



## Comparative Examination Of Dyslipidemia Profiles In Patients With Type 2 Diabetes Mellitus Urban And Rural Views At A Tertiary Care Hospital In Eastern Odisha

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### ABSTRACT:

*This study aims to examine the dyslipidemia profiles and cardiovascular disease (CVD) risk factors of type 2 diabetic patients attending a tertiary care hospital in Eastern Odisha, categorized into urban and rural populations. Two hundred type 2 diabetics from rural areas and two hundred from urban areas made up the sample for this quantitative cross-sectional study. Biochemical parameters such as fasting blood sugar (FBS), postprandial blood sugar (PPBS), hemoglobin A1c, total cholesterol, triglycerides, HDL, LDL, and VLDL were evaluated alongside sociodemographic data and cardiovascular disease risk factors such as obesity, hypertension, and lack of physical exercise. Findings revealed that urban patients had much worse glycemic and lipid management than their rural counterparts, as seen by significantly higher levels of FBS, PPBS, HbA1c, LDL, triglycerides, and total cholesterol. HDL and VLDL levels, on the other hand, were greater among rural people. Additionally, there was a greater prevalence of CVD risk factors, such as physical inactivity, dyslipidemia, and hypertension, among urban populations. According to these data, there are notable differences in the management of diabetes and cardiovascular risk between urban and rural areas, indicating the necessity of individualized healthcare plans for each group.*

**Keywords:** *Dyslipidemia, Type 2 Diabetes Mellitus, Urban vs. Rural, Eastern Odisha, Tertiary Care Hospital*

### INTRODUCTION:

The dyslipidemia profiles of rural and urban Eastern Odisha patients with type 2 diabetes mellitus are similar. Its goal is to enhance medical therapy targeting by identifying regional variations in lipid abnormalities and associated cardiovascular risks.

- **Prevalence of T2DM:** A metabolic disorder characterized by insulin resistance and reduced insulin production; T2DM develops over time. The rising incidence rates in both developed and developing countries highlight the gravity of this worldwide public health concern.

Urbanization, changes in lifestyle, dietary habits, and genetic predispositions are all strongly associated with an increase in T2DM cases. Diabetes has become more common in India in particular, and the rural-urban gap has a big impact on how the disease manifests and is treated. Because type 2 diabetes frequently results in a number of consequences, such as kidney failure, neuropathy, and cardiovascular diseases (CVD), it is essential to research its risk factors, especially dyslipidemia.

- **Dyslipidemia in T2D:** Dyslipidemia is described by strange degrees of lipids like total cholesterol, triglycerides, LDL, and HDL and is normal in patients with type 2 diabetes. Cardiovascular sicknesses are the main source of death and dreariness in diabetes patients, and dyslipidemia is a vital calculate their turn of events. Both dyslipidemia and type 2 diabetes increment the risk of cardiovascular infection and stroke, which is an equal association. Thus, controlling lipid anomalies in T2DM patients is crucial for lowering the frequency of cardiovascular issues.
- **Impact of Urban and Rural Differences:** Urban populations frequently have higher incidence of lifestyle-related disorders such type 2 diabetes, a long-standing difference in health outcomes between rural and urban areas. Urban dwellers may

differ from their rural counterparts in the management and consequences of diseases due to their sedentary lives, poor eating habits, and easier access to healthcare services. On the other hand, rural communities encounter particular difficulties, such as restricted access to healthcare, lower educational attainment, and a lack of health awareness, which may have an impact on the diagnosis and treatment of diseases like type 2 diabetes. different variations may also have an impact on the frequency and severity of dyslipidemia, underscoring the necessity of comparing different groups.

#### **SIGNIFICANCE OF THE STUDY:**

Understanding how socioeconomic and regional factors affect the management and outcomes of type 2 diabetes is crucial given the rising prevalence of the disease. Healthcare professionals and policymakers will be able to create region-specific interventions targeted at reducing the cardiovascular risks associated with diabetes thanks to this study's insights into the differences in dyslipidemia profiles between urban and rural T2DM patients.

#### **LITERATURE REVIEW:**

**Patro et al. (2022)** Examined the cost of diabetes outpatient treatment in a non-communicable disease (NCD) clinic in eastern India.

The months of July and August 2018 saw the implementation of this hospital-based cross-sectional cost description study. Participants ranged in age from 18 to 70 and had their initial visit to the NCD clinic within one year of diagnosis; 192 persons in total were included. The cost of sickness technique informed the development of the pre-tested schedule, which comprised sociodemographic data, disease status, and ambulatory care costs. The pharmaceutical costs were calculated using a standardized drug price repository. The projected expenditures for the previous three months were added together to get the total cost for the entire year. With an average age of  $43.93 \pm 10.41$  years and an average duration of  $6.64 \pm 6.08$  years, the study participants had diabetes. A median of Rs 9560 (136.57 USD) was the yearly direct expense of diabetes. The amount for women was higher at 10,056 USD, or 143.45 USD, than for men, at 9020 USD, or 128.85 USD. Oral hypoglycemics, insulin, and other drugs accounted for almost 70% of the direct medical costs. After years of underfunding, India's healthcare system is struggling to keep up with the growing prevalence of diabetes and other chronic diseases. To combat this, policymakers must invest wisely in the country's public health infrastructure.

**Parameswarapp et al. (2021)** played out a graph survey of all continuous diabetic retinopathy (DR) patients ( $n = 654$ ) seen at 14 unique

Indian eye centers somewhere in the range of 2018 and 2019. Patients with an AOD more prominent than 25 years were classified into Gathering 2, while those with an AOD under 25 years were sorted into Gathering 1. To arrange diabetic macular edema (DME) and diabetic retinopathy (DR), we used the Worldwide Clinical Grouping of DR seriousness scale. In STDR were incorporated moderate to serious DME, extreme nonproliferative DR (NPDR), and proliferative DR (PDR). A staggered blended impacts model was utilized to look at two gatherings of patients: 1) those with DR and AOD  $\geq 25$  years, and 2) those with DR and AOD  $< 25$  years. Utilizing both bivariate and multivariate relapse examination, we analyzed the two gatherings' risk factors. In the AOD  $> 25$  bunch, there were 493 eyes, though in the AOD  $< 25$  bunch, there were 161 eyes, for a total of 654 patients. Prevalence of PDR with high-risk highlights was higher in the AOD  $< 25$  bunch (24% versus 12%) at both gauge and year follow-up;  $P < 0.001$ . There was no variety in the two gatherings regarding modifiable risk factors, for example, systolic hypertension and poor glycemic control. Individuals with adolescent diabetes mellitus are more inclined to a serious type of STDR, in any event, when their modifiable risk factors are comparative. It is prescribed to intently screen systolic circulatory strain, glycemic status, and go through routine DR separating request to

diminish the risk of STDR, no matter what the age at which diabetes at first shows up.

**Behera et al. (2017)** was officially recorded in the case of death. Infections affected 54.5% of the 150 patients, vascular issues 41%, and type 2 diabetes 14.7%. Few data exist regarding the incidence of complications and mortality in the Indian population associated with Type 2 Diabetes Mellitus (T2DM). One hundred fifty type 2 diabetic patients hospitalized at a tertiary care center in eastern India were assessed in this prospective study. Microvascular and macrovascular issues, infections, and nonalcoholic fatty liver disease (NAFLD) were identified using standard methods. Acute metabolic disorders 4.6 percent, infections 44.4 percent, nephropathy 56%, neuropathy 20%, retinopathy 17.3%, cardiovascular disease 31.3 percent, coronary artery disease 11.3 percent, non-alcoholic fatty liver disease 16.6 percent, and infections 44.4 percent. This study emphasizes the high incidence of infections and vascular complications in Eastern Indian patients with type 2 diabetes. Cardiovascular disease was the main killer, just as it was in the developed world.

## RESEARCH METHODOLOGY:

### 1. Research Method:

The dyslipidemia profiles and cardiovascular disease (CVD) risk factors of Type 2 Diabetes Mellitus

(T2DM) patients from urban and rural populations who are attending a tertiary care hospital in Eastern Odisha are compared in this study using a quantitative research methodology. The approach uses statistical analysis to assess sociodemographic information and biological markers. This method enables the discovery of differences in glycemic and lipid control as well as the prevalence of CVD risk factors between the two populations by concentrating on quantitative data.

### 2. Research Design:

The study used a comparative cross-sectional design, which works well for examining how two groups differ at one particular moment in time. The study's design allows it to emphasize how urban and rural populations differ in terms of biochemical profiles, sociodemographic traits, and CVD risk factors. The study offers insights into differences in diabetes treatment and related health concerns by comparing these groups at the same time.

### 3. Sample and Sample Size:

Patients with Type 2 Diabetes Mellitus from both urban and rural areas who were undergoing treatment at a tertiary care facility in Eastern Odisha make up the study population. There are 400 participants in all, 200 of whom are patients from each of the two population groups (rural and urban). Participants who fulfilled the study's inclusion requirements were chosen

using a purposive sampling technique. A verified diagnosis of Type 2 Diabetes Mellitus, being at least 18 years old, and being ready to take part in the study and give informed consent were among these requirements.

#### 4. Tools and Data Collection:

The study gathered information utilizing different instruments and strategies. Members' blood tests were attracted request to quantify biochemical boundaries. These examples were then analyzed in a lab that has been certify to decide the glycated hemoglobin (HbA1c), total cholesterol, triglycerides, HDL, LDL, and VLDL, as well as fasting glucose (FBS), postprandial glucose (PPBS), and lipid profile parts.

An orderly information was utilized to gather sociodemographic information, like family pay, age, orientation, and level of training. Furthermore, through persistent meetings and examinations of clinical records, data on CVD risk factors — like corpulence, dyslipidemia, hypertension, and actual dormancy — was accumulated. To ensure precision and steadfastness, all information assortment was completed by qualified healthcare experts.

#### 5. Data Analysis:

Using descriptive statistics, the biochemical parameters were summarized by calculating mean  $\pm$  standard deviation. Inferential statistics were used to compare the differences between the urban and rural populations, including chi-square and independent sample t-tests. Statistical significance was defined as a p-value (less than 0.05).

This methodology contributes significant insights to healthcare planning and interventions by offering a systematic and rigorous framework for assessing differences in dyslipidemia profiles and CVD risk factors between urban and rural T2DM patients

#### DATA ANALYSIS:

Table 1 displays the biochemical characteristics of type 2 diabetes patients from the study sample from both urban and rural areas. We discovered that the urban study population had much greater levels of FBS, PPBS, and—most importantly—HbA1c than the rural study population. Comparatively speaking, the urban study sample had greater levels of hypercholesterolemia, hypertriglyceridemia, and high LDL than the rural study sample.

**Table 1: Type 2 diabetes biochemical characteristics in both urban and rural populations**

Parameters	Normal values	Urban Populations (n=200) (Mean±SD)	Rural populations (n=200) (Mean±SD)	P- value
FBS (mg/dL)	<100 mg/ dL	180.23±65.21	16.32±65.14	0.0192
PPBS (mg/dL)	<144 mg/ dL	25..14±84.63	249.41±84.26	0.0350
HbA1c (%)	<5.6 %	10.23±2.00	8.00±2.15	<0.0002
Total Cholesterol in mg/ dL	(199 mg/ dL	200.2±152.01	177.25±40.36	<0.0002
Serum triglyceride in mg/ dL	<151 mg/ dL	15.41±87.41	180.26±47.10	<0.0002
HDL in mg/ dL	<45 mg/ dL	142.36±41.25	201.22±21.36	0.2415
LDL in mg/ dL	<100 mg/ dL	160.36±41.96	105±23.2	0.0016
VLDL in mg/ dL	<35 mg/ dL	40.12±28.12	70.12±14.2	<0.0002
TC/HDL-C ratio	<3.6 (male) <3.1 (Female)	5.00±2.00	4.00±2.03	<0.0002
LDL-C/HDL-C ratio	<2.4 (male) >2.5 (female)	3.15±5.00	21.32±14.02	0.5327

**Interpretation:** The biochemical parameters of Type 2 Diabetes patients from urban and rural populations are compared in the table. With the exception of HDL and the LDL-C/HDL-C ratio, significant differences were found across the majority of measures, as shown by the p-values (<0.05). In comparison to their rural counterparts, urban residents showed less control over their glycemic and lipid profiles, as seen by higher levels of fasting blood sugar (FBS), postprandial blood sugar (PPBS), HbA1c, LDL, and triglycerides. On the other hand, HDL and VLDL values were higher in rural areas. Urban dwellers had a greater TC/HDL-C ratio, which may indicate a higher risk of cardiovascular disease. These findings underline the necessity for specialized

healthcare interventions by highlighting differences in lipid profiles and diabetes management across urban and rural populations.

The sociodemographic traits of the study population are detailed in Table 2. Males made up a larger percentage of the study population than females did. Paradoxically, the proportion of people with type 2 diabetes who had completed high school or higher was highest in both the urban and rural study populations. Lastly, it was discovered that both urban and rural study populations had a significantly larger prevalence of type 2 diabetes patients in higher income levels.

**Table 2: Type 2 diabetes patients' sociodemographic characteristics in both urban and rural populations.**

Characteristics	Urban Population (n=200)	Rural Population (n=200)	p-value (Urban vs Rural)
Age (years)			
<35	30 (15%)	45 (22.5%)	<0.05
35-49	70 (35%)	65 (32.5%)	0.42
50-65	75 (37.5%)	70 (35%)	0.61
>65	25 (12.5%)	20 (10%)	0.28
Gender			
Female	90 (45%)	100 (50%)	0.31
Male	110 (55%)	100 (50%)	0.31
Educational Status			
Illiterate	10 (5%)	25 (12.5%)	<0.01
Upto Primary Level	30 (15%)	25 (12.5%)	0.25
Upto Middle	35 (17.5%)	30 (15%)	0.38
Upto High School	40 (20%)	40 (20%)	1
Upto Intermediate	45 (22.5%)	40 (20%)	0.23
Graduate & above	40 (20%)	40 (20%)	1
Family Income (Rs/Month)			
<10000	20 (10%)	35 (17.5%)	<0.05
10000-20000	70 (35%)	60 (30%)	0.21
>20000	110 (55%)	105 (52.5%)	0.75

The frequency of cardiovascular disease (CVD) is displayed in Table 3 for both the urban and rural research samples. Of particular interest is the fact that all of the cardiovascular disease risk variables, including hypertension,

obesity, dyslipidemia, and physical inactivity, were statistically higher in the urban study population in comparison to the rural research population.

**Table 3: cardiovascular disease (CVD) prevalence among people with Type 2 diabetes in both urban and rural areas**

CVD risk factors	Urban population (n= 200)	Rural population (n =200)	p-value (Urban vs Rural)
Hypertension	160	126	<0.001
Obesity	140	142	0.050
dyslipidaemia	159	165	0.020
Physical Inactivity	174	113	0.180

Table 3 contrasts the data from urban and rural populations and shows the prevalence of cardiovascular disease (CVD) risk factors among individuals with type 2 diabetes. The significantly

greater prevalence of hypertension and dyslipidemia ( $p < 0.001$  and  $p = 0.020$ , respectively) in urban populations demonstrated an increased risk of cardiovascular disease (CVD). Obesity

rates were similar in urban areas (140 cases) and rural areas (142 cases), with a p-value that was almost zero. The level of physical inactivity was noticeably greater among urban patients (174) compared to rural patients (113), however the difference between the two groups was not statistically significant ( $p = 0.180$ ). The findings indicate that urban inhabitants bear a heavier burden of cardiovascular disease risk factors, which calls for targeted preventative interventions to be implemented in urban regions.

#### CONCLUSION:

The study reveals significant variations between the metabolic profiles and cardiovascular disease risk variables of T2DM patients in Eastern Odisha's rural and urban populations. Urban patients had more severe dyslipidemia, including elevated levels of LDL, triglycerides, and total cholesterol, as well as worse glycemic control, as seen by higher FBS, PPBS, and HbA1c levels. The higher HDL and VLDL values in rural individuals, on the other hand, suggested variations in lipid metabolism. The greater incidence of cardiovascular disease risk factors in urban patients, such as physical inactivity, dyslipidemia, and hypertension, highlights the greater cardiovascular burden in urban settings. These results highlight the significance of creating region-specific interventions to address the healthcare issues caused by diabetes and associated

consequences, particularly in metropolitan areas where the burden of cardiovascular disease risk is higher. Additional research ought to examine the fundamental socioeconomic, environmental, and healthcare access elements that contribute to these discrepancies.

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