-care activities among patients with type 2 diabetes was collected using the revised version of Summary Diabetes Self-Care Activities questionnaire (SDSCA). The Questionnaire was prepared according to local culture in English and translated into the local language Tamil and back translated again to ensure appropriateness of translation.

Questionnaire was pilot tested among 30 individuals in local language and necessary corrections were made. Finally, a semi structured pretested questionnaire in regional language (Tamil) was used for data collection which has the following sections.

Section 1: Socio demographic profile & addictive habits.

Section 2: Details on Diabetes Mellitus which includes questions on duration of diabetes, diagnosis, family history, type of treatment facility, medications and co-morbidities.

Section 3: Details on awareness of self-care practices which includes questions on diet, physical activity, foot care, adherence to drug, blood glucose monitoring, screening for complications and hypoglycemia management.

Section 4: Self-care practices focusing on domains such as diet, physical activity, foot care, adherence to drug, blood glucose monitoring and screening for complications.

Section 5: Role of Health-care personnel.

The questionnaire is given in the **Annexure-3** in this book.

### **5.8 Data collection method:**

Data collection was done in the study area after obtaining official permission from the Dean, Government Stanley medical College, Chennai, Deputy Director of Health Services, Salem and City Health Officer, Salem. Details of the study was informed to the Medical officer of Veerapandy block, the Medical officer of Murungapatty PHC and the Medical officer of Urban PHC, Ammapettai (Ward 33).

Approval for the study was obtained from the Institutional ethics committee, Stanley Medical College (**Annexure-10**). The information regarding the study was explained in local language to the study subjects (**Annexure-1**). After their understanding and willingness to participate in the study, written informed consent was obtained (**Annexure-2**). Then study participant was interviewed using the questionnaire by face to face interview method.

Questions were read out to the study subjects in exactly the same order as listed in the questionnaire and sufficient time was given to the subject to respond. If the respondent did not understand the questions, it was repeated in the same manner without probing for the answer. If the respondent was still doubtful about the answer, it was recorded as No.

## **5.9 Service rendered**

Persons found to have complications of diabetes like foot ulcer, visual problem, reduced urinary output, frequent infections were referred to the nearest public health facilities for further management. Persons with poor self-care were educated about various self-care practices and its advantages and encouraged to follow it regularly.

## **5.10 Statistical analysis**

After data collection, the details were entered in Micro Soft Excel and analyzed using SPSS software version 16. For categorical data, frequencies and proportion were calculated. For continuous data, mean and standard deviation or

median and inter-quartile range were calculated. Chi-square test was used as test of significance for categorical data. A p value of less than 0.05 has been considered to be statistically significant.

## **5.11 Variables of interest and operational definition**

### **5.11.1 Physician diagnosed Type 2 Diabetes Mellitus:**

Any person aged 30 years and above found to be positive for any one of the following tests by the physician.

1. Fasting glucose =  $\geq 126$  mg/dL (7.0 mmol/L)
2. 2-hour blood glucose estimation following ingestion of 75-g glucose load =  $\geq 200$  mg/dL (11.1 mmol/L)
3. Random plasma glucose in symptomatic patient =  $\geq 200$  mg/dL (11.1 mmol/L)
4. HbA1c =  $\geq 6.5\%$  (48 mmol/mol)
  - (Fasting is defined as no caloric intake for at least 8 hours.
  - The HbA1c test should be performed in a laboratory using a method that is NGSP-certified and standardized to the Diabetes Control and Complications Trial assay.
  - The 2-hour postprandial glucose test should be performed using a glucose load containing the equivalent of 75-g anhydrous glucose dissolved in water.)

### 5.11.2 Self-care practices in Diabetes Mellitus:

Self-care practices are behaviors undertaken by people with diabetes in order to successfully manage the disease of their own.

In this study, healthy eating plan, increasing the physical activity, foot care, dental care, regular monitoring of blood glucose level, adherence to prescribed drugs, screening for complications and life free from having addictive habits are the 8 domains considered under self-care.

#### A. Diet:

In this domain 5 questions were framed, and all questions were given score from 0 (none of the days in a week) to 7 (all 7 days in a week) based on the practice of study participants. A cumulative score was obtained and converted into percentage. The questions under dietary domain were,

- 1.Reduced the serving size of Cereal based food like idly, dosa, cooked rice
- 2.Consumed Vegetables
- 3.Avoided high fat containing foods (fried items, red meat)
- 4.Avoided sugar rich foods
- 5.Followed splitting of meals.

In the dietary domain, self-care was considered good if the patient had followed the self-care measures for more than 75% of the time in a week.

**B. Physical activity:**

Following moderate physical activity like brisk walking, swimming etc. for at least 30 mins per day for 5 days in a week is considered as good self-care under the domain of physical activity.

**C. Foot care:**

Under foot care, 6 questions were framed and all questions were given score from 0 (no days in a week) to 7 (all 7 days in a week). A cumulative score was obtained and converted into percentage. Questions were

- Examined foot for cracks, blisters, wounds
- Washed foot with soap and water
- Dried the skin between the toes
- Applied oil to the feet
- Examined the footwear for discharge
- Used footwear inside the house.

In this domain, good self-care was ascertained if the patient had followed the self-care measures for more than 75% of the time in a week.

**D. Dental care:**

Brushing teeth twice daily for is considered as a good self-care.

**E. Adherence to drug:**

Taking oral hypoglycemic agents or insulin in a dosage as prescribed by the treating physician for at least 6 days a week was taken as a good self-care.

#### **F. Blood glucose monitoring:**

Monitoring venous blood glucose concentration at least once in 3 months was considered as good practice.

#### **G. Screening for complications:**

- ❖ Checked Blood pressure at least once in 3 months.

All the following examinations to be done at least once in a year.

- ❖ Fundus examination done at least once in a year.
- ❖ Dental check-up.
- ❖ Renal function test.
- ❖ Electrocardiogram
- ❖ Lipid profile

Screening for complications using these tests was verified using the records present with the participants.



## 6. RESULTS AND ANALYSIS

This study included 200 participants in rural area and 200 participants from urban area, obtained from 923 households from rural area and 804 households from urban area. Data collected were entered in Microsoft excel and analyzed using SPSS software version 17.

Simple frequencies were used to analyze socio demographic characteristics like gender, education, socioeconomic status, addictive habits and diabetic profile of participants like medications, type of treatment facility and co-morbidities.

Awareness on self-care practices was analyzed using simple frequencies.

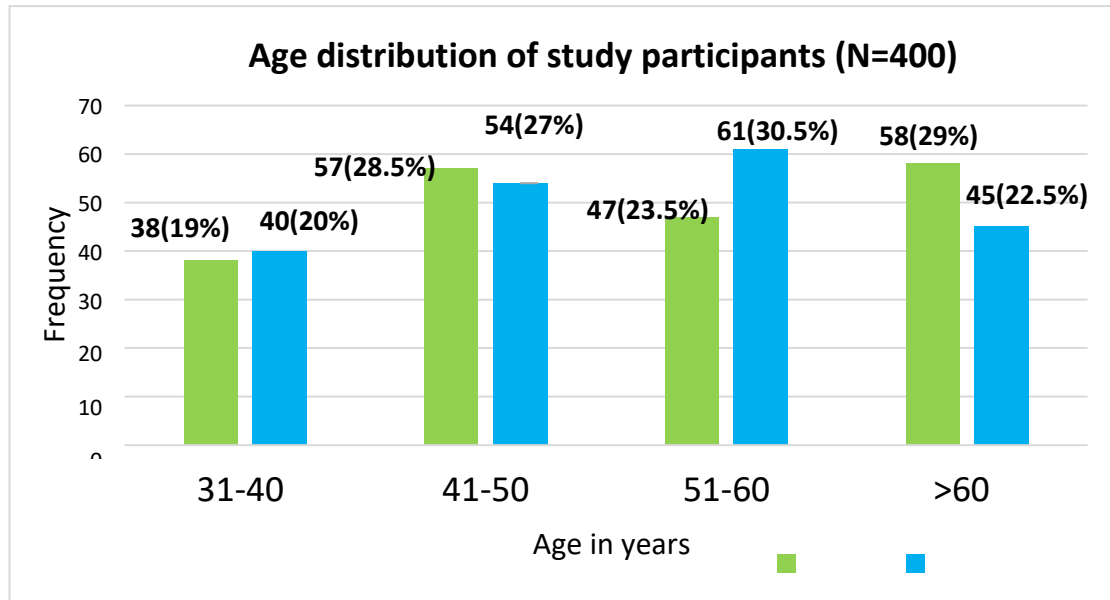
Independent sample T test was done to compare the cumulative awareness scores between urban and rural study participants.

Chi-square test and Fisher's exact test were used for analysis to check for association between various demographic characteristics and self-care practices.  $p$  value  $< 0.05$  is considered as statistically significant.

Simple frequencies were used to analyze the barriers and role of health care personnel.

## 6.1 Socio demographic characteristics of study participants:

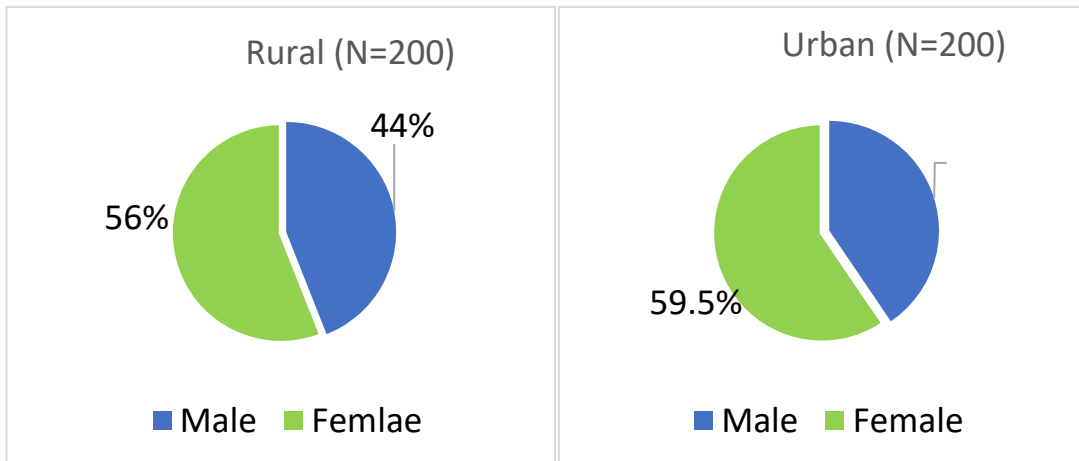
### 6.1.1 Age distribution of study participants:



**Figure:4 Age distribution of study participants (N = 400)**

The mean age of study participants was 51.4 years with standard deviation of 11.2 years. The mean age of study participants in rural area was 51.49 years (S.D = 11.5) and in urban area it was 51.35 years (S.D = 11). In rural area, most of the study participants belonged to more than 60 years of age group (29%) followed by 41 to 50 years age group (28.5%). In urban area, most of the study participants belonged to 51-60 years age group (30.5%) followed by 41-50 years age group (27%).

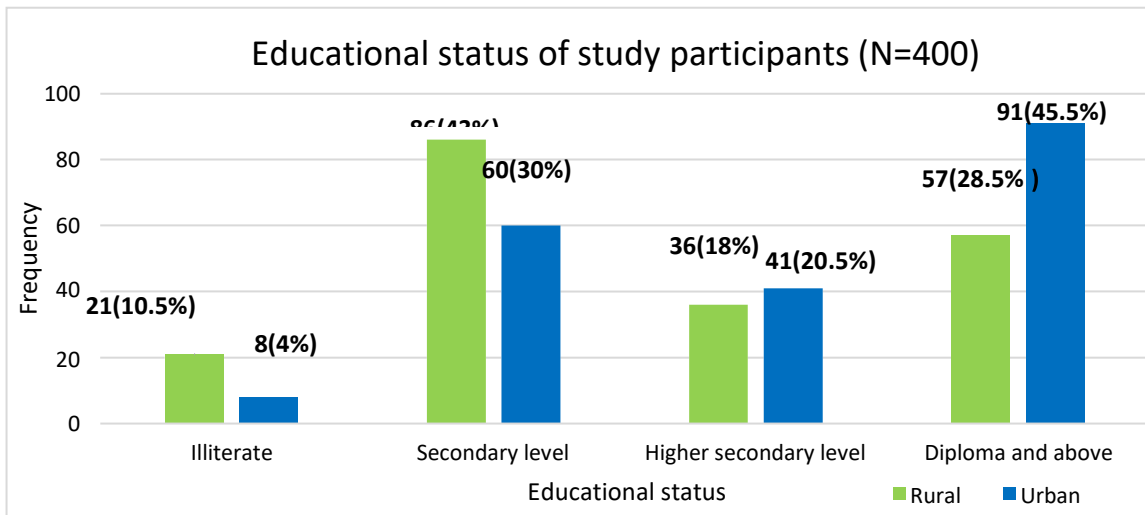
### 6.1.2 Sex distribution of study participants:



**Figure:5 and 6 Sex distribution of study participants**

Both in rural and urban area, females were the major study participants.

### 6.1.3 Educational status of study participants:

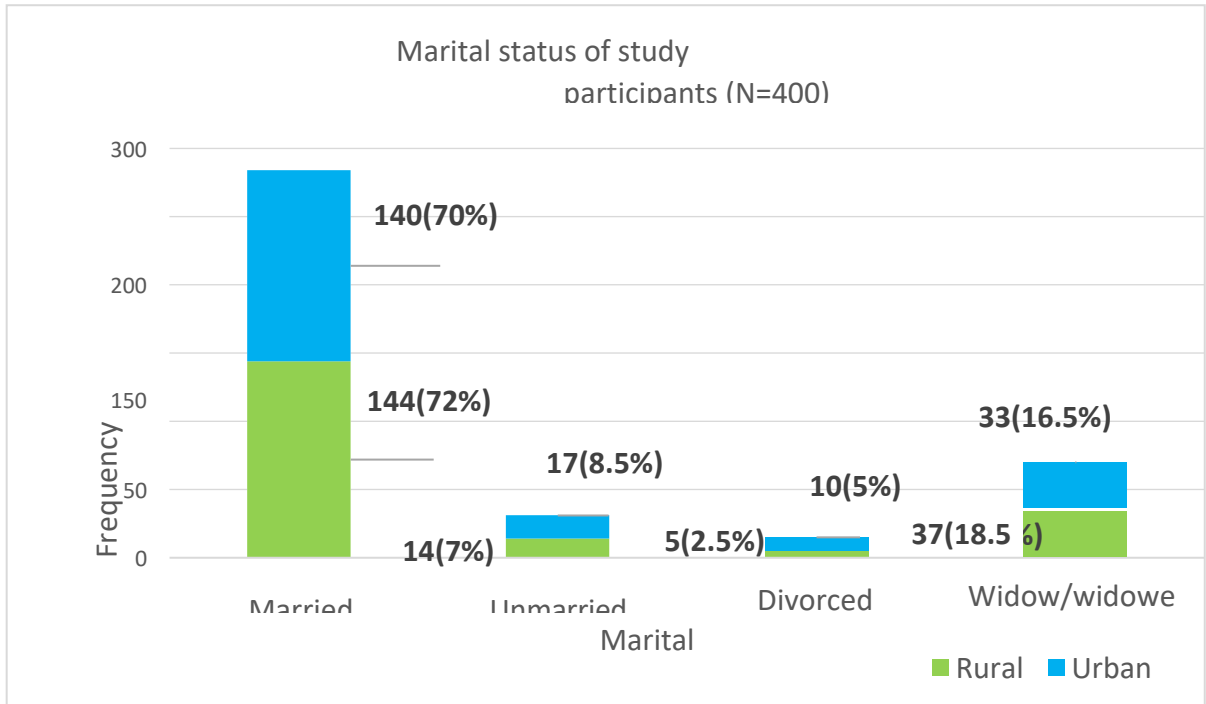


**Figure:7 Educational status of study participants (N=400)**

In rural area, most of the study participants had completed secondary level of education (43%) followed by diploma and higher level of education (28.5%) but

in urban area, most of the study participants had completed diploma (45.5%) followed by secondary level of education (30%).

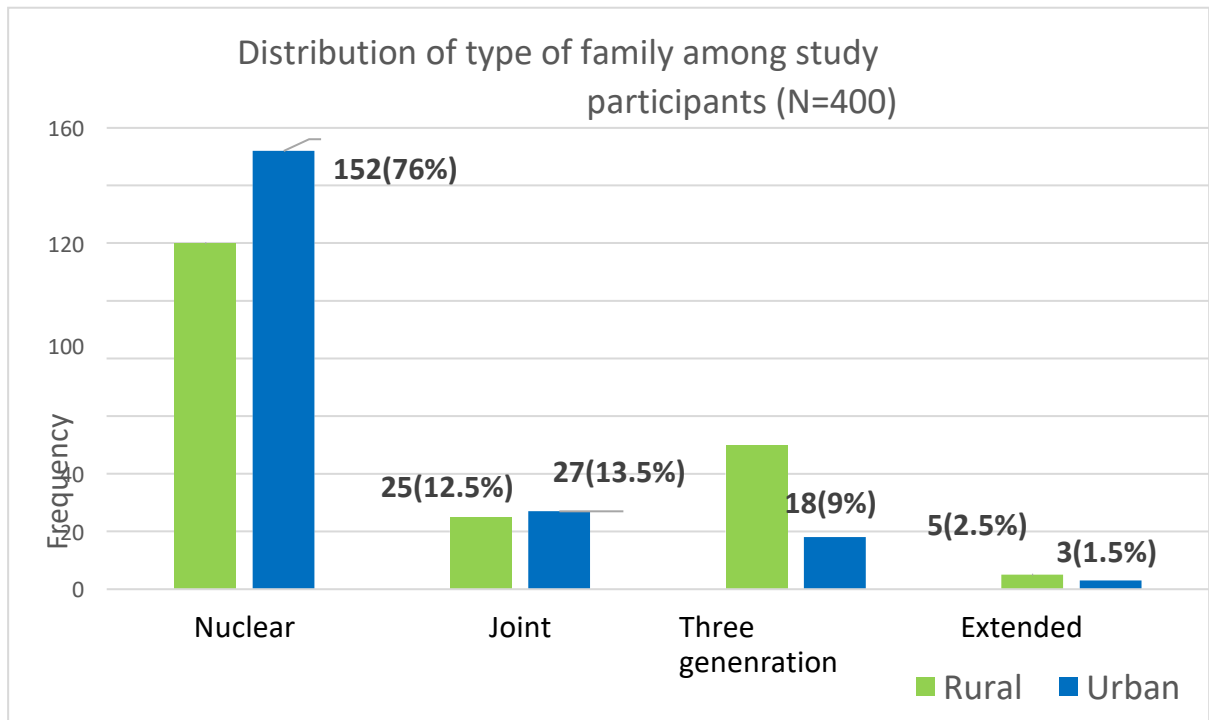
**6.1.4 Marital status of study participants:**



**Figure:8 Marital status of study participants (N=400).**

Nearly ¾ th of study participants were married in both rural and urban area i.e. 144 (72%) and 140 (70%) respectively.

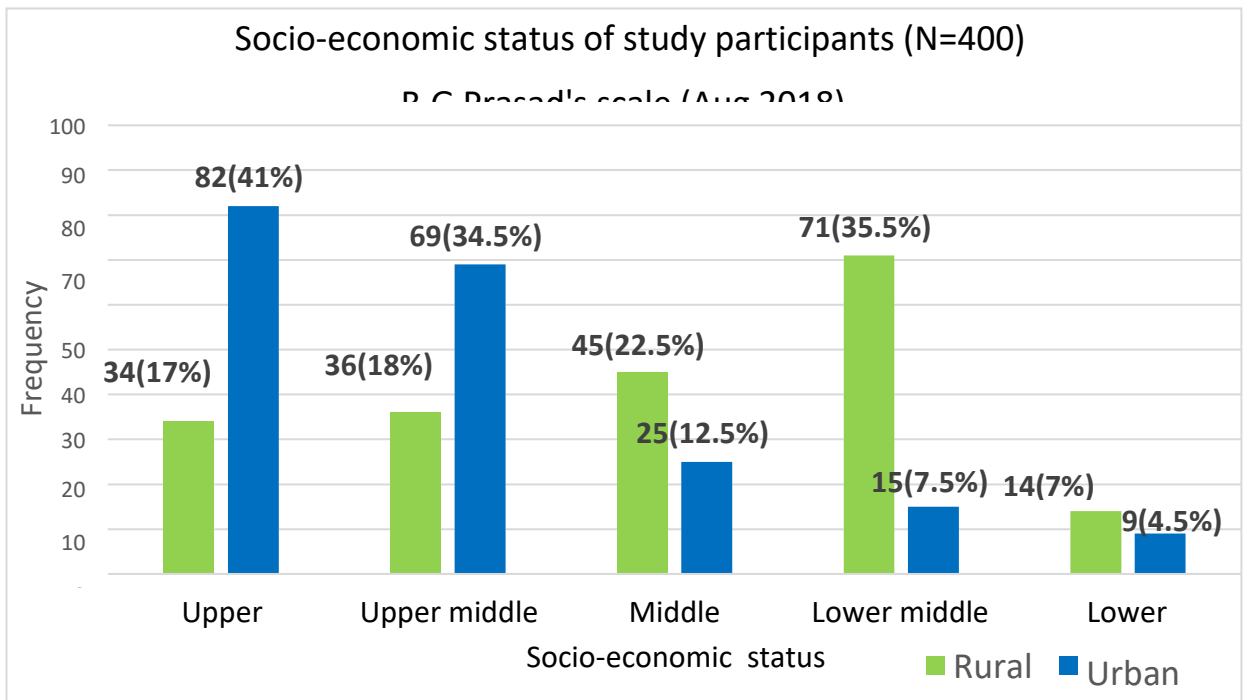
### 6.1.5 Distribution of type of Family:



**Figure:9 Distribution of type of families in rural area and urban area (N=400)**

Figure:9 shows distribution of type of family in rural and urban areas. In both the areas, Nuclear family was the most common type i.e. 60% in rural area and 76% in urban area.

### 6.1.6 Socio-economic status of study participants:



**Figure:10 Socio-economic status of study participants.**

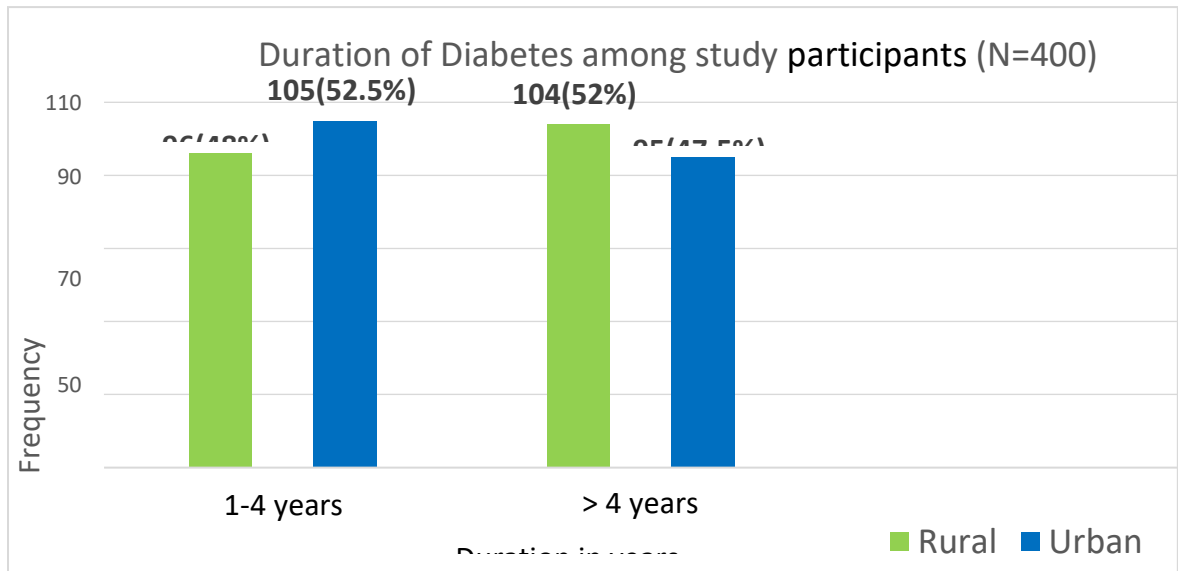
From the above figure, it was evident that in rural area, most of the study participants belonged to lower-middle class (35.5%) followed by middle class (22.5%). In urban area, most of the study participants belonged to upper class (41%) followed by upper middle class(34.5%). The Socioeconomic status was calculated using B.G Prasad's scale. (**Annexure-4**)

### 6.2 Addictive habits of study participants:

Usage of tobacco products by study subjects was high in rural area (32%) when compared to 27% in urban area. Alcohol consumption was almost similar in both rural and urban areas.(25%)

### 6.3 Diabetic profile of study participants:

#### 6.3.1 Duration of Diabetes Mellitus among study participants:



**Figure:11 Duration of Diabetes among study participants.**

The median duration of diabetes among study participants was 4 years with maximum and minimum duration of 31 years and 1 year respectively. In rural area, the median duration of diabetes was 5 with interquartile range of 6 and in urban area, the median duration of diabetes among study participants was 4 years with interquartile range 4.

From the above bar diagram it was evident that, more than half of study participants had duration of Diabetes for > 4 years (52%) in rural area and duration of Diabetes between 1 to 4 years in urban (52.5%) area.

### 6.3.2 Diagnosis of Diabetes among study participants

Table:3 Diagnosis of diabetes among study participants.

Diagnosis	Rural(N=200)	Urban(N=200)
Health checkup	39 (19.5%)	30 (15%)
Had symptoms	105 (52.5%)	100 (50%)
Incidentally	36 (18%)	43 (21.5%)
Had complications	20 (10%)	27 (13.5%)
Total	200	200

From the above table, it was evident that nearly half of study participants were diagnosed with Diabetes only when they were symptomatic both in rural (52.5%) and urban (50%) areas. Remaining study participants were diagnosed during health check up (19.5%), after developing complications (10%) and some were diagnosed incidentally (18%) in rural area. In urban area, 15% were diagnosed during health checkup, 13.5% only after they developed complications and 21.5% were diagnosed incidentally.

### 6.3.4 Family history of diabetes mellitus among study participants:

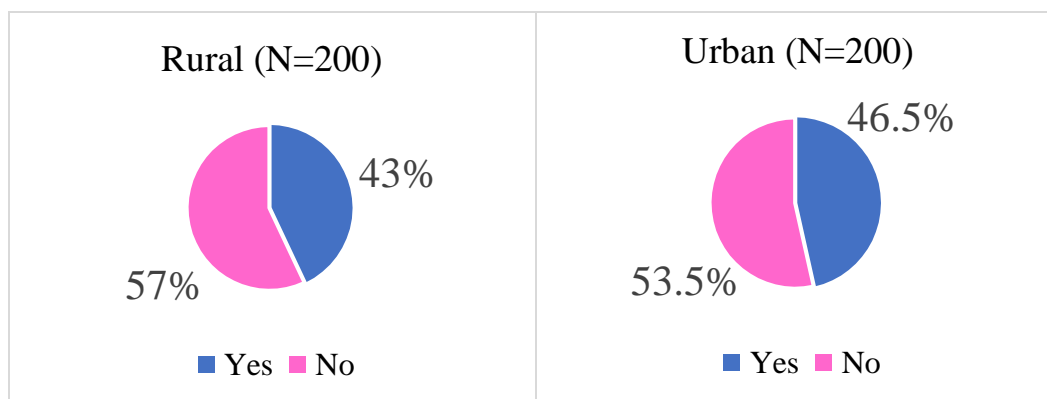
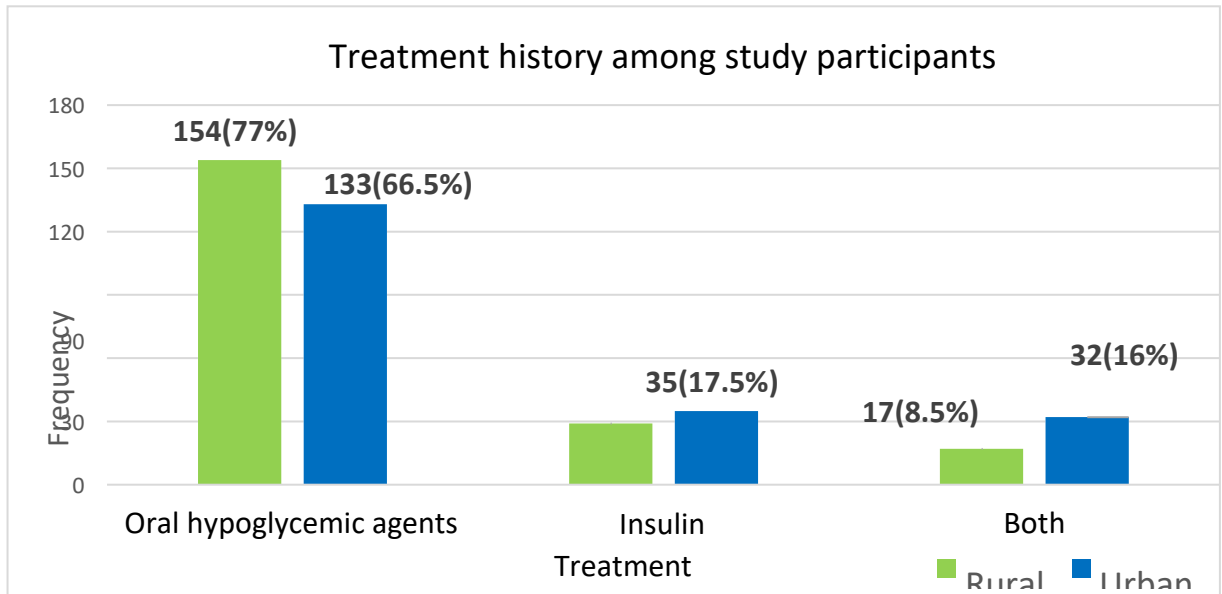


Figure:12 and 13 - Family history of diabetes mellitus among study participants



From the above chart it was evident that, family history of study participants was little high in urban area (46.5%) when compared with rural area (43%)

### 6.3.5 Treatment history among study participants:

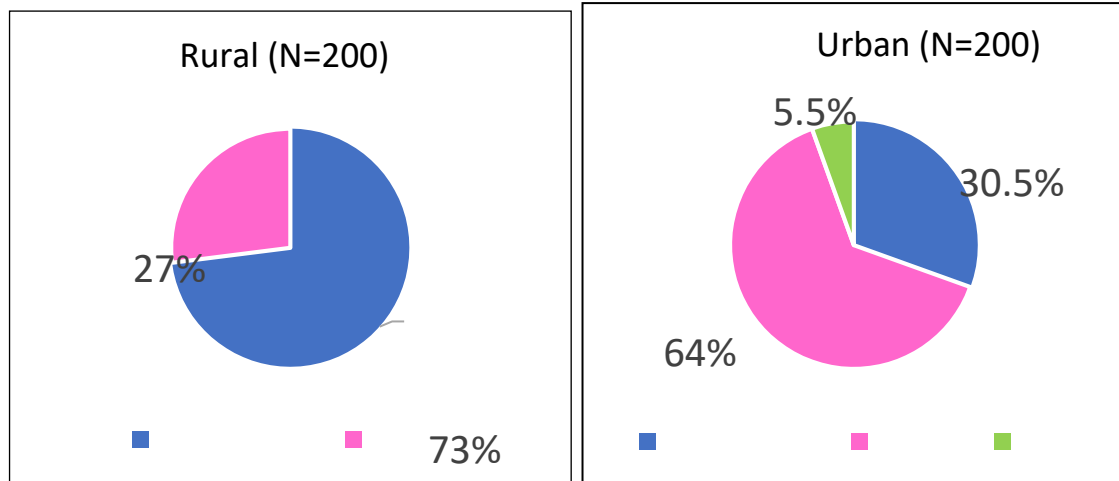


**Figure:14 Treatment history among study participants (N=400).**

From the above chart, it was evident that, study participants treated with oral hypoglycemic agents were high in rural area (77%) when compared with urban area (66.5%), but those using insulin and both OHA and insulin together were high among urban participants.

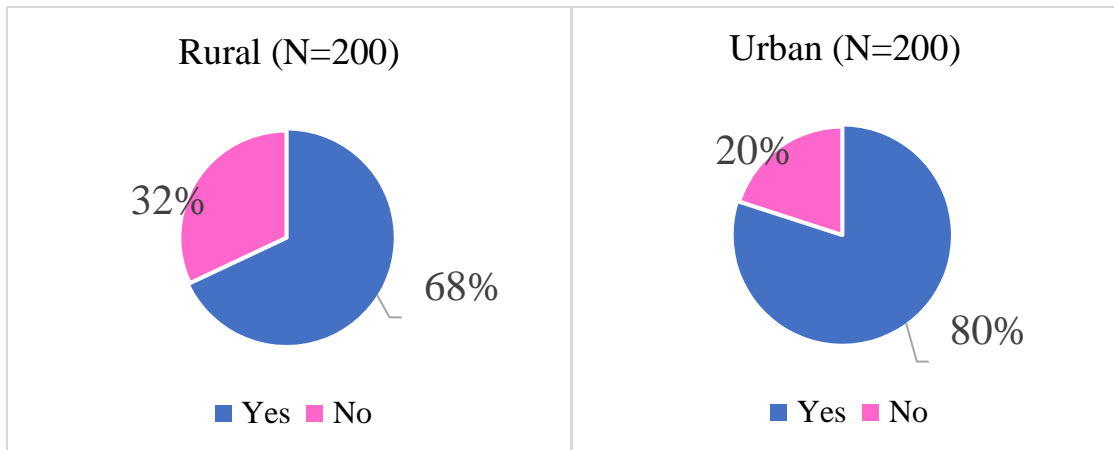
### 6.3.6 Utilization of various treatment facilities by study participants:

**Figure:15 and 16- Utilization of various treatment facilities by study participants. (N=400)**



From the above chart it was evident that, in rural area nearly three-fourth (73%) of participants received treatment from government health facility and remaining from private health care facility. In urban area, majority 64% of participants received treatment from private health care facility and 30.5% received treatment from government facility and 5.5% of study participants received treatment from both the facilities.

### 6.3.7 Presence of co-morbidities among study participants:



**Figure:17 and 18 Presence of co-morbidities among study participants (N=400)**

The above chart shows that presence of co-morbidities were high among urban participants (80%) when compared with rural participants (68%).

### 6.4 Knowledge on self-care in Diabetes:

To assess knowledge on self-care, 14 questions were framed. One question about communicability of disease, 5 questions for diet, and one question in each domain like physical activity, foot care, adherence to drugs, blood glucose monitoring, screening for complications, regarding smoking were framed and it also included 2 questions on hypoglycemia.

Correct response was given 1 mark and wrong response was given zero. Cumulative score was obtained by adding all the responses with maximum score of 14 and minimum score of zero. The mean score was 9.49 with standard deviation of 2.034.

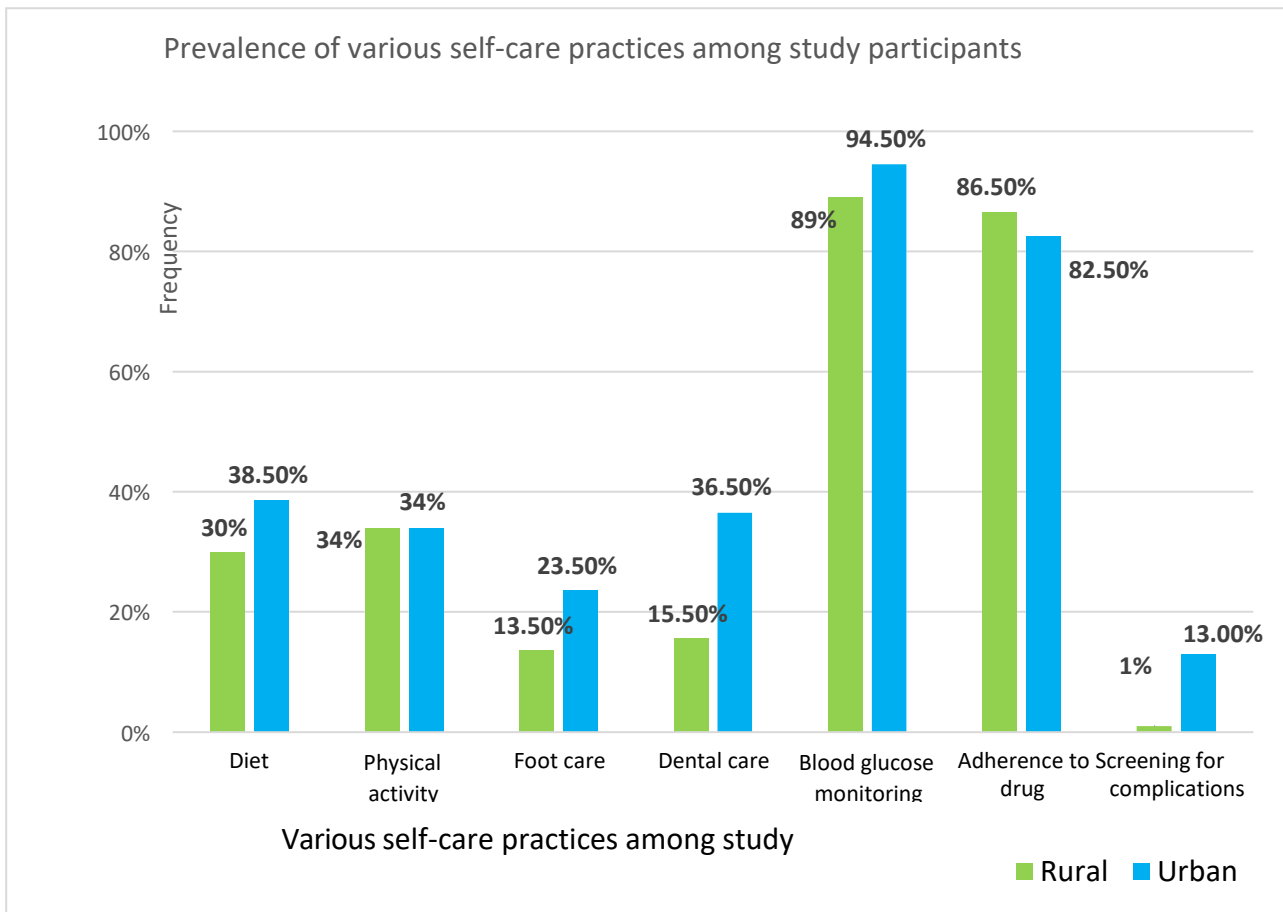
On performing Independent sample T-test, assuming equal variances for Levene's test, difference in cumulative knowledge score was found between study participants in rural and urban area and it was statistically significant ( $p < 0.05$ )

### **6.5 Prevalence of various self-care practices among study participants:**

Simple frequency was used to find out the proportion of participants with good self-care in rural and urban area.

In this study self care practices were assessed under various domains and categorized as follows, in the dietary domain and foot care domain self-care was considered good if the patient had followed the self-care measures for more than 75% of the time in a week. In the domain of physical activity moderate physical activity for at least 30 mins per day for 5 days in a week is considered as good self-care. In the dental care domain brushing teeth twice daily is considered as a good self-care. In the domain of adherence to drugs taking oral hypoglycemic agents or insulin in a dosage as prescribed by the treating physician for at least 6 days a week was taken as a good self-care. Under the domain of blood glucose monitoring, monitoring of venous blood glucose concentration at least once in 3 months was considered as good practice.

Figure:19 Prevalence of various good self-care practices among rural and urban study participants



The above picture shows that most of the self-care practices were good in urban participants than in rural participants except for the practice of adherence to drugs.

Among all the practices, blood glucose monitoring once in 3 months was the highest practiced self-care domain in both rural and urban settings. The least practiced self-care domain was screening for at least 4 complications in both rural and urban area

## 6.6 Comparison of self-care practices among rural and urban study participants:

**Table:4 Cross tabulation between rural and urban study participants and various self-care practices.**

Self-care practices	Residence	Good	Poor	Total	Chi-square	df	p-value
<b>DIET</b>	Rural	60(30%)	140(70%)	200	3.208	1	0.073
	Urban	77(38.5%)	123(61.5%)	200			
<b>PA</b>	Rural	68(34%)	132(66%)	200	0.000	1	1
	Urban	68(34%)	132(66%)	200			
<b>FC</b>	Rural	27(13.5%)	173(86.5%)	200	6.632	1	<b>0.010*</b>

	Urban	47(23.5%)	153(76.5%)	200			
<b>DC</b>	Rural	31(15.5%)	169(84.5%)	200	22.921	1	<b>0.001*</b>
	Urban	73(36.5%)	127(63.5%)	200			
<b>BGM</b>	Rural	178(89%)	22(11%)	200	3.996	1	<b>0.046*</b>
	Urban	189(94.5%)	11(5.5%)	200			
<b>ADH DRUG</b>	Rural	173(86.5%)	27(13.5%)	200	1.222	1	0.269
	Urban	165(82.5%)	35(17.5%)	200			
<b>BP</b>	Rural	178(89%)	22(11%)	200	5.91	1	<b>0.015*</b>
	Urban	191(95.5%)	9(4.5%)	200			
<b>EYE</b>	Rural	7(3.5%)	193(96.5%)	200	27.367	1	<b>0.000*</b>
	Urban	41(20.5%)	159(79.5%)	200			
<b>DENTAL CHECKUP</b>	Rural	3(1.5%)	197(98.5%)	200	13.332	1	<b>0.000*</b>
	Urban	20(10%)	180(90%)	200			
<b>RFT</b>	Rural	5(2.5%)	195(97.5%)	200	28.376	1	<b>0.000*</b>
	Urban	38(19%)	162(81%)	200			
<b>ECG</b>	Rural	12(6%)	188(94%)	200	29.762	1	<b>0.000*</b>
	Urban	52(26%)	148(74%)	200			
<b>LIPID</b>	Rural	10(5%)	190(95%)	200	31.373	1	<b>0.000*</b>
	Urban	50(25%)	150(75%)	200			

(\*- Statistically significant)

[PA- Physical activity, FC-Foot care, DC-Dental care, BGM-Blood glucose monitoring, ADH DRUG – Adherence to drug, BP – Blood pressure monitoring, EYE – Eye examination (retinal), RFT- Renal function test, ECG- Electrocardiogram, LIPID- Lipid profile]

From the above table it was evident that, the statistically significant

difference was found between rural and urban areas in most of the domains of self-care practice except for diet, physical activity and adherence to drug.

## 6.7 Factors affecting self-care practices among diabetic patients

### 6.7.1 Dietary practices:

Various demographic details like age, sex, educational status, employment status, marital status, socio economic status, tobacco usage, alcohol consumption and duration of diabetes was cross tabulated with dietary practices. Among them association between educational status and socioeconomic status was statistically significant. ( $p < 0.001$ )

Table:5 Cross tabulation between educational status and dietary practices among rural and urban study participants:

Educational Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
<b>Illiterate</b>	3(14.3%)	18(85.7%)	21(100%)	1(12.5%)	7(87.5%)	8(100%)
<b>Secondary education</b>	9(10.5%)	77(89.5%)	86(100%)	9(15%)	51(85%)	60(100%)
<b>Higher secondary education</b>	14(38.9%)	22(61.1%)	36(100%)	11(26.8%)	30(73.2%)	41(100%)
<b>Diploma and above</b>	34(59.6%)	23(40.4%)	57(100%)	56(61.5%)	35(38.5%)	91(100%)
<b>Total</b>	60(30%)	140(70%)	200(100%)	77(38.5%)	123(61.5%)	200(100%)



Chi square test = 43.312 df = 3 <b>p value &lt;0.001(S)</b>	Fisher's exact test value = 39.505 <b>p value &lt;0.001(S)</b>
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It was evident from the table that, people who were illiterate had poor practice in dietary self-care i.e. nearly 85% both in rural and urban area. As the educational status increased the dietary self-care practices improved among study participants. Both in rural and urban area participants who had completed education of diploma and above were 60% compliant to the dietary self-care. The association was statistically significant in both the areas (p value < 0.001)

Table:6 Cross tabulation between Socioeconomic status and dietary practices among rural and urban study participants.

Socio-economic Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
Upper class	22(64.7%)	12(35.3%)	34(100%)	53(64.6%)	29(35.4%)	82(100%)
Upper Middle class	11(30.6%)	25(69.4%)	36(100%)	19(27.5%)	50(72.5%)	69(100%)
Middle class	6(13.3%)	39(86.7%)	45(100%)	2(8%)	23(92%)	25(100%)

<b>Lower Middle class</b>	19(26.8%)	52(73.2%)	71(100%)	1(6.7%)	14(93.3%)	15(100%)
<b>Lower class</b>	2(14.3%)	12(85.7%)	14(100%)	2(22.2%)	7(77.8%)	9(100%)
<b>Total</b>	60(30%)	140(70%)	200(100%)	77(38.5%)	123(61.5%)	200(100%)
	Fisher's exact test = 25.616 <b>p value &lt; 0.001(S)</b>			Chi square test = 45.321 <b>p value &lt; 0.001(S)</b>		

From the table it was clear that, participants who belonged to upper socio-economic status (65%) were highly adherent to dietary self-care practices when compared to participant in lower socio-economic status (14% in rural area and 22% in urban area). As socioeconomic status increased, the practice of dietary self-care improved both in rural and urban settings and it was statistically significant (p value < 0.001)

Table:7 Cross tabulation between duration of Diabetes and practice of dietary self-care among rural and urban study participants.

<b>Duration of diabetes</b>	<b>Rural</b>		<b>Total</b>	<b>Urban</b>		<b>Total</b>
	<b>Good practice</b>	<b>Poor practice</b>		<b>Good practice</b>	<b>Poor practice</b>	
<b>1 – 4 Years</b>	34(35.4%)	62(64.6%)	96(100%)	33(31.4%)	72(68.6%)	105(100%)
<b>&gt;4 year</b>	26(25%)	78(75%)	104(100%)	44(46.3%)	51(53.7%)	95(100%)
<b>Total</b>	60(30%)	140(70%)	200(100%)	77(38.5%)	123(61.5%)	200(100%)

Chi square test = 2.579 df = 1 p value = 0.108	Chi square test = 4.668 df = 1 <b>p value = 0.031(S)</b>
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In urban area, as the duration of diabetes increased to more than 4 years, participants (44%) were more compliant to dietary modification as against only 31% of study participants followed the dietary practice when duration of diabetes less than 4 years. As duration of diabetes increased, practice of dietary self-care improved in urban area and it was statistically significant. (p value = 0.031)

### 6.7.2 Physical activity

Various factors like age, sex, educational status, employment status, marital status, socio economic status, tobacco usage, alcohol consumption and duration of diabetes were cross tabulated with physical activity. No association was found between them.

Table:8 Cross tabulation between educational status and physical activity among rural and urban study participants

Educational Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
<b>Illiterate</b>	6(28.6%)	15(71.4%)	21(100%)	4(50%)	4(50%)	8(100%)

<b>Secondary education</b>	26(30.2%)	60(69.8%)	86(100%)	13(21.7%)	47(78.3%)	60(100%)
<b>Higher secondary education</b>	14(38.9%)	22(61.1%)	36(100%)	17(14.5%)	24(58.5%)	41(100%)
<b>Diploma and above</b>	22(38.6%)	35(61.4%)	57(100%)	34(37.4%)	57(62.6%)	91(100%)
<b>Total</b>	68(34%)	132(66%)	200(100%)	68(34%)	132(66%)	200(100%)
	Chi square test = 1.740 df = 3 p value = 0.628			Fisher's exact test value = 6.456 p value = 0.075		

From the table it was clear that as educational status improved, physical activity improved but it was not statistically significant.

### 6.7.3 Foot care:

Various demographic details like age, sex, educational status, employment status, marital status, socio economic status, tobacco usage, alcohol consumption and duration of diabetes were cross tabulated with foot care practice. Among them association between educational status, socioeconomic status and foot care was statistically significant in urban area.

Table:9 Cross tabulation between educational status and foot care practice among rural and urban study participants

<b>Educational Status</b>	<b>Rural</b>		<b>Total</b>	<b>Urban</b>		<b>Total</b>
	<b>Good practice</b>	<b>Poor practice</b>		<b>Good practice</b>	<b>Poor practice</b>	

<b>Illiterate</b>	4(19%)	17(81%)	21(100%)	0(0%)	8(100%)	8(100%)
<b>Secondary education</b>	6(7%)	80(93%)	86(100%)	5(8.3%)	55(91.7%)	60(100%)
<b>Higher secondary education</b>	6(16.7%)	30(83.3%)	36(100%)	4(9.8%)	37(90.2%)	41(100%)
<b>Diploma and above</b>	11(19.3%)	46(80.7%)	57(100%)	38(41.8%)	53(58.2%)	91(100%)
<b>Total</b>	27(13.5%)	173(86.5%)	200(100%)	47(23.5%)	153(76.5%)	200(100%)
	Fisher's exact test value = 6.242 p value = 0.089			Fisher's exact test value = 30.404 <b>p value &lt; 0.001(S)</b>		

The above table showed that, practice of foot care was good among those participants who had completed diploma and above in urban area (41.8%) when compared with participants with low level of education. As educational status improved, the practice of foot care improved markedly among urban study participants which was statistically significant (p value < 0.001)

Table:10 Cross tabulation between Socioeconomic status vs foot care practice among rural and urban study participants.

<b>Socio-</b>	<b>Rural</b>		<b>Urban</b>	
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<b>econom ic Status</b>	<b>Good practice</b>	<b>Poor practice</b>	<b>Total</b>	<b>Good practice</b>	<b>Poor practice</b>	<b>Total</b>
<b>Upper class</b>	10(29.4%)	24(70.6%)	34(100%)	36(43.9%)	46(56.1%)	82(100%)
<b>Upper Middle class</b>	3(8.3%)	33(91.7%)	36(100%)	6(8.7%)	63(91.3%)	69(100%)
<b>Middle class</b>	5(11.1%)	40(88.9%)	45(100%)	3(12%)	22(88%)	25(100%)
<b>Lower Middle class</b>	8(11.3%)	63(88.7%)	71(100%)	1(6.7%)	14(93.3%)	15(100%)
<b>Lower class</b>	1(7.1%)	13(92.9%)	14(100%)	1(11.1%)	8(88.9%)	9(100%)
<b>Total</b>	27(13.5%)	173(86.5%)	200(100%)	47(23.5%)	153(76.5%)	200(100%)
	Fisher's exact test = 7.421 p value = 0.099			Fisher's exact test = 30.621 <b>p value &lt; 0.001(S)</b>		

In urban area, participants who belonged to upper socioeconomic status (43.9%) had good practice of foot care when compared to participants belonging to lower socioeconomic status (11.1%). From the table it was clear that, socioeconomic status increased the foot care practice improved in urban settings and it was statistically significant. (p value <0.001)

#### **6.7.4 Dental care**

Various factors like age, sex, educational status, employment status, marital status, socio economic status, tobacco usage, alcohol consumption and

duration of diabetes were cross tabulated with physical activity. Statistically significant association was found between educational status and dental care practice in urban area.

Table:11 Cross tabulation between educational status and dental care practice among rural and urban study participants

Educational Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
<b>Illiterate</b>	3(14.3%)	18(85.7%)	21(100%)	3(37.5%)	5(62.5%)	8(100%)
<b>Secondary education</b>	13(15.1%)	73(84.9%)	86(100%)	12(20%)	48(80%)	60(100%)
<b>Higher secondary education</b>	5(13.9%)	31(30.4%)	36(100%)	12(29.3%)	29(70.7%)	41(100%)
<b>Diploma and above</b>	10(17.5%)	47(82.5%)	57(100%)	46(50.5%)	45(49.5%)	91(100%)
<b>Total</b>	31(15.5%)	169(84.5%)	200(100%)	73(36.5%)	127(63.5%)	200(100%)
	Fisher's exact test value = 0.319 p value = 0.973			Fisher's exact test value = 15.726 <b>p value &lt; 0.001(S)</b>		

The above table showed that as education improved, the practice of dental care improved markedly among urban study participants which was statistically significant (p value < 0.001)

Table:12 Cross tabulation between Socioeconomic status and dental care among rural and urban study participants

Socioeconomic Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
Upper class	6(17.6%)	28(82.4%)	34(100%)	42(51.2%)	40(48.8%)	82(100%)
Upper Middle class	4(11.1%)	32(88.9%)	36(100%)	21(30.4%)	48(69.6%)	69(100%)
Middle class	9(20%)	36(80%)	45(100%)	4(16%)	21(84%)	25(100%)
Lower Middle class	11(15.5%)	60(84.5%)	71(100%)	5(33.3%)	10(66.6%)	15(100%)
Lower class	1(7.1%)	13(92.9%)	14(100%)	1(11.1%)	8(88.9%)	9(100%)
<b>Total</b>	31(15.5%)	169(84.5%)	200(100%)	73(36.5%)	127(63.5%)	200(100%)
	Fisher's exact test value = 1.848 p value = 0.778			Fisher's exact test = 15.513 <b>p value = 0.003(S)</b>		

The above table showed that, as socioeconomic status improved the practice of dental care improved among urban study participants and it was statistically significant (p value = 0.003)



### 6.7.5 Blood glucose monitoring

Age, sex, educational status, employment status, marital status, socioeconomic status, tobacco usage, alcohol consumption and duration of diabetes were cross tabulated with practice of blood glucose monitoring. Statistically significant association was found between socioeconomic status and practice of blood glucose monitoring

Table:13 Cross tabulation between Socioeconomic status and practice of blood glucose monitoring among rural and urban study participants.

Socio-economic Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
Upper class	28(82.4%)	6(17.6%)	34(100%)	80(97.6%)	2(2.4%)	82(100%)
Upper Middle class	34(94.4%)	2(5.6%)	36(100%)	65(94.2%)	4(5.8%)	69(100%)
Middle class	39(86.7%)	6(13.3%)	45(100%)	20(80%)	5(20%)	25(100%)
Lower Middle class	63(88.7%)	8(11.3%)	71(100%)	15(100%)	0(0%)	15(100%)
Lower class	14(100%)	0(0%)	14(100%)	9(100%)	0(0%)	9(100%)
<b>Total</b>	178(89%)	22(11%)	200(100%)	189(94.5%)	11(5.5%)	200(100%)
	Fisher's exact test = 4.093 p value = 0.368			Chi square test = 8.691 <b>p value = 0.040 (S)</b>		

From the above table it was clear that, as socioeconomic status improved the practice of blood glucose monitoring improved in urban settings and it was statistically significant. (p value < 0.040)

#### **6.7.6 Screening for complications:**

Among 200 study participants in rural area, only 1 participant had done all the 6 screening procedures. In urban area, among 200 participants only 5 of them had undergone all the 6-screening test.

For the purpose of analyzing the factors that influence screening for complications, each screening test done as per recommendation was given score of 1 and cumulative score was calculated with maximum score of 6 and minimum score of 0.

The score of 4 and above was considered as a good practice under this domain.

Factors like age, sex, educational status, employment status, marital status, socio economic status, tobacco usage, alcohol consumption and duration of diabetes were cross tabulated with screening for complications.

Table:14 Cross tabulation between Socioeconomic status and practice of screening for complications among rural and urban study participants.

Socio-economic Status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
Upper class	0(0%)	34(100%)	34(100%)	18(22%)	64(78%)	82(100%)
Upper Middle class	1(2.8%)	35(97.2%)	36(100%)	6(8.7%)	63(91.3%)	69(100%)
Middle class	0(0%)	45(100%)	45(100%)	1(4%)	24(96%)	25(100%)
Lower Middle class	1(1.4%)	70(98.6%)	71(100%)	0(0%)	15(100%)	15(100%)
Lower class	0(0%)	14(100%)	14(100%)	1(11.1%)	8(88.9%)	9(100%)
<b>Total</b>	2(1%)	198(99%)	200(100%)	26(13%)	174(87%)	200(100%)
	Fisher's exact test = 2.694 p value = 0.839			Fisher's exact test = 9.634 <b>p value = 0.032(S)</b>		

From the above table it was clear that, more participants belonging to upper socioeconomic status have done screening than participants in lower socioeconomic status in urban area and it was statistically significant.

Table:15 Cross tabulation between Marital status and practice of screening for complications among rural and urban study participants.

Marital status	Rural		Total	Urban		Total
	Good practice	Poor practice		Good practice	Poor practice	
Living with spouse	2(1.4%)	142(98.6%)	144(100%)	24(17.1%)	116(82.9%)	140(100%)
Living alone	0(0%)	56(100%)	56(100%)	2(3.3%)	58(96.7%)	58(100%)
<b>Total</b>	2(1%)	198(99%)	200(100%)	26(13%)	174(87%)	200(100%)
	Fisher's exact test = 0.884 p value = 1		Chi square test = .082 df = 1 <b>p value = 0.008 (S)</b>			

From the above table it was clear that, those participants who were living with spouse (17.1%) had better screening for complications than persons who were living alone (3.3%) in urban area. It was statistically significant. (p value = 0.008)

### 6.8 Barriers to self-care practices

Among those study participants who had poor practice, various factors in each domain were stated as barriers to practice self-care. They are listed below

### **6.8.1 Dietary practice:**

Among study participants 140 (70%) and 123 (61.5%) had poor dietary self-care practice in rural and urban area respectively. The following factors had been stated by them as barriers.

In rural area, among 140 participants, 22.1% stated that they could not follow their dietary advice due to work, 21.4% stated that their blood sugar was well controlled, so it was not necessary to practice dietary modification.

In urban area, most of participants (33.3%) stated that their blood sugar was well controlled, so it was not necessary to practice dietary modification followed by 24.4% stated poor family support.

### **6.8.2 Poor physical activity**

Among 400 study participants, 132 (66%) and 132 (66%) had poor physical activity in rural and urban area respectively. The following factors had been stated by them as barriers for poor physical activity.

Both in rural area and urban area, nearly half of study participants stated that recommended level of physical activity was compensated in their daily work, followed by participants stating that they had no time for separate physical activity.

### **6.8.3 Foot care**

Among 400 study participants, 173 (86.5%) and 153 (76.5%) had poor foot care practice in rural and urban area respectively.

Both in rural and urban area most of participants stated that their blood glucose was well controlled so there was no need for practicing foot care followed by unawareness as the barriers for practicing foot care.

#### **6.8.4 Dental care**

169 (84.5%) participants in rural area and 127 (63.5%) participants in urban area had poor dental care practice.

Both in rural and urban area participants had stated forgetfulness and unawareness as reasons for poor dental care practice.

#### **6.8.5 Adherence to drug**

27 (13.5%) participants in rural area and 35 (17.5%) participants in urban area had poor adherence to drugs. Forgetfulness and fear of side effects were the 2 main reasons stated for poor adherence by the participants both in rural and urban area.

#### **6.8.6 Blood glucose monitoring**

Among 400 study participants, 22 (11.1%) and 11 (5.5%) had poor monitoring of blood glucose in rural and urban area respectively. Well controlled blood glucose, unawareness were the major reasons stated by participants for poor practice of blood glucose monitoring both in rural and urban area.

### 6.8.7 Screening for complications:

For undergoing test like blood pressure monitoring, eye examination, dental check-up, renal function test, electrocardiogram, lipid profile most of participants stated unawareness followed by poor family support as barriers both in rural and urban area.

### 6.9 Role of health care personnel:

**Table:16 Role of health care personnel in self-care practices (N=400)**

S.No	Received advice on	Rural (%)	Urban(%)
1.	Diet	80.5%	88.5%
2.	Physical activity	76%	82%
3.	Adherence to drug	91.5%	90.5%
4.	Foot care	27.5%	42%
5.	Blood glucose monitoring	80.5%	72%
6.	Screening for complications	7.5%	16%
7.	Symptoms of Low blood sugar	13.5%	15%
8.	To quit moking	6%	5%

From the table it was evident that, urban participants had received more advice on all domains except for adherence to drug and blood glucose monitoring, which was higher in rural participants. Most of the participants had received advice on adherence to drug both in rural and urban areas.

## 7. DISCUSSION

The current study was a community based cross-sectional study conducted to assess and compare the various self-care practices among patients with type 2 Diabetes mellitus in rural and urban areas of Salem, Tamil Nadu. This study has its importance as self-care practices becomes an integral part in the management of type 2 Diabetes.

This study included 400 participants (200 from rural area and another 200 participants from urban areas, obtained from 923 households from rural area and 804 households from urban area of Salem. As this study was conducted mainly to compare the self-care practices among diabetic patients residing in different locality, statistically significant difference was found between most of the domains and residence of the study participants except for dietary practices, physical activity and adherence to drug.

### 7.1 Socio demographic characteristics of the study participants.

In this study, majority of the study participants were in the age group of 41 to 60 years. 60% of the participants were female and 70% were living with their spouse.

These findings were similar to the study conducted in the urban settings in Vellore<sup>23</sup>, and another facility-based study conducted in Pondicherry<sup>19</sup> to assess self-care among Diabetic patients.

The current study showed illiteracy rate was 10.5% in rural area and 4% in urban area. This illiteracy rate falls in the same range as given by NFHS – 4 data of Tamil Nadu.<sup>34</sup>



The results of this study showed that most of the study participants both in rural and urban area belonged to nuclear type of family. This finding reflects the rising trend of nuclear family in our state. In this study, majority of the participants from the rural area were treated in government facility in contrast to participants from urban area who received their treatment from private facility.

It was evident from this study that, nearly half of study participants were diagnosed with Diabetes only when they were symptomatic both in rural (52.5%) and urban (50%) area. Nearly 10% of study participants both in rural and urban area were diagnosed with diabetes once they had complications. Though screening was carried out among adults aged 30 years and above for early detection of Non-communicable disease under NPCDCS<sup>18</sup>, these people were missed diagnosing the disease at an earlier stage due to lack of awareness. So, awareness about screening and community level screening of individuals should be strengthened.

## **7.2 Dietary practices**

In this study, satisfactory level of dietary self-care was practiced by 30% of the study participants in rural area and nearly 40% of the study participants in urban area.

Gopichandran et al reported a prevalence of dietary self-care practice of 29% in his study conducted in urban area of Vellore.<sup>23</sup> On comparing with this study, the current study showed 10% increased prevalence of dietary self-care practices in urban settings. This could be due to the fact that majority of study participants in urban area were treated in private health care, thus increasing the chance of receiving constant reinforcement about dietary modification.

A facility-based study conducted in Pondicherry<sup>19</sup> to assess self-care among diabetics attending Chronic illness, also reported similar prevalence (32.8%) of dietary self-care practices.

As dietary modification forms an important process in management of blood sugar level in diabetic patients healthy eating habits should be promoted among patients while counselling them and through health education sessions.

### **7.3 Physical activity**

The physical activity component of self-care practices appeared to be poor in this study. Both in rural and urban area, only 34% of the study participants did 30 minutes of moderate physical activity for 5 days in a week regularly.

This finding was similar to the camp-based study conducted by Shrivastava et al in Kancheepuram in 2014 which reported only 30% of study participants had satisfactory level of physical activity<sup>20</sup>.

This level of poor physical activity was also consistent with the results obtained from a community based cross-sectional study conducted in urban areas of Vellore in 2009<sup>23</sup>. This study showed only 20% of participants had good practice of physical activity.

As engaging in regular physical activity by the diabetic patients will be beneficial for them in maintaining blood glucose, reducing the insulin resistance and better control of blood pressure, more stress should be given on this domain while educating the diabetic patients.

#### **7.4 Foot care**

In the domain of foot care practices, washing feet with soap and water was practiced by almost all participants in rural and urban area. This could be attributed to the cultural practices prevailing in our society. But other practices like checking foot for ulcer, checking inside of the footwear for discharges, applying oil to prevent dryness, drying the skin between the toes, using footwear inside the house were unsatisfactory as only 13% of study participants in rural area and 23% of study participants in urban area followed the advice.

As foot care was the most neglected domain of self-care in most of the studies conducted in India and Tamil Nadu<sup>19-23</sup>, this study also reflects the same. This shows the need for more concentration on foot care education in both rural and urban areas.

#### **7.5 Dental care**

Brushing the teeth twice daily was followed only by 15 % of study participants in rural area and 36 % of the study participants in urban area. Although this practice has been emphasized since the school days, it still remains under unsatisfactory level.

Though there exists inherent knowledge on other practices of self-care like diet, physical activity among diabetic patients, dental hygiene remains as a grey area in the field of self-care for diabetics in our sociocultural settings.

A study conducted to assess oral health knowledge, attitude, and practices among diabetics in a Northern Union Territory of India by S Gupta et al<sup>57</sup> in 2017, showed almost three-fourth of study participants had lack of awareness about the relationship between diabetes and oral health. Oral health knowledge, attitudes and self-care practices of people with diabetes, a systematic review done by Poudel et al

<sup>58</sup>, showed diabetics had inadequate oral health knowledge, poor oral health attitudes, and fewer dental visits. They poorly received oral health education and dental referrals from their care providers. So, the provision of oral health education by diabetes care providers should be emphasized.

## **7.6 Blood glucose monitoring**

Blood glucose monitoring at least once in 3 months was the highly practiced self-care in this study. This satisfactory level of results was consistent with the other studies done in Tamil Nadu <sup>19-23</sup>.

In spite of the patients being involved, the role of treating physician in emphasizing regular monitoring of blood glucose during health visit, plays a vital role in this domain and this would have contributed to the satisfactory level in all the studies.

## **7.7 Adherence to drugs**

This community based cross-sectional study on self-care practices among Diabetics showed satisfactory level of adherence to medications as nearly 85% of the study participants both in rural and urban area had good adherence.

This finding was consistent with the results obtained from community based cross-sectional study conducted in Vellore in 2009 <sup>23</sup>, which showed 80% of the study participants had good adherence to medication.

A facility-based cross-sectional study conducted in Tiruvallur <sup>21</sup>, also showed 90% adherence to medications by diabetic patients.

These findings could be due to the fact that perception that taking drugs regularly would cure diabetes on long term prevails in our cultural settings.

### **7.8 Screening for complications**

Under this domain, practice for 6 screening tests was assessed. Among them monitoring blood pressure once in 3 months was under satisfactory level but screening with other 5 test were poor. On comparing rural and urban, statistically significant difference was found between them. This could have been due to the place of treatment facility where the participants have been treated, as most of the rural participants received treatment from government facility while most of the urban participants from private facility.

This finding was consistent with the results obtained from various studies conducted among diabetic patients to assess knowledge on complications of diabetes all over India <sup>36-38</sup>

### **7.9 Addictive habits**

The current study showed that usage of tobacco products by study subjects was high in rural area (32%) when compared to 27% in urban area. 25% of study participants both in rural and urban area were consuming alcohol at present. Special care must be provided by the treating physician in identifying these people and deaddiction should be initiated among them at the earliest.

### **7.10 Factors influencing self-care among Diabetes patients.**

This study showed positive association between educational status, socioeconomic status and most of the self-care practices. This finding was consistent with the results obtained from various studies done to assess self-care among diabetics in India <sup>12-14</sup>.

The current study showed unawareness as the main barrier for various self-care practices. Other barriers identified were poor perceived benefits, lack of family support, financial constraints.

Shrivastava et al <sup>11</sup>, also stated attitude, beliefs, knowledge about Diabetes, culture and language capabilities, health literacy, financial resources and social support as factors responsible for poor self-care among Diabetic patients.

### **7.11 Role of Health care personnel in self-care practices**

The current study had showed that only 7.5% of participants in rural area and 16% of study participants in urban area had received advice on screening for complications from health care personnel. As timely screening helps in early identification and management and thus delays the progression of complication, active participation by health care personnel should be emphasized.

## 7. SUMMARY AND CONCLUSION

A community based cross-sectional study was conducted to assess and compare the various self-care practices and factors influencing it, among patients with type 2 Diabetes mellitus in rural and urban areas of Salem, Tamil Nadu.

400 persons with type 2 Diabetes mellitus residing in selected rural and urban areas of Salem selected through multistage sampling were the study participants. Both men and women aged 30 and above who have physician diagnosed type 2 Diabetes mellitus for at least 1 year and residing in the selected locality for at least 1 year and who consented for the study were included in this study.

The information regarding self-care activities among patients with type 2 diabetes was collected using the revised version of Summary Diabetes Self-Care Activities questionnaire (SDSCA). Data was collected using semi-structured pretested questionnaire with 5 sections in regional language (Tamil) by face to face interview method.

In this study, dietary practice, physical activity, foot care, dental care, monitoring of blood glucose level, adherence to prescribed drugs, screening for complications and life free from having addictive habits are the 8 domains considered under self-care.

The study revealed the following findings,

- Majority of the study participants were in the age group of 41 to 60 years in both rural and urban area. 60% of the participants were female and 70% were living with their spouse. The illiteracy rate was 10.5% in rural area and 4% in urban area.

- Usage of tobacco products was high in rural area (32%) when compared to (27%) in urban area.
- Alcohol consumption by study participants was almost similar (25%) in rural and urban area.
- The median duration of diabetes among study participants was 4 years with maximum and minimum duration of 31 and 1 year respectively
- Nearly half of study participants were diagnosed with Diabetes only after developing symptoms in both rural (52.5%) and urban (50%) area. 10% of participants in rural area and 13.5% of participants in urban area were diagnosed only after developing complications of Diabetes.
- In rural area nearly three-fourth (73%) of participants received treatment from government health facility and remaining from private health care facility but in urban area more than half i.e. 64% of participants received treatment from private health care facility, 30.5% received treatment from government and 5.5% of study participants received treatment from both facilities.
- Among all the practices, blood pressure monitoring (95.5%) once in 3 months was the highest practiced self-care in urban settings but in rural area blood glucose monitoring and blood pressure monitoring at least once in 3 months were the highest (89%).
- The least practiced self-care was dental check-up at least once in a year in both rural (1.5%) and urban (10%) settings.



- The only practice which was high among rural participants was adherence to drugs (86.5%) for 6 days in a week.
- Good dietary self-care practice was more among urban (38.5%) study participants when compared with rural (30%) participants but it was not statistically significant.
- Practicing good physical activity (34%) was equal among study participants in rural and urban area.
- Foot care practice was higher among residence of urban (23.5%) than rural (13.5%) participants and it was statistically significant.
- Dental care practice was higher among residence of urban (36.5%) than rural (15.5%) participants and it was statistically significant.
- Nearly 95% of study participants in urban area monitored their blood glucose at least once in 3 months while 89% of study participants monitored in rural settings. This difference was found to be statistically significant.
- Adherence to drugs was high among rural study participants (86.5%) than urban participants (82.5%) but it was not statistically significant.
- Screening for diabetic retinopathy was done by 3.5% and 20.5% of study participants in rural and urban area respectively and the association was found to be statistically significant.
- 2.5% and 19% of study participants had done renal function test in last year in rural and urban area respectively. This difference was statistically significant.

- Monitoring ECG at least once in a year was high among urban participants (26%) than rural participants (5%). It was found to be statistically significant.
- Monitoring Lipid profile at least once in a year was high among urban participants (25%) than rural participants (5%). It was found to be statistically significant.
- This study showed positive association between educational status, socioeconomic status and most of the self-care practices.
- The current study showed unawareness as the main barrier for various self-care practices.
- Other barriers identified were poor perceived benefits, lack of family support, financial constraints, physical disability.

## 8. LIMITATIONS

1. Even though the diabetic status of the participants were verified with the records available with them during the study, the stigma attached to chronic illnesses such as diabetes would have prevented some of the participants from disclosing their status. As they were not included in this study, it could have affected the true estimate of prevalence of self-care practices.
2. As this study estimated the practice of self-care followed by participants in last 7 days, the role of recall bias especially in the domain of dietary practices could not be eliminated completely.
3. The existence of the social desirability bias in this study, against dietary practices and foot care practices could not be ruled out.
4. Repeated systematic sampling had to be done to achieve the calculated sample size within the available sample frame in the rural and urban area.

## 10. RECOMMENDATIONS

- The health care personnel should identify the people with the risk of poor compliance at the earliest and provide special attention to them.
- As this study showed poor foot care practices among participants, IEC & Behavioral Change Communication sessions on foot care and demonstration sessions on foot care practice can improve the foot care practices among rural and urban study participants.
- As financial constraints were stated as barrier by the participants, periodic screening for complications can be strengthened at the primary health care level.
- As our out-patients services are utilized by a huge number of people daily, existing health care staff will be overburdened to provide advice on self-care individually. So, a medical social worker can be appointed and trained as a diabetes educator to provide diabetes education program at the block level to provide special care for diabetic patients.
- Diabetes education program should not happen once, but periodic reinforcement is necessary to bring about change in behavior and to sustain them for a long period of time.
- Self-help groups can be created at each village level with active participation of people with diabetes under the guidance of Village health nurse. Participants can be encouraged to meet on monthly basis to identify the enablers and barriers for self-care practices.

- More exploratory studies are recommended at the grassroot level to identify the barriers to practice self-care to plan for effective management.

## 11. REFERENCES

1. The top 10 causes of death. [cited 2019 Oct 10]. Available from:  
<https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>
2. Non communicable diseases. Who.int. 2019 [cited 10 October 2019].  
Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
3. WHO | World Health Organization [Internet]. [cited 2019 Oct 10]. Available from: <https://www.who.int/gho/ncd/en/>
4. Diabetes [Internet]. [cited 2019 Oct 10]. Available from:  
<https://www.who.int/news-room/fact-sheets/detail/diabetes>
5. IDF Diabetes Atlas [Internet]. Idf.org. 2019 [cited 20 October 2019].  
Available from: <https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/134-idf-diabetes-atlas-8th-edition.html> IDF Diabetes Atlas 8E CH5.pdf.
6. Chronic complications in newly diagnosed patients with Type 2 diabetes mellitus in India Sosale A, Prasanna Kumar K M, Sadikot S M, Nigam A, Bajaj S, Zargar A H, Singh S K - Indian J Endocr Metab [Internet]. [cited 2019 Oct 11]. Available from: <http://www.ijem.in/article.asp?issn=2230-8210;year=2014;volume=18;issue=3;spage=355;epage=360;aulast=Sosale>

7. AADE7 Self-Care Behaviors for Managing Diabetes Effectively [Internet]. [cited 2019 Oct 11]. Available from: <https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors>
8. Povey RC, Clark-Carter D. Diabetes and healthy eating: a systematic review of the literature. *Diabetes Educ.* 2007 Dec;33(6):931–59; discussion 960-961.
9. Boulé NG, Haddad E, Kenny GP, Wells GA, Sigal RJ. Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: a meta-analysis of controlled clinical trials. *JAMA.* 2001 Sep 12;286(10):1218–27.
10. Odegard PS, Capoccia K. Medication taking and diabetes: a systematic review of the literature. *Diabetes Educ.* 2007 Dec;33(6):1014–29; discussion 1030-1031.
11. Deakin T, McShane CE, Cade JE, Williams RDRR. Group based training for self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database Syst Rev.* 2005 Apr 18;(2):CD003417.
12. Patients' adherence to diabetes treatment. - PubMed - NCBI [Internet]. [cited 2019 Oct 11]. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/11225220>
13. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2

diabetes (UKPDS 33). UK Prospective Diabetes Study (UKPDS) Group.  
Lancet. 1998 Sep 12;352(9131):837–53.

14. American Association of Clinical Endocrinologists. The American Association of Clinical Endocrinologists Medical Guidelines for the Management of Diabetes Mellitus: the AACE system of intensive diabetes self-management--2000 update. *Endocr Pract.* 2000 Feb;6(1):43–84.
15. Hendra TJ, Sinclair AJ. Improving the care of elderly diabetic patients: the final report of the St Vincent Joint Task Force for Diabetes. *Age Ageing.* 1997 Jan;26(1):3–6.
16. Mensing C, Boucher J, Cypress M, Weinger K, Mulcahy K, Barta P, et al. National standards for diabetes self-management education. *Diabetes Care.* 2006 Jan;29 Suppl 1:S78-85.
17. Diabetes Self Management Education | American Diabetes Association [Internet]. [cited 2019 Aug 21]. Available from:  
<https://www.professional.diabetes.org/diabetes-self-management-education>
18. Training Module for Medical Officers for Prevention, Control and Population Level Screening of NCDs.pdf [Internet]. [cited 2019 Oct 1]. Available from:  
<https://mohfw.gov.in/sites/default/files/Training%20Module%20for%20Medical%20Officers%20for%20Prevention%2C%20Control%20and%20Population%20Level%20Screening%20of%20NCDs.pdf>



19. Selvaraj K, Ramaswamy G, Radhakrishnan S, Thekkur P, Chinnakali P, Roy G. Self-care practices among diabetes patients registered in a chronic disease clinic in Puducherry, South India. *Journal of Social Health and Diabetes*. 2016 Jun;04(01):025–9.
20. Shrivastava P, Shrivastava SRBL, Ramasamy JD. An Epidemiological Study to Assess the Knowledge and Self Care Practices among Type 2 Diabetes Mellitus Patients Residing in Rural Areas of Tamil Nadu. In 2015.
21. Self-care practices among type II diabetics attending primary health centre, Thiruvallur district, Tamil Nadu | R. | *International Journal Of Community Medicine And Public Health* [Internet]. [cited 2019 Aug 21]. Available from: <https://www.ijcmph.com/index.php/ijcmph/article/view/1587>
22. Veerakumar, Shanmugapriya V, Narayanan SP, Subashini V. Self-care Activities among Diabetic patients in rural areas of Trichy District ,. In 2017.
23. Gopichandran V, Lyndon S, Angel MK, Manayalil BP, Blessy KR, Alex RG, et al. Diabetes self-care activities: A community-based survey in urban southern India. *THE NATIONAL MEDICAL JOURNAL OF INDIA*. 2012;25(1):4.
24. Adu MD, Malabu UH, Malau-Aduli AEO, Malau-Aduli BS. Enablers and barriers to effective diabetes self-management: A multi-national investigation. *PLOS ONE*. 2019 Jun 5;14(6):e0217771.

25. Tk C, KJ S. Diabetes Mellitus: Current challenges and barriers in the delivery and utilization of health care in a coastal district of Karnataka. 2016;7(1):6.
26. Shrivastava SR, Shrivastava PS, Ramasamy J. Role of self-care in management of diabetes mellitus. J Diabetes Metab Disord. 2013 Mar 5;12:14.
27. Ahmed AM. History of diabetes mellitus. Saudi Med J. 2002 Apr;23(4):373–8.
28. Jameson L. (2017). Harrison's Endocrinology. 4<sup>th</sup> ed. New York: McGrawHillEducation, pp.230-328.
29. Diabetes [Internet]. [cited 2019 Aug 15]. Available from: <https://www.who.int/news-room/fact-sheets/detail/diabetes>
30. International Diabetes Federation - Diabetes in SEA [Internet]. [cited 2019 Aug 10]. Available from: <https://idf.org/our-network/regions-members/south-east-asia/diabetes-in-sea.html>
31. Singh K, Narayan K MV, Eggleston K. Economic Impact of Diabetes in South Asia: the Magnitude of the Problem. Curr Diab Rep. 2019 May 16;19(6):34.
32. Bansode B, Jungari DS. Economic burden of diabetic patients in India: A review. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2019 Jul 1;13(4):2469–72.

33. Thomas N, Jeemon P. India State-Level Disease Burden Initiative Diabetes Collaborators\*. The increasing burden of diabetes and variations among the states of India: the Global Burden of Disease Study 1990–2016. *The Lancet Global Health*. 2018 Sep 12;
34. TN\_FactSheet.pdf [Internet]. [cited 2019 Aug 21]. Available from: [http://rchiips.org/nfhs/pdf/NFHS4/TN\\_FactSheet.pdf](http://rchiips.org/nfhs/pdf/NFHS4/TN_FactSheet.pdf)
35. Diabete.qc.ca. 2019 [cited 20 October 2019]. Available from: <https://www.diabete.qc.ca/wp-content/uploads/2016/12/IDF-DA-8e-EN-finalR3-2.pdf>
36. Deepa M, Bhansali A, Anjana RM, Pradeepa R, Joshi SR, Joshi PP, et al. Knowledge and awareness of diabetes in urban and rural India: The Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes 4. *Indian J Endocrinol Metab*. 2014;18(3):379–85.
37. Durgad A, Parakh RB, Dhananjaya M, Ramesh KN. Awareness of Diabetes Mellitus and its Complications among Patients at Tertiary Care Hospital. 2016;4(1):3.
38. Shah K, Gandhi A, Natarajan S. Diabetic retinopathy awareness and associations with multiple comorbidities: Insights from DIAMOND Study. *Indian Journal of Endocrinology and Metabolism*. 2018 Jan 1;22(1):30.

39. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care*. 2000 Jul;23(7):943–50.
40. Schmitt A, Gahr A, Hermanns N, Kulzer B, Huber J, Haak T. The Diabetes Self-Management Questionnaire (DSMQ): development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control. *Health Qual Life Outcomes*. 2013 Aug 13;11:138.
41. Mbuagbaw L, Aronson R, Walker A, Brown RE, Orzech N. The LMC Skills, Confidence & Preparedness Index (SCPI): development and evaluation of a novel tool for assessing self-management in patients with diabetes. *Health Qual Life Outcomes*. 2017 Jan 31;15(1):27.
42. Stetson B, Schlundt D, Rothschild C, Floyd JE, Rogers W, Mokshagundam SP. Development and validation of The Personal Diabetes Questionnaire (PDQ): A measure of diabetes self-care behaviors, perceptions and barriers. *Diabetes Research and Clinical Practice*. 2011 Mar 1;91(3):321–32.
43. Peyrot M, Peeples M, Tomky D, Charron-Prochownik D, Weaver T, Project AOP and ADEO. Development of the American Association of Diabetes Educators' Diabetes Self-management Assessment Report Tool. *Diabetes Educ*. 2007 Sep 1;33(5):818–26.
44. Jackson IL, Adibe MO, Okonta MJ, Ukwé CV. Knowledge of self-care among type 2 diabetes patients in two states of Nigeria. *Pharm Pract (Granada)*

[Internet]. 2014 [cited 2019 Oct 1];12(3). Available from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4161403/>

45. Alhaik S, Anshasi HA, Alkhaldeh J, Soh KL, Naji AM. An assessment of self-care knowledge among patients with diabetes mellitus. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2019 Jan 1;13(1):390–4.
46. Kassahun T, Gesesew H, Mwanri L, Eshetie T. Diabetes related knowledge, self-care behaviours and adherence to medications among diabetic patients in Southwest Ethiopia: a cross-sectional survey. *BMC Endocr Disord*. 2016 May 31;16(1):28.
47. Padma K, Bele S, Bodhare T, Valsangkar S, Padma C. Evaluation of knowledge and self care practices in diabetic patients and their role in disease management. *Natl Med J India*. 2012 Jan 1;3.
48. Dedefo MG, Ejeta BM, Wakjira GB, Mekonen GF, Labata BG. Self-care practices regarding diabetes among diabetic patients in West Ethiopia. *BMC Res Notes* [Internet]. 2019 Apr 8 [cited 2019 Aug 22];12. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6454742/>
49. Bongor Z, Shiferaw S, Tariku EZ. Adherence to diabetic self-care practices and its associated factors among patients with type 2 diabetes in Addis Ababa, Ethiopia. *Patient Prefer Adherence*. 2018 Jun 6;12:963–70.

50. Tan MY, Magarey J. Self-care practices of Malaysian adults with diabetes and sub-optimal glycaemic control. *Patient Educ Couns*. 2008 Aug;72(2):252–67.
51. Mohandas A, Bhasin SK, Upadhyay M, Madhu SV. Diabetes self care activities among adults 20 years and above residing in a resettlement colony in East Delhi. *Indian Journal of Public Health*. 2018 Apr 1;62(2):104.
52. Rajasekharan D, Kulkarni V, Unnikrishnan B, Kumar N, Holla R, Thapar R. Self-Care Activities Among Patients with Diabetes Attending a Tertiary Care Hospital in Mangalore Karnataka, India. *Ann Med Health Sci Res*. 2015;5(1):59–64.
53. Dinesh PV, Kulkarni AG, Gangadhar NK. Knowledge and self-care practices regarding diabetes among patients with Type 2 diabetes in Rural Sullia, Karnataka: A community-based, cross-sectional study. *J Family Med Prim Care*. 2016 Dec;5(4):847–52.
54. Raithatha SJ, Shankar SU, Dinesh K. Self-Care Practices among Diabetic Patients in Anand District of Gujarat [Internet]. *International Scholarly Research Notices*. 2014 [cited 2019 Oct 17]. Available from: <https://www.hindawi.com/journals/isrn/2014/743791/>
55. Welcome to mDiabetes... [Internet]. [cited 2019 Oct 2]. Available from: <http://mdiabetes.nhp.gov.in/>

56. Eat Right India [Internet]. [cited 2019 Oct 2]. Available from: <https://eatrightindia.gov.in/index.jsp>
57. Gupta. Evaluation of oral health knowledge, attitude, and practices among diabetics in a Northern Union Territory of India [Internet]. [cited 2019 Oct 14]. Available from: <http://www.ijds.in/article.asp?issn=0976-4003;year=2017;volume=9;issue=3;spage=148;epage=152;aulast=Gupta>
58. Poudel P, Griffiths R, Wong VW, Arora A, Flack JR, Khoo CL, et al. Oral health knowledge, attitudes and care practices of people with diabetes: a systematic review. BMC Public Health [Internet]. 2018 May 2 [cited 2019 Oct 14];18. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5930945/>

## **ANNEXURES**



**Information sheet**

**A Comparative Cross-sectional study on self-care practices among patients with type 2 diabetes in rural and urban areas in Salem district, Tamil Nadu.**

I..... am going to undertake the study on the above-mentioned topic

**Research Subject Information Sheet**

Non communicable disease is the leading cause of death in adults worldwide. The primary goal in diabetes management is better control of blood sugar levels. The treatment options tend to be multiple and lifelong. Apart from regular medications, there are other beneficial activities that can help in improvement of quality of life among patients with diabetes and help to prevent complication. They are healthy eating, being physically active, regular monitoring of blood sugar level, taking medications regularly, stress management and risk reduction behaviors. Regular practices of these activities is associated with good outcome.

**Purpose of the study:**

This study aims to assess the knowledge of diabetes, self-care practices in its management and its various determinants in type 2 diabetes patients in rural and urban areas.

**Procedure:**

The survey would take approximately 15-30 minutes of your valuable time. You will be asked a few questions regarding yourself, your awareness regarding diabetes, and self-care practices that you follow in the management of diabetes along with medication. The collected data will be used for research purpose only.

**Benefits:**

There may not be any direct benefit for you from this study. But the information provided by you may prove to be of great importance with respect to understanding the difficulties in practicing self-care in management of diabetes at community level.

Signature/left thumb impression of the participant

## தகவல் தாள

கிராமப்புற மற்றும் நகர்ப்புறங்களில் உள்ள இரண்டாம் வகை சர்க்கரை நநாயாளிகளுக்கு இகடநயயான சுய பராமரிப்பு குறித்த ஆய்வு. நசலம் மாவட்டம் ,தமிழ்நாடு.

I..... am going to undertake the study on the above-mentioned topic

இந்த ஆராய்ச்சியில் உங்களிடம் கேட்கும் கேள்விகளுக்கு உங்கள் முழு மனதுடன் பதிலளிக்க வேண்டும்.

இந்த ஆராய்ச்சியில் உங்களுக்கு எந்த பின்விளைவும் ஏற்படாது என்பதை நான் உறுதியளிக்கிறேன்.

உங்களிடம் கேட்கும் கேள்விகளில் உங்களின் சுயவிபரம் சர்க்கரை நோய் பற்றிய விபரம் மற்றும் அதை பற்றிய விழிப்புணர்வு, சுய பாதுகாப்பு நடைமுறைகள் பற்றி சில கேள்விகள் கேட்கப்படும்.

உங்களுக்கு பணம் எதுவும் அளிக்கப்படாது என்பதை இதன் மூலம் தெரிவிக்கிறேன்.

இந்த ஆய்வில் உங்களுக்கு நேரடி பயன் எதுவும் இல்லை. நீங்கள் அளிக்கும் தகவல் மூலம் புது யுக்திகள் வகுக்கப்படலாம். அதன் மூலம் வருங்காலத்தில் உங்களுக்கோ அல்லது உங்களை போன்ற மக்களுக்கு பயன்படலாம்.

நீங்கள் எப்போது வேண்டுமானாலும் இந்த ஆய்விலிருந்து விலகி கொள்ளலாம். அதனால் உங்களுக்கு எந்த பாதிப்பும் இல்லை. உங்களின் விபரங்கள் எதுவும் மற்றவர்களுக்கு தெரிவிக்கப்படாது என்பதை உறுதியளிக்கிறேன்.

இந்த ஆராய்ச்சியின் முடிவுகள் பத்திரிக்கைகளில் பிரசுரிக்கப்படலாம். ஆனால் உங்களின் அடையாளம் எதுவும் தெரிவிக்கப்படாது.

**கையொப்பம்**

**Informed Consent form**

Participant identification number:

Title of the study: A Comparative Cross-sectional study on self-care practices among patients with type 2 diabetes in rural and urban areas in Salem district, Tamil Nadu.

Name of the Principal Investigator: Dr.Sharmila.P.V.  
Phone number: 9894383281

I have read/been read the details of the information sheet. The nature of the study and my involvement have been explained and all my questions regarding the study have been answered satisfactorily. By signing/providing thumb impression on this consent form, I indicate that I understand what is expected from me and that I am willing to participate in this study. I know that I can withdraw my participation at any time during the interview without any explanation.

Signature / Left thumb print

Name and portal address of the patient

\_\_\_\_\_

Date of consent:

Witness 1

\_\_\_\_\_

Signature

Witness 2

\_\_\_\_\_

Signature

## ஒப்புதல் படிவம்

தலைப்பு:

நான் இந்த ஆராய்ச்சியின் முழு விபரம் பற்றி அறிந்துகொண்டேன்.  
இந்த ஆராய்ச்சியில் எந்த பின்விளைவும் இல்லை என்பதை புரிந்துகொண்டேன்.

இந்த ஆராய்ச்சிக்கு பணமோ, பொருளோ கிடைக்காது என்பதையும்  
அறிந்துகொண்டேன்.

இந்த ஆராய்ச்சியில் கேட்கப்படும் கேள்விகளுக்கு என்னால் முயன்ற  
வரை உண்மை விபரம் அளிப்பேன் என்பதை உறுதியளிக்கிறேன்.

என் முழு மனதுடன் இந்த ஆராய்ச்சிக்கு ஒத்துழைப்பு அளிக்கிறேன்.

### கையொப்பம்

Name and portal address of the patient

\_\_\_\_\_

Date of consent:

Witness 1

\_\_\_\_\_

Signature

Witness 2

\_\_\_\_\_

Signature

A COMPARITIVE CROSS-SECTIONAL STUDY ON SELF CARE PRACTICES AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN RURAL AND URBAN AREAS OF SALEM DISTRICT, TAMIL NADU.

QUESTIONNAIRE

Id No:

**Section:1 Socio-demographic details**

1. Name:
2. Age:
3. Sex:        1) Male 2) Female
4. Residence: 1) Rural 2) Urban
5. Education:
6. Occupation: 1) Employed 2) Unemployed
7. Marital status – 1) Married 2) Unmarried 3) Divorced 4) widow/widower
8. Type of Family – 1) Nuclear 2) Joint 3) Three Generation 4) Others (Specify)
9. Total number of household family members:
10. Total family income per month\_\_\_\_\_.

**Addictive Habits:**

11. What form of tobacco products do you use currently?  
1) Cigarettes 2) Chewable 3) Snuff 4) None
12. Do you consume alcohol at present? 1) Yes 2) No  
If yes, amount of alcohol-\_\_\_\_\_and frequency -\_\_\_\_\_ (in months)

**Section:2 Diabetic profile of study participants:**

13. At what age were you diagnosed to have diabetes?\_\_\_\_\_.
14. How were you diagnosed?  
1) Health checkup 2) Had symptoms like increased thirst, increased urination, increased

appetite 3) Incidentally 4) Had complications

15. Who in your Family suffer from diabetes?

1. Father 2. Mother 3. Siblings 4. Grandparents 5. Cousins 6. None

16. What are the medications you are using for diabetes currently?

1. Insulin 2. OHA 3. Both.

17. What is the type of treatment facility you receive your treatment (currently)?

1. Government 2. Private 3. Both.

18. How many times have you changed the place of treatment/physician since your diagnosis?

19. Do you have any other disease? 1. Yes 2. No

If yes, mention the disease \_\_\_\_\_.

[1. Hypertension 2. Heart disease 3. Stroke 4. Renal problems 5. Others]

20. Do you have any hospitalization in last 1 year? Yes/no

If yes, reason for hospitalization is \_\_\_\_\_.

**Section: 3 Patients Awareness on Diabetes Mellitus**

(Answer the below questions as Yes / No / Don't know except for Question -3 under this section)

21. Knowledge on Diabetes	Yes	No	Don't know
1. Is diabetes communicable?			
2. Taking frequent small meals will be beneficial for control of diabetes			
3. What are the changes to be made in amount of following food items by Diabetic patient? i) Cereals - i) increased ii) decreased iii) no change ii) Vegetables - i) increased ii) decreased iii) no change iii) Sweets - i) increased ii) decreased iii) avoided iv) no change iv) Deep fried items - i) increased ii) decreased iii) avoided iv) no change			
4. Exercising regularly will help to control of diabetes			
5. Diabetic patient must take a special care on their foot			

<ol style="list-style-type: none"><li>6. Taking drugs regularly as told by their physician will help patients to attain good control</li><li>7. Diabetic patient needs regular monitoring of blood glucose</li><li>8. Should a diabetic need screening for complications?</li><li>9. Should a diabetic patient need to carry a card indicating the diabetes status whenever they go out?</li><li>10. Should a diabetic carry a candy whenever they go out?</li><li>11. Quitting smoking and alcohol will be beneficial for a diabetic patient</li></ol>			
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<p style="text-align: center;"><b>Section – 4</b></p> <p style="text-align: center;"><b>22. SELF-CARE PRACTICES</b></p> <p>How many of the last seven days have you followed the below practices?</p>	<p style="text-align: center;"><b><u>SCORING</u></b></p> <p style="text-align: center;">0 1 2 3 4 5 6 7</p>	<p>If not followed reasons for not practicing</p>
<p><b><u>DIET:</u></b></p> <p>1.Reduced the serving size of Cereal based food like idly, dosa, cooked rice</p> <p>2. Consumed Vegetables</p> <p>3.Avoided high fat containing foods (fried items, red meat)</p> <p>4.Avoided sugar rich foods like sweets</p> <p>5.Followed splitting of meals (3 meals + 2 snacks)</p>		
<p><b><u>PHYSICAL ACTIVITY</u></b></p> <p>Did you exercise at least 30mins/day? (like swimming, walking, jogging)</p>		
<p><b><u>FOOT CARE</u></b></p> <p>Did you check the foot for?</p> <p>1. Examined foot for cracks, blisters, wounds</p> <p>2. Washed foot with soap and water</p> <p>3. Dried the skin between the toes</p> <p>4. Applied oil to the feet</p> <p>5. Examined the footwear for discharge</p> <p>6. Used footwear inside the house</p>		
<p><b><u>DENTAL CARE</u></b></p> <p>Brushed teeth twice a day</p>		
<p><b><u>ADHERENCE TO DRUG</u></b></p> <p>Took drugs as told by the physician</p>		
<p><b><u>BLOOD GLUCOSE MONITORING:</u></b></p> <p>Checked Venous blood glucose at least once in 3 months</p>	<p>&lt; / &gt; 3months</p>	
<p><b><u>SCREENING FOR COMPLICATIONS</u></b></p> <p>Checked</p> <ul style="list-style-type: none"> <li>-Blood Pressure</li> <li>- Eye (fundus examination)</li> <li>-Dental Check up</li> <li>-RFT</li> <li>-ECG</li> <li>-Lipid profile</li> </ul>	<p>&lt; / &gt; 3months</p> <p>&lt; / &gt; 1 year</p> <p>&lt; / &gt; 1 year</p> <p>&lt; / &gt; 1 year</p> <p>&lt; / &gt; 1 year</p> <p>&lt; / &gt; 1 year</p>	

[Reasons for poor practice: 1.Unaware 2.forgetfulness 3.no need as diabetes is a minor disease 4.no need as my blood sugar is well controlled 5.poor perceived benefits 6.fear of side effects 7.financial reasons 8.Poor family support 9.Easy fatigability 10.Knee pain 12.others specify]



## **Section: 5**

### **23.Role of Health Care Personnel:**

Does your health care personnel advice you about the following? 1.yes 2.no

i)Dietary modification -

ii) Physical activity -

iii) Adherence to drug -

iv) Foot care

v) Blood glucose monitoring -

vi) Screening for complications -

vii) Complications of diabetes -

viii) Symptoms of low blood sugar and its management -

ix) To quit smoking and consuming alcohol (applicable to smoker and those who consumes alcohol)

### Annexure-3

கிராமப்புற மற்றும் நகர்ப்புறங்களில் உள்ள இரண்டாம் வகை சர்க்கரை நநாயாளிகளுக்கு இகடநயயான சுய பராமரிப்பு குறித்த ஆய்வு. நசலம் மாவட்டம் ,தமிழ்நாடு.

#### கேள்வித்தாள்

##### பிரிவு 1 சமூகப் புள்ளிவிவரங்கள்

1. பெயர்:
2. வயது:
3. ாலினம்: 1) ஆண் 2) பெண்
4. குடியிருப்பு: 1) கிராமப்புறம் 2) நகர்ப்புறம்
5. கல்வி:
6. ப ாழில்: 1) ணிக்கு பெல்ெவர் 2) ணி இல்லாத ார்
7. மண வாழ்க்கை: 1) மணம் முடித் வர் 2) மணமாகா வர் 3)விவாகரத் ானவர் 4) கணவன் அல்லது மகனவிகய இழந் வர்
8. குடும்ெம்: 1) னிக்குடும்ெம் 2) கூட்டுக்குடும்ெம் 3) மூன்று கலமுகறயினர் உடன் வாழ் ல் 4) மற்றகவ
9. கௌடும்ெ உறபுபெினர்களின் ணண்ணிக்கை:
10. குடும்ெத் ின் பமாத் மா வருமானம்:

##### நபாகத பழக்கங்கள்

11. எந் வடிவிலான புககயிகலகய ற்பொழுது எடுத்துக்பகாள்கிறர்கள்?  
1) ணிகபரட் 2) பமன்று உட்பகாள்ககூடிய புககயிகல  
3)மூக்குப்பொடி 4) மற்றகவ
12. நீங்கள் ற்பொழுது மது உட்பகாள்வரீ களா 1) ஆம் 2) இல்கல

ஆம் எனில், எவ்வளவு மது உட்பகாள்கிறார்கள்-----ஒரு  
மா த் ிற்கு எத் கன முகற - - - - -

##### பிரிவு 2 ஆய்வு பங்நகற்பாளர்களின் குறித்த விவரங்கள்

13. உங்களுக்கு நீரிழிவு தநாய் இருபெ்து இருபெ்து எந் வய ில் கண்டுெிடத் ீர்கள்?

.....  
14. உங்களுக்கு எவ்வாறு கண்டறியப்பட்டது?

1) முழு உடல் ரெரிதொ கன

2) அ ிகப்டெடியான ாகம், எெெி மற்றும் எெெிநீர் கழித் ல் தொன்ற

குகறொடுகளால்

3 ) ற்பெயலாக

4) தவறு உடல் டொக களால்

15. உங்கள் குடும்ெத் ில் தவறு யாருக்கு நீரிலிவு தநாய் உள்ளது?

1) நக 2) ாய் 3) உடன்ெ்றந்த ார் 4) ாத் ா மற்றும் ொட்டி

5) இரண்டாம் நிகல உறவினர்கள் 6) யாரும் இல்கல

16. நீரிழிவு தநாய்க்காக ாங்கள் ற்பொழுது உட்பகாள்ளும் மருந்துகள்?

1) இன்சலின் 2) மாத் ிகரகள் 3) இரண்டும்

17. நீங்கள் நீரிழிவு தநாய்க்காக ற்பொழுது ெிகிச்செக எடுத்துக்கபகாள்ளும் மருத்துவமகன எது?

1) அரசு மருத்துவமகன

2) னியார் மருத்துவமகன

3) இரண்டும்

18. நீங்கள் இதுவகர நீரிழிவு தநாய் ெிகிச்செகக்காக எத் கன முகற மருத்துவமகன / மரூத்துவர் மாற்றி உள்ளீ கள்? .....

19. உங்களுக்கு தவறு ஏத னும் தநாய்கள் உள்ள ா?

ஆம்/ இல்கல

ஆம் எனில்

1) உயர் ரத் அழுத் ம் 2) இ ய தநாய் 3) ெக்கவா ம் 4) ெ்றுநீரக தகாளாறு 5) மற்றகவ

20. கடந் ஒரு ஆண்டில் ஏத னும் மருத்துவமகனயில் உள்தநாயாளியாக அனும் ிக்கபெட்டு உள்ளீ களா? ஆம்/ இல்கல

ஆம் எனில், காரணம்.....

**பிரிவு 3 - நீரிழிவு நநாய் குறித்த நநாயாளிகளின் விழிப்புணர்வு**

(கீழ்வரும் வினாக்களுக்கு ஆம்/ இல்லை/ ப ரியாது என்று ெில் அளிக்கவும்.  
தகள்வி எண் 3 ஐ விர)

21. நீரிழிவு தநாய் விழிப்புணர்வு	ஆம்	இல்கல	ப ரியாது
<p>1. நீரிழிவு தநாய் ப ாற்று வியா ியா?</p> <p>2. ஒரு நாளில் அடிக்கடி அளவு உணவுகளை உட்பகாள்வது ரத் ெர்க்ககரகய கட்டுப்ெடுத் உ வுமா?</p> <p>3. கீழ்க்கண்ட உணவு வகைகளில் நீரிழிவு தநாயாளிகள் எந் மா ிரியான மாற்றக்க எடுக்க தவண்டும்?          ானியங்கள் - 1) அ ிகரிப்ெது 2) குகறப்ெது 3) மாற்றம் த கவ இல்கல          காய்கறிகள் - 1 ) அ ிகரிப்ெது 2) குகறப்ெது 3) மாற்றம் த கவயில்கல          இனிப்பு பொருட்கள் - 1) அ ிகரிப்ெது 2) குகறப்ெது 3) மாற்றம் த கவயில்கல          எண்பணயில் பொரித் உணவுகள் - 1) அ ிகரிப்ெது 2) குகறப்ெது 3) மாற்றம் த கவயில்கல</p> <p>4. ினமும் உடற்ெயிற்ெி பெய்வது நீரிழிவு தநாகய கட்டுப்ெடுத் உ வுமா?</p> <p>5. நீரிழிவு தநாயாளிகள் ங்களின் கால்களுக்கு னி கவனம் பெலுத் தவண்டுமா?</p> <p>6. மருத்துவரின் ஆதலாெகனப்ெடி ெரியாக மருந்துகளை உட்பகாள்வது நீரிழிவு தநாகய கட்டுப்ெடுத்துமா?</p> <p>7. நீரிழிவு தநாயாளிகள் ரத் ெர்க்ககர அளகவ ெீரான இகடபவளியில் ெரிதொ கன தமற்பகாள்ள தவண்டுமா?</p> <p>8. நீரிழிவு தநாயாளிகள், நீரிழிவு தநாயால் ஏற்ெும் ொ ிப்புகள் குறித் ெரிதொ கன தமற் பகாள்ளப்ெட தவண்டுமா?</p> <p>9. நீரிழிவு தநாயாளிகள் பவளியில் பெல்லும் பொழுது,</p>			

<p>அவர்கள் நீரிழிவு தநாய் உள்ளவர்கள் என குறிப்பெிடும் ஓர் அகடயாள அட்கட எடுத்துச் பெல்ல தவண்டுமா?</p> <p>10. நீரிழிவு தநாயாளிகள் ரியல் பெல்லும்பொழுது, மிட்டாய் அல்லது இனிப்புகள் எடுத்து பெல்ல தவண்டுமா?</p> <p>11. புககப்டெழக்கம் மற்றும் மதுப்டெழக்கத்க நிறுத்துவ ால் நீரிழிவு தநாயாளிகளுக்கு நன்கம ஏற்றெுமா?</p>			
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<p><b>பிரிவு 4 சுய பராமரிப்பு வழிமுறைகள்</b></p> <p>கீழ்க்கண்ட முறைகளை கடந்த ஒரு வாரத்தில் எதற்கான நாட்கள் நீங்கள் திற்பகாண்டுள்ளீர்கள்?</p>	<p><b>0 1 2 3 4 5 6 7</b></p>	<p><b>இல்கல என்றால் அற்கான காரணக்க கூறவும்</b></p>
<p><b>உணவு கட்டுப்பாடு:</b></p> <ol style="list-style-type: none"> <li>1. மாவு ஂத்து அ ிகம் உள்ள உணவுப் பொருட்கள் அளகவ குகறத் ல் ( இட்லி, த ாகெ, தவககவத் அரிஂி)</li> <li>2. காய்கறிககள உட்பகாள்ளு ல்</li> <li>3. பகாழுப்பு ஂத்து அ ிகமுள்ள உணவுககள விர்த் ல்</li> <li>4. ஂர்க்ககர அ ிகமுள்ள உணவுப் பொருட்ககள விர்த் ல் ( இனிப்புககள், குளிர்ஂானககள்)</li> <li>5. உணவுககள ஂரித்து உட்பகாள்ளு ல்</li> </ol>		
<p><b>உடற்யிற்றஂி:</b></p> <p>ஂரு நாககளுக்கு குகறந் து 30 நிமிடககள் ஂயிற்றஂி தற்பகாள்வது? ( நகடப்யிற்றஂி , ஂட்டப்யிற்றஂி, நீச்யெல், தஂன்றகவ)</p>		
<p><b>கால்களுக்கான சுய ஂராமரிப்பு</b></p> <ol style="list-style-type: none"> <li>1. ினமும் ஂாங்களில் காயககள், பகாப்புளககள் அல்லது ஂிளவுககள் உள்ளனவா என ஂரிதஂ ித் ல்</li> <li>2. கால்ககள நீர் மற்றும்தொப்பு பகாண்டு கழுவு ல்</li> <li>3. கால் விரல்களுக்கு இகடதய உள்ள த ாகல உலர கவத் ல்</li> </ol>		



<p>4. கால்களுக்கு எண்பணய் டவு ல்</p> <p>5. காலணிகளில் ஏத னும் நீர் அல்லது ஁லம் பவளிதயறி உள்ள ா எனப் ுர்த் ல்</p> <p>6. வீ டின் உள்தள காலணிகள் ுயன்஁ுத்து ல்</p>		
<p>ெற்களின் ுராமரிப்பு</p> <p>ஒரு நாகளக்கு இரண்டு முகற ுல் துலக்கு ல்</p>		
<p>மருந்துகள் உட்பகாள்ளு ல்</p> <p>மருத்துவர் ுரிந்துகரத் ுடி மருந்துகள் உட்பகாள்ளு ல்</p>		
<p>ெர்க்ககர அளவு கண்காணித் ல்</p> <p>ெர்க்ககர அளகவ மூன்று மா த் ிற்கு ஒரு முகற ுரிதொ கன பெய் ல்</p>	<p>&lt;/&gt; 3 மாதங்ேள்</p>	
<p>நீரிலிவு தநாய் ுா ிப்புகளுக்காக ுரிதொ கன தமற்பகாள்ளு ல்</p> <p>ரத் அழுத் ம்</p> <p>கண் ுரிதொ கன</p> <p>ெற்களுக்கான ுரிதொ கன</p> <p>ெ்ரிநீரக ுரிதொ கன</p> <p>இரு ய துடிப்பு ுிவு</p> <p>ரத் க் பகாழுப்பு ுரிதொ கன</p>	<p>&lt;/&gt; 3 மாதங்ேள்</p> <p>&lt;/&gt; 1 ஆண்டு</p> <p>&lt;/&gt; 1 ஆண்டு</p> <p>&lt;/&gt; 1 ஆண்டு</p> <p>&lt;/&gt; 1 ஆண்டு</p> <p>&lt;/&gt; 1 ஆண்டு</p>	

தமற்கண்டவற்கற ஁ன்றொ அற்கான காரணங்கள்: 1. அக ப்ெற்றி ப ரியாது  
2. அக நிகனவில் பகாள்வ ில்கல 3. ெர்க்ககர தநாய் ஒரு ொ ாரண வியா ி

ஆ லால் இகவபயல்லாம் த கவயில்கல 4. ரத் ெர்க்ககர அளவு குகறவாகதவ  
உள்ளது எனதவ இகவ எல்லாம் த கவயில்கல 5. இவற்றின் ெலன்கள்

அறியவில்கல 6. ெக்கவிகளவுகள் ெற்றிய ெயம் 7. நி ி ெற்றாக்குகற 8.

குடும்ெத் ாரின் ஒத்துகழப்பு இல்கல 9. தொம்ெல் ஏற்ெடும் ன்கம 10.

முழங்கால் வலி 11. மற்றகவ

## பிரிவு 5 மருத்துவர்/ மருத்துவ பணியாளர்களின் பங்கு

கீழ்க்கண்டவற்கற ெற்றி உங்களின் மருத்துவர்/ மருத்துவ ெணியாளர்  
அறிவுகர கூறியுள்ளார்களா? 1) ஆம் / 2) இல்கல

1. உணவு ெழக்கங்கள் -

2. உடற்ெயிற்ெி -

3. மருந்து உட்பகாள்ளு ல் -

4. ொ ெராமரிப்பு -

5. ரத் ெர்க்ககர அளவு கண்காணித் ல்

6. ெர்க்ககர தநாய் ொ ிப்புகள கண்காணித் ல் -

7. ெர்க்ககர தநாயின் ொ ிப்புகள்

8. ெர்க்ககர அளவு குகறந்ற்கான அறிகுறிகள் மற்றும் அவற்கற எவ்வாறு  
ககயாள்வது

9. புககப்ெழக்கம் மற்றும் மதுப்ெழக்கத்கு நிறுத்து ல் (புககப்ெழக்கம்  
மற்றும் மது

ெழக்கம் உகடயவர்களுக்கு)

### BG PRASAD'S SOCIO-ECONOMIC STATUS SCALE

The BG Prasad's scale was formulated in 1961 keeping the base Consumer Price Index (CPI) for 1960 as 100. This was revised in 1982 by introducing a linking factor of 4.93 to convert CPI (1982) from the new base of 100 to old base of CPI (1960). Again, a need was felt in 2001 to revise the base, which was done by introducing the linking factor of 4.63. These linking factors have been given by Labour Bureau. To calculate the new income values, first we have to find out the All India Consumer Price Index (AICPI) for industrial workers (CPI-IW; 2001=100) then we have to calculate multiplication factor which is given by following equation.

Multiplication factor = current index value / base index value in 2001 i.e 100.

As the study was done in both rural & urban area, Modified B.G Prasad's classification was used for socioeconomic classification.

The calculation was done as follows:

Consumer price index (CPI) for industrial workers (IW) for the month of September 2018 is 301.

(Base, 2001=100).

The new income value can now be calculated by using the following equation.

Where 4.63 and 4.93 are the linking factors given by the labour bureau.

Multiplication factor = Value of consumer price index X 4.63 X 4.93 / 100

$$= 301 \times 4.63 \times 4.93 / 100 = 68.7$$

Modified BG Prasad's classification for August=Per capita income in 1961 X multiplication factor

Socioeconomic class	Old classification 1961 per capita monthly income limits in rupees	Income September 2018 per capita monthly income limits in rupees
I (Upper class)	100 and above	$\geq 6871$
II (Upper Middle class)	50-99	3435-6870
III (Middle class)	30-49	2061-3434
IV (Lower Middle class)	15-29	1031-2060
V (Lower class)	$<15$	$<1030$

## List of Blocks in Salem Health

## Unit District

Name of The District	Name of Block PHC
Salem District	1.Salem
	2. Panamarathupatti
	3.Valapady
	4. Ayothiapatnam
	<b>5. Veerapandy</b>
	6. Yercaud
	7. P.N. Palayam.
	8. Attur
	9. Gangavalli
	10. Thalaiwasal
	11. Kolarur
	12. Nangavali
	13. Mecheri
	14. Omalur
	15. Tharamangalm
	16. Kadayampalayam
	17. Sankari
	18. Idappadi
	19. Konganapuram
	20. Mac Choultry.

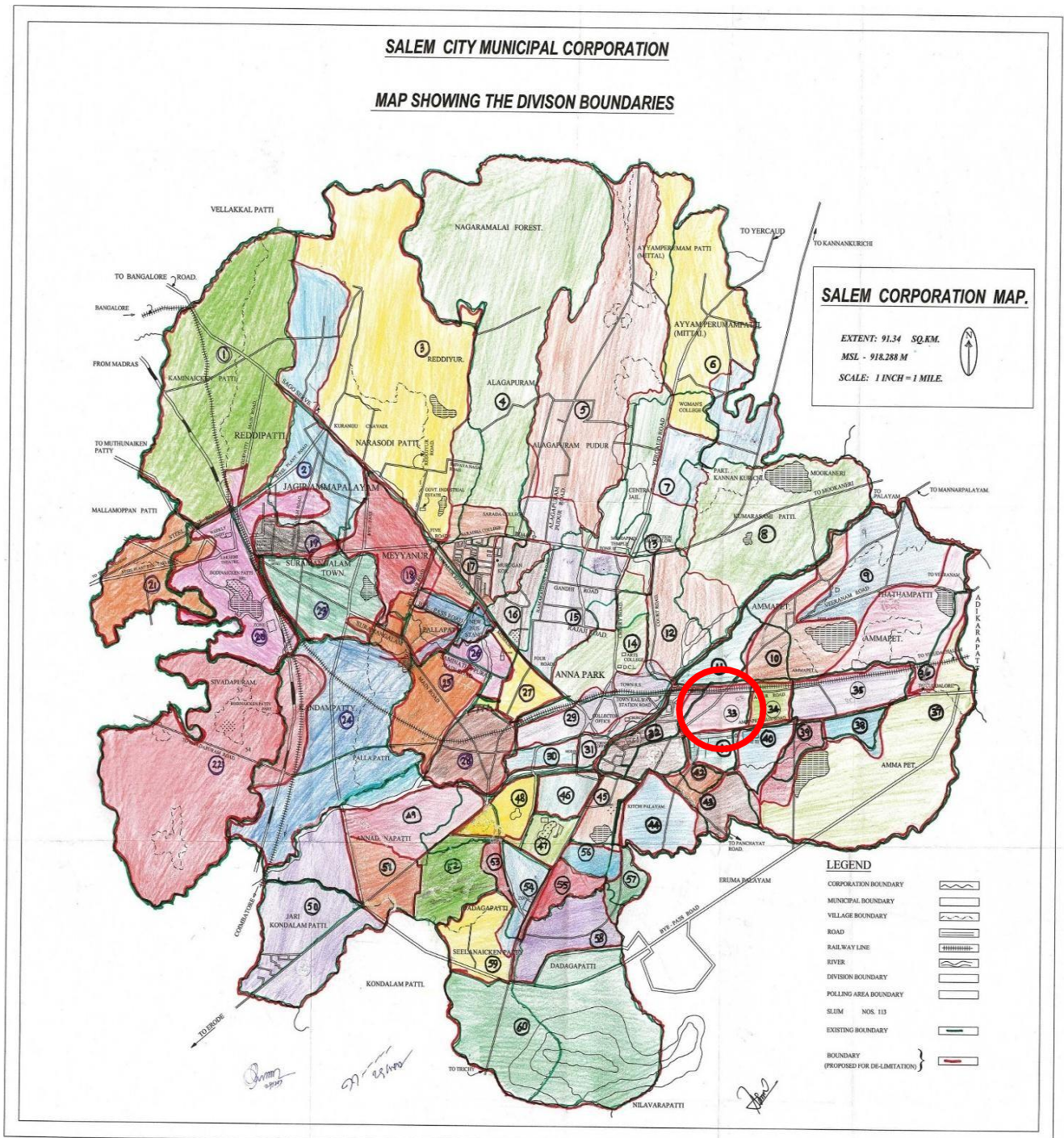
**List of PHCs in Veerapandy Block**

<b>Name of The Block</b>	<b>List of PHC</b>
Veerapandy	1.Elampillai
	<b>2. Murungapatti</b>
	3. Pollaveri
	4. Nainampatti
	5. Veerapandy

**List of HSCs in Veerapandy Block:**

<b>Name of PHC</b>	<b>List of HSC</b>
Murungapatty	<b>1.Murungapatti</b>
	2. Ariyagoundampatty
	3. Maramangalathupatty
	4. Perumampatty

URBAN STUDY AREA MAP



 - Selected ward in urban area

## KEY TO MASTER SHEET

S.NO	VARIABLE	LABEL	CODING
1	Sno	Serial number	
2	Age	Age of the participant	
3	Sex	Sex of the participant	1= Male, 2= Female
4	Residence	Residence of the participant	1= Rural, 2= Urban
5	employmentstatus	Employment status	1= Employed 2 = Unemployed
6	maritalstatus	Marital status	1 =Married, 2 = Unmarried, 3= Divorced 4 = widow/widower
7	familytype	Type of family	1 = Nuclear 2= Joint 3 = Three Generation 4 = Others (Specify)
8	tnofammem	Total number of family members	
9	incomepermonth	Family income per month	
10	Tobacco	Use of tobacco	1 = Cigrattes, 2 = chewable, 3 = snuff, 4 = none
11	Alcohol	Consumption of alcohol	1 = yes, 2 = No
12	Ageatdx	Age at diagnosis	
13	modeofdx	Mode of diagnosis of DM	1= Health checkup, 2 =Had symptoms like increased thirst, increased urination, increased appetite , 3 =Incidentally, 4 = Had complications
14	Familyho	Family history of DM	1 = Father, 2=Mother,3= Sibling, 4 =Grand parents, 5=Cousins, 6=none
15	medications	Medications	1=Insulin, 2=OHA 3=Both
16	treatmentfacility	Type of treatment facility	1 = Government 2 = Private 3 = Both.
17	otherdisease	Other disease	1 = Yes 2 = No
18	comorbiddisease	Comorbid condition	1 = Hypertension, 2 = heart disease, 3 = Stroke, 4 =.Renal problems, 5 =Others
19	hospitalization	History of hospitalization	1= Yes, 2 = No
20	reasonforhospi	Reason for hospitalization	



21	k1	Knowledge on communicability of disease	1 = Yes, 2 = No, 3 = Don't know
22	k2	Knowledge on frequent meal consumption	1 = Yes, 2 = No, 3 = Don't know
23	k3a	Knowledge on amount of cereals	1= Increased, 2 = decreased, 3= no change
24	k3b	Knowledge on amount of vegetables	1= Increased, 2 = decreased, 3= no change
25	k3c	Knowledge on amount of sweet consumption	1= Increased, 2 =decreased, 3 = avoided, 4 = no change
26	k3d	Knowledge on consumption of deep-fried items	1= Increased, 2 =decreased, 3 = avoided, 4 = no change
27	k4	Knowledge on regular exercise	1 = Yes, 2 = No, 3 = Don't know
28	k5	Knowledge on foot care	1 = Yes, 2 = No, 3 = Don't know
29	k6	Knowledge on adherence to drug	1 = Yes, 2 = No, 3 = Don't know
30	k7	Knowledge on monitoring of blood glucose	1 = Yes, 2 = No, 3 = Don't know
31	k8	Knowledge on screening for complications	1 = Yes, 2 = No, 3 = Don't know
32	k9	Knowledge on carrying a card indicating diabetic status	1 = Yes, 2 = No, 3 = Don't know
33	k10	Knowledge on carrying a candy	1 = Yes, 2 = No, 3 = Don't know
34	k11	Knowledge on quitting smoking and alcohol	1 = Yes, 2 = No, 3 = Don't know
35	d1	Practice of reducing the cereal	Number of days practiced in a week
36	d2	Practice of consuming vegetables	Number of days practiced in a week
37	d3	Practice of avoiding high fat containing foods	Number of days practiced in a week
38	d4	Practice of avoiding sugar rich foods	Number of days practiced in a week
39	d5	Practice of splitting of meals	Number of days practiced in a week
40	Readiet	Reason for not practicing diet	
41			
42	Pa	Practice of physical activity	Number of days practiced in a week
43	Reapa	Reason for not practicing physical activity	

44	fc1	Practice of examining the foot	Number of days practiced in a week
45	fc2	Practice of washing the foot	Number of days practiced in a week
46	fc3	Practice of drying the skin between toes	Number of days practiced in a week
47	fc4	Practice of applying oil to the foot	Number of days practiced in a week
48	fc5	Practice of examining the footwear	Number of days practiced in a week
49	fc6	Practice of using foot wear inside the house	Number of days practiced in a week
50	Reafc	Reasons for not practicing foot wear	
51	Dc	Practice of dental care	Number of days practiced in a week
52	Readc	Reason for not practicing dental care	
53	Adhdrug	Practice of adherence to drug	Number of days practiced in a week
54	reaadhrdrug	Reason for non-adherence to drug	
55	Bgm	Practice of blood glucose monitoring in last 3 months	1 = yes, 2 = no
56	Reabgm	Reason for not monitoring blood glucose	
57	Bp	Practice of monitoring blood pressure once in 3 months	1 = yes, 2 = no
58	reabp	Reason for not monitoring blood pressure	
59	eye	Practice of examining the eye yearly once	1 = yes, 2 = no
60	reaeye	Reason for not doing eye examination	
61	dental	Practice of dental check up yearly once	1 = yes, 2 = no
62	readental	Reason for not practicing dental check up	
63	rft	Practice of doing renal function test yearly once	1 = yes, 2 = no
64	rearft	Reason for not doing renal function test	
65	ecg	Practice of doing ECG yearly once	1 = yes, 2 = no
66	reaecg	Reason for not doing ECG	
67	lipid	Practice of checking lipid profile yearly once	1 = yes, 2 = no
68	realipid	Reason for doing lipid profile	

69	rhcp1	Role of health care personnel on dietary advice	1 = yes, 2 = no
70	rhcp2	Role of health care personnel on advising physical activity	1 = yes, 2 = no
71	rhcp3	Role of health care personnel on adherence to drug	1 = yes, 2 = no
72	rhcp4	Role of health care personnel on foot care	1 = yes, 2 = no
73	rhcp5	Role of health care personnel on monitoring blood glucose level	1 = yes, 2 = no
74	rhcp6	Role of health care personnel on screening for complications	1 = yes, 2 = no
75	rhcp7	Role of health care personnel on symptoms of low blood sugar	1 = yes, 2 = no
76	rhcp8	Role of health care personnel on quit smoking	1 = yes, 2 = no
77	ses	Socio economic status	1,2,3,4,5



















376	38	M	1	1	1	3	2	1	34	2	6	3	1	0	1	1	1	fev	2	1	2	1	3	3	1	1	1	3	1	3	1	2	1	1	1	2	1	2	2	2	7	4	5	5	7			
377	48	M	1	4	1	4	1	1	44	2	2	3	2	1	2		2			2	1	2	1	3	1	1	1	1	1	1	2	1	3	1	1	1	1	1	2	2	2	7	5	7	7	7		
378	44	F	1	2	1	3	4	2	38	1	3	2	1	3	2		2			2	1	2	1	3	2	1	1	1	1	1	3	1	1	1	1	1	1	2	2	2	2	2	6	7	7	7	7	
379	39	F	1	2	1	4	4	2	36	1	1	2	1	2	1	2	2			3	1	2	1	3	1	3	1	1	3	1	2	1	3	1	1	1	1	2	1	2	2	2	7	7	7	7	7	
380	62	F	2	1	1	3	4	2	56	2	6	2	2	2	1	1	2			2	1	2	1	3	1	1	1	1	1	1	2	1	3	1	1	1	1	1	1	2	2	7	7	7	7	7		
381	62	M	1	1	1	3	2	2	58	2	2	3	2	2	1	1	1	catá	2	1	2	2	3	3	1	1	1	2	1	2	1	1	1	1	1	1	1	1	2	2	2	7	7	7	7	7		
382	64	F	2	1	1	4	4	2	57	3	6	1	3	1	1	1	2			3	1	2	2	3	3	3	1	1	1	1	3	1	1	1	1	2	2	2	2	2	2	2	7	6	6	6	7	
383	45	F	1	1	1	4	4	2	35	2	6	3	2	3	1	1	2			2	1	3	1	3	3	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2	7	5	7	7	7		
384	47	F	1	1	3	3	4	2	40	3	3	2	1	2	1	1	2			2	1	2	1	3	3	1	1	1	1	1	3	1	3	1	1	1	1	2	1	2	2	2	5	5	7	7	5	
385	37	F	1	1	1	4	1	1	35	2	3	1	1	2	1	3	2			2	2	2	1	3	4	1	1	1	1	1	3	1	1	1	2	1	2	1	2	2	2	7	5	7	7	7		
386	51	F	1	1	2	3	1	2	44	4	6	2	2	0	1	4	1	gla	2	2	4	1	3	3	1	1	1	1	1	2	1	1	1	1	2	1	1	1	2	1	2	7	6	7	7	7		
387	58	M	1	1	1	3	3	1	54	2	6	3	2	1	1	1	2			3	1	2	1	3	4	1	3	1	1	1	3	1	3	1	1	1	1	1	1	2	2	7	7	7	7	7		
388	56	F	2	1	1	3	4	2	48	4	1	2	1	1	1	2	1	foot	2	1	2	3	3	3	1	1	1	1	1	3	1	3	1	1	1	1	1	1	2	2	2	7	5	7	7	7		
389	63	F	2	4	3	1	4	2	59	2	6	3	2	0	1	3	1	foot	2	2	2	1	3	3	3	1	1	1	1	3	1	3	1	1	1	1	2	2	1	2	7	5	7	7	7			
390	46	M	1	1	2	5	4	1	43	2	1	2	2	2	2		2			2	1	2	4	3	3	1	1	1	1	1	2	1	3	1	1	1	1	1	2	2	6	6	6	6	6			
391	32	F	2	1	3	3	4	2	30	3	2	1	2	1	1	4	2			3	1	2	1	3	1	1	1	1	1	1	2	1	3	1	1	1	1	1	2	2	2	5	7	7	7	7		
392	66	F	2	4	2	5	4	2	58	2	6	3	2	2	2		2			3	1	2	1	3	3	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2	7	7	6	5	5		
393	52	M	1	1	1	4	1	2	49	2	3	2	2	1	1	2	2			2	1	2	1	3	2	1	3	1	1	1	2	1	3	1	1	1	1	1	2	2	2	7	7	7	7	7		
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395	38	M	1	4	2	6	4	2	36	2	6	1	2	1	1	4	2			2	1	2	1	3	3	1	3	1	1	1	3	1	3	1	1	1	1	2	1	2	2	7	5	7	7	7		
396	64	F	2	1	1	4	4	2	60	4	1	2	1	0	1	3	2			2	3	2	1	3	3	1	1	3	3	3	3	1	3	1	1	1	2	1	2	2	2	6	4	7	7	0	3	
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400	46	F	1	1	1	3	4	2	43	3	6	2	1	1	1	3	1	cho	2	1	2	1	3	3	1	1	1	2	1	3	1	3	1	1	1	1	2	2	2	7	5	7	7	7				



















1	7		0	7	0	0	0	0	3	0	2	7		1		1		2	1	2	1	2	1	2	2	2	1	4	21666.67	2
1	3	no ti	0	7	0	0	0	0	3	7		7		1		1		2	1	2	1	2	1	2	2	2	1	4	16250	2
1	6		0	7	0	0	0	0	5	7		5	2	1		1		2	1	2	1	2	1	2	1	2	1	6	8166.67	2
1	1	no ti	0	7	0	0	0	0	5	0	2	7		1		1		2	1	2	1	2	1	2	1	2	1	3	9000	2
1	3	no ti	0	7	0	0	0	0	4	0	2	7		1		1		2	1	2	1	2	1	2	1	2	1	6	15000	2
1	1	easy	0	7	0	0	0	0	4	0	2	7		1		1		2	1	2	1	2	1	2	1	2	1	4	7833.33	2
1	2	comp	0	7	0	0	0	0	2	0	1	7		1		1		2	1	2	1	2	1	2	1	2	1	7	9000	2
1	4	no ti	0	7	0	0	0	0	5	7		7		1		1		2	1	2	1	2	1	2	1	2	1	10	9500	2
1	6		0	7	0	0	0	0	1	0	2	7		1		1		2	3	2	2	2	1	2	1	2	1	7	16000	2
1	1	comp	0	7	0	0	0	0	2	7		7		1		1		2	2	2	2	2	1	2	1	2	1	2	12500	2
1	6		7	7	7	7	7	7	1	0	2	7		1		1		2	3	2	1	2	1	2	2	2	1	7	21666.67	2
1	4	comp	7	7	7	7	7	7		7		5	2	1		2	1	2	2	2	1	2	1	1		2	1	4	8666.67	2
1	1	no ti	7	7	7	7	7	7		7		7		1		1		2	1	2	1	2	1	2	2	2	1	8	8000	2
1	1	comp	7	7	7	7	7	7		0	2	7		1		1		2	2	2	1	2	1	2	1	2	1	4	18500	2
1	4	comp	7	7	7	7	7	7		0	1	5	2	1		1		2	1	2	1	2	1	2	1	2	1	3	7000	2
1	3	easy	7	7	7	7	7	7		0	2	7		1		1		2	1	2	1	2	1	2	1	2	1	2	16666.67	2
1	6		7	7	7	7	7	7		0	2	7		1		1		2	1	2	1	2	1	2	1	2	1	8	8000	2
1	4	knee	7	7	7	7	7	7		0	1	7		1		1		2	1	2	1	2	1	2	1	2	1	3	14500	2
1	6		7	7	7	7	7	7		0	1	7		1		1		2	1	2	1	2	1	2	1	2	1	10	11666.67	2
1	4	knee	7	7	7	7	7	7		7		7		1		1		2	1	2	1	2	1	2	1	2	1	2	10833.33	2
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3	0	comp	0	7	0	0	0	0	1	7		0	2	2	4	2	2	2	1	2	1	2	3	2	1	2	1	2	3000	2
3	0	5	0	7	0	0	0	0	1	0	1	0	4	2	4	2	2	2	1	2	1	2	1	2	1	2	1	5	2666.67	2
1	2	comp	0	7	0	0	0	0	5	0	1	7		1		2	1	2	2	2	1	2	1	2	1	2	1	10	12500	2
1	7		7	7	7	7	7	7		7		7		1		2	2	2	1	2	1	2	1	2	1	2	1	3	12666.67	2

## PLAGIARISM CERTIFICATE



## Urkund Analysis Result

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## ETHICS COMMITTEE APPROVAL CERTIFICATE



**GOVERNMENT STANLEY MEDICAL COLLEGE & HOSPITAL, CHENNAI -01**  
**INSTITUTIONAL ETHICS COMMITTEE**

Title of the Work : A cross sectional study on comparison of self-care practices among type 2 Diabetes patients in rural and urban areas in Salem District.

Principal Investigator : Dr.Sharmila P.V

Designation : I MD Community Medicine,

Department : Department of Community Medicine,  
Govt. Stanley Medical College.

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 21.11.2017 at the Council Hall, Stanley Medical College, Chennai-1 at 10am.

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator, investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

  
 MEMBER SECRETARY,  
 IEC, SMC, CHENNAI

## EXPERTS

Helped me to complete my dissertation with academic inputs

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1.	<b>Dr. P. SEENIVASAN M.D.,</b>	Professor and Head of the Department, Department of Community Medicine, Government Stanley Medical College, Chennai,
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3.	<b>Dr. J. ANAIAPPAN, M.D., D.C.H</b>	Associate Professor, Department of Community Medicine, Government Stanley Medical College, Chennai
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6.	<b>Dr. EVANGELINE MARY (Co-Guide)</b>	Assistant Professor, Department of Community Medicine, Government Stanley Medical College, Chennai
7.	<b>Dr. SUSILA.T. M.D.,</b>	Assistant Professor, Department of Community Medicine, Government Stanley Medical College, Chennai



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