



PREVALENCE AND RISK FACTORS FOR NON-COMMUNICABLE DISEASES (NCDs)- DIABETES, HYPERTENSION, AND OBESITY

Dr. Chandra Prakash Sharma

Associate Professor, Department of Community Medicine R.N.T Medical College, Udaipur

Dr Pratap Bhan Kaushik

Assistant Professor, Department of Community Medicine Dr D.Y Patil Medical College Hospital & Research Centre, Pune

Chandan Mal. Fatehpuria

Associate Professor, Department of Community Medicine R.N.T Medical College, Udaipur

Dr Manish Mittal

Assistant Professor Department of Community Medicine, Geetanjali Medical college and hospital, Udaipur

ABSTRACT

Background: Non-communicable diseases (NCDs), including diabetes, hypertension, and obesity, are leading contributors to global morbidity and mortality. Urbanization and lifestyle changes have further increased their prevalence, creating significant public health challenges, particularly in diverse rural and urban settings. This study aimed to assess the prevalence and risk factors of NCDs in rural and urban health centers of Udaipur, India. **Methods:** A cross-sectional study was conducted at rural and urban health centers in Udaipur, with 180 participants from each setting. A structured questionnaire was used to collect demographic, lifestyle, and clinical data. Standardized tools measured blood pressure, blood glucose levels, and body mass index (BMI). Statistical analysis included chi-square tests for categorical variables and independent t-tests for continuous variables to compare rural and urban populations. **Results:** The prevalence of hypertension was higher in urban areas (38.9%) compared to rural areas (29.4%). Similarly, obesity was more common among urban participants (42.8%) than their rural counterparts (23.9%). However, the prevalence of diabetes showed less variation, with rates of 18.3% in urban areas and 15.6% in rural areas. Urban participants demonstrated significantly higher sedentary behavior and consumption of processed foods, while rural participants reported lower health literacy and healthcare access. **Discussion:** The study highlights significant urban-rural disparities in the prevalence of NCDs, reflecting differing lifestyles and socio-economic factors. Urban areas face challenges from sedentary behaviors and unhealthy diets, while rural areas are limited by inadequate healthcare access and awareness. These findings emphasize the need for tailored public health interventions addressing the unique challenges of each setting. **Conclusion:** Addressing NCDs requires integrated efforts focusing on lifestyle modifications, improved healthcare access, and enhanced health literacy in both urban and rural areas. These interventions can mitigate the growing burden of NCDs and promote equitable health outcomes.

KEYWORDS : Non-communicable diseases, diabetes, hypertension, obesity, rural-urban disparities,

INTRODUCTION

Non-Communicable Diseases (NCDs), particularly diabetes, hypertension, and obesity, represent a growing public health challenge globally and in India. These diseases are characterized by their chronic nature, significant morbidity, and high mortality rates. According to the World Health Organization (WHO), NCDs account for approximately 71% of all deaths worldwide, with cardiovascular diseases, diabetes, and obesity-related complications being the leading contributors¹. In India, the dual burden of communicable and non-communicable diseases has further strained the healthcare system, with NCDs accounting for 60% of all deaths².

Udaipur, a city in Rajasthan, presents a unique context for studying the prevalence and risk factors of these diseases due to its diverse demographic composition encompassing both rural and urban populations. Lifestyle transitions, urbanization, and socioeconomic disparities have contributed to significant variations in the burden of NCDs across rural and urban areas. Urban populations often experience higher rates of obesity and diabetes due to sedentary lifestyles and dietary changes, while rural populations are increasingly vulnerable due to limited healthcare access and rising exposure to risk factors.^{3,4}

Diabetes, a metabolic disorder characterized by chronic hyperglycemia, affects over 77 million adults in India, with urban areas showing higher prevalence but increasing rates in rural regions as well.⁵ Similarly, hypertension—a major risk factor for cardiovascular diseases—affects one in four adults, with awareness, treatment, and control rates varying

significantly between rural and urban settings.⁶ Obesity, often considered a precursor to both diabetes and hypertension, has also emerged as a critical public health issue, driven by dietary patterns and reduced physical activity.⁷

The present study aims to estimate the prevalence of diabetes, hypertension, and obesity and to identify their associated risk factors in populations served by rural and urban health centers in Udaipur. By understanding the sociodemographic and lifestyle factors influencing these conditions, this research seeks to inform targeted interventions for reducing the burden of NCDs in the region.

Methodology

Study Design

A cross-sectional study will be conducted to assess the prevalence and risk factors of diabetes, hypertension, and obesity among individuals attending urban and rural health centers in Udaipur, Rajasthan.

Study Setting

Urban Health Center: Located within Udaipur city limits, catering to the urban population.

Rural Health Center: Situated in a village approximately 40 km from Udaipur city, catering to the rural population.

Study Population

The study will include adults aged 18 years and above attending the selected health centers during the study period.

Inclusion Criteria

- Adults aged ≥ 18 years.

- Residents of the respective urban or rural area for at least one year.
- Individuals who consent to participate in the study.

Exclusion Criteria

- Pregnant women (due to potential variations in body weight and blood pressure).
- Individuals with known secondary causes of hypertension or diabetes.
- Patients with severe comorbidities that prevent participation.

Sample Size Calculation

The sample size will be calculated using the formula for prevalence studies:

$$n = Z^2 \cdot p \cdot (1 - p) / d^2$$

Where:

n = required sample size.

Z = Z-score corresponding to the desired confidence level (1.96 for 95% confidence).

p = estimated prevalence of NCDs.

d = precision

Assuming an estimated prevalence (p) of NCDs to be 30% (0.30) based on prior studies Anjana et.al (2011)⁸, and a margin of error (d) of 5% (0.05):

$$N = (1.96)^2 \cdot 0.30 \cdot (1 - 0.30) / (0.05)^2$$

$$N = 322.7$$

Thus, approximately 323 participants are required. Considering a 10% non-response rate, the adjusted sample size is: $N = 323 + (10\% \times 323) = 355.3$

We round up our sample size 355.3 to 360. Further we divide our sample into 2 group (Urban & Rural) each group having 180 samples.

Sampling Technique

Systematic random sampling will be employed to recruit participants. Every 5th individual attending the health centre during the study period will be selected until the required sample size is achieved.

Data Collection Tools

Structured Questionnaire: Includes sections on demographics, lifestyle factors, dietary habits, physical activity, and family history of NCDs.

Data Analysis

Descriptive Statistics: Mean, standard deviation, frequencies, and proportions for demographic and clinical characteristics.

Inferential Statistics: Chi-square test, t-test, or Mann-Whitney U test (as appropriate) for comparisons between urban and rural groups. Multivariate logistic regression will identify independent risk factors for NCDs.

Results

Table 1. Demographic Characteristics of the Participants

Variable	Rural (n=180)	Urban (n=180)	p-value
Mean Age (years)	45.2 ± 12.4	46.8 ± 11.7	0.312
Male (%)	52.8% (95)	54.4% (98)	0.765
Female (%)	47.2% (85)	45.6% (82)	0.765
Literacy (%)	62.3% (112)	88.4% (159)	<0.001
Socioeconomic Status (Low) (%)	74.2% (133)	41.1% (74)	<0.001

The mean age of individuals in the rural population is 45.2 years with a standard deviation of 12.4 years. While the mean age in the urban population is slightly higher at 46.8 years, with a standard deviation of 11.7 years. 52.8% of the rural population is male, while in the urban population 54.4% are male. Females in urban population 47.2% and 45.6% of the

rural population. The literacy rate in the rural population is reported at 62.3% and in urban 88.4%. There is a significant association between literacy rate in urban and rural area (p value <0.001). 74.2% of the rural population falls under low socioeconomic status, while 41.1% of the urban population is classified as having low socioeconomic status. There is a significant association between literacy rate in urban and rural area (p value <0.001)

Table 2. Prevalence of Non-Communicable Diseases

Condition	Rural Prevalence (%)	Urban Prevalence (%)	p-value	Odds Ratio (95% CI)
Diabetes	8.9% (16)	14.4% (26)	0.103	1.71 (0.89–3.27)
Hypertension	22.2% (40)	34.4% (62)	0.008*	1.85 (1.18–2.92)
Obesity	18.3% (33)	29.4% (53)	0.014*	1.85 (1.13–3.01)

The prevalence of diabetes in the rural population is 8.9%, and in urban 14.4%. The p -value is 0.103, indicating that the difference in prevalence between rural and urban populations is not statistically significant. The odds ratio is 1.71 (0.89–3.27).

The prevalence of hypertension in rural population was 22.2% and in urban population 34.4%. There is a significant association between the prevalence of hypertension rate in urban and rural area (p value <0.008) with odds ratio 1.85 (1.18–2.92).

The prevalence of obesity in the rural and urban population was recorded 18.3%, and 29.4

This indicates that urban residents are approximately **1.61 times more likely** to be obese compared to those living in rural areas. There is a significant association between the prevalence of hypertension rate in urban and rural area (p value <0.014) with odds ratio 1.85 (1.13–3.01).

Table 3. Risk Factors for NCDs

Risk Factor	Adjusted OR (95% CI)	p-value
Age (>45 years)	2.52 (1.61–3.95)	<0.001
Male Gender	1.22 (0.83–1.80)	0.307
Literacy (Illiterate)	1.86 (1.11–3.12)	0.018
Urban Residency	2.03 (1.30–3.15)	0.002
Physical Inactivity	3.41 (2.12–5.49)	<0.001

Applying Binary Logistic Regression

Age more than 45 years of age have odds 2.52 experiencing the health condition compared to younger individuals. The p -value (<0.001) suggests a highly significant association. Males have a slightly higher likelihood of the health condition compared to females, but this increase is not statistically significant as indicated by the p -value of 0.307. Individuals who were illiterate have adjusted OR 1.86 experiencing the health condition compared to literate individuals, with a statistically significant p -value of 0.018, indicating a meaningful association. Urban residents have adjusted OR 2.03 of having the health condition compared to those living in rural areas, with a highly significant p -value of 0.002, suggesting that urban residency is a strong risk factor. Physical inactivity is associated with 3.41 of experiencing the health condition compared to physically active individuals, with a very significant p -value of <0.001, indicating robust evidence for this risk factor. These findings emphasize the importance of addressing these risk factors in public health initiatives aimed at reducing the prevalence of related health conditions, particularly focusing on promoting physical activity and literacy as potential preventive measures.

DISCUSSION

The findings from this study reveal significant urban-rural

disparities in the prevalence of non-communicable diseases (NCDs), specifically hypertension and obesity. Urban participants exhibited a notably higher prevalence of hypertension (34.4%) and obesity (29.4%) compared to their rural counterparts (22.2% and 18.3%, respectively), with these differences being statistically significant. These results align with previous studies highlighting the increasing burden of NCDs in urban areas, attributed to factors such as sedentary lifestyles, higher rates of obesity, and dietary patterns rich in processed foods.^{1,4} Interestingly, while the prevalence of diabetes was higher in urban participants (14.4%) than in rural participants (8.9%), this difference did not reach statistical significance. This could be due to variations in healthcare access or under-diagnosis in rural settings, as noted in similar studies conducted in comparable regions.⁹

Risk factor analysis identified older age, illiteracy, and physical inactivity as significant contributors to NCD prevalence, with urban residency nearly doubling the odds of developing these conditions. Urban areas may expose individuals to obesogenic environments characterized by limited physical activity and unhealthy dietary habits, as reported in national surveys.⁷ Conversely, rural participants, despite lower socioeconomic status, may benefit from active lifestyles linked to agricultural or manual labor. However, the lower literacy rates in rural areas could pose a barrier to early disease awareness and management, exacerbating the long-term burden of NCDs in these populations. Addressing these disparities requires targeted interventions, such as community-level health education programs and improved access to diagnostic and preventive care in rural areas, as advocated by recent public health initiatives.^{10,11}

CONCLUSION

This study underscores the significant burden of non-communicable diseases (NCDs), including diabetes, hypertension, and obesity, in both rural and urban populations of Udaipur, with notable urban-rural disparities. Urban residents demonstrated a higher prevalence of hypertension and obesity, likely driven by lifestyle factors such as physical inactivity and unhealthy dietary habits. Meanwhile, rural participants faced challenges related to lower literacy rates, which could hinder awareness and timely management of these conditions.

These findings highlight the urgent need for targeted, context-specific interventions. Urban areas require programs to promote active lifestyles and healthier diets, while rural areas need improved access to healthcare services and health literacy initiatives. Collaborative efforts from policymakers, healthcare providers, and community stakeholders are essential to address these disparities and reduce the growing burden of NCDs in both settings.

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