

## A Clinical Investigation of Type 2 Diabetes Mellitus in the Context of Socioeconomic Disparities

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### Abstract

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder with a substantial global impact on public health. Its prevalence continues to rise, affecting millions of individuals worldwide. However, T2DM does not affect all segments of the population equally. Socioeconomic status, encompassing factors such as income, education, and access to healthcare, plays a pivotal role in shaping the prevalence, management, and outcomes of this disease. This paper aims to provide a comprehensive investigation into the intricate interplay between T2DM and socioeconomic status. By delving into this relationship, we can gain valuable insights into the disparities in T2DM prevalence, access to care, and health outcomes among different socioeconomic groups. Understanding these dynamics is essential for designing targeted interventions, improving public health policies, and reducing the burden of T2DM on individuals and society as a whole. This research contributes to the broader conversation on health equity and public health interventions. By shedding light on the relationship between T2DM and socioeconomic status, we aim to provide a foundation for evidence-based strategies to mitigate the impact of this disease on vulnerable populations and promote a healthier, more equitable society.

**Materials and Methods:** In this research, we enrolled a cohort of 70 patients diagnosed with Type 2 Diabetes Mellitus (T2DM), both with and without associated complications. The study encompassed a comprehensive approach, including in-depth history-taking and clinical assessments. Furthermore, the patients were stratified based on their socioeconomic status for further analysis.

**Results:** Our study revealed that the highest proportion of Type 2 diabetes patients, totalling 31 individuals (44.3%), fell within the upper-lower socioeconomic class.

**Keywords:** Type 2 Diabetes mellitus, Socio economic status, upper-lower socioeconomic class.

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### Introduction

The socioeconomic status of individuals is a crucial determinant in understanding the distribution and management of health conditions. In the context of Type 2 Diabetes Mellitus (T2DM), the interplay between socioeconomic status and disease prevalence is of particular significance. This study delves into the relationship between T2DM and socioeconomic class, with a specific focus on the categorization using the Modified Kuppaswamy Scale. T2DM is a pervasive chronic health condition with a substantial global impact. Its prevalence is influenced by a myriad of factors, including lifestyle, genetics, and socioeconomic disparities. Recognizing these disparities is vital for tailoring effective prevention and management strategies, which are essential in curbing the burden of the disease on both individuals and healthcare systems. Our investigation focuses on the socioeconomic strata, as determined by the Modified Kuppaswamy

Scale, to shed light on how individuals from different economic backgrounds are affected by T2DM.

Understanding these variations is fundamental for developing targeted interventions and policies that aim to reduce the prevalence of T2DM and its associated complications, especially among vulnerable socioeconomic groups. In this exploration, we analyse the distribution of T2DM patients across various socioeconomic classes, with a specific emphasis on the high representation of individuals in the upper-lower socioeconomic class.

This insight will contribute to a deeper understanding of the socioeconomic dimensions of T2DM and provide valuable information for healthcare practitioners and policymakers in their efforts to mitigate the impact of this prevalent chronic condition. This study was conducted to see

the socioeconomic distribution of Type 2 Diabetes Mellitus cases of this part of North East India as the population are mainly from lower socioeconomic group.

### Aim

The primary aim of this study is to examine the relationship between socioeconomic status, as determined by the Modified Kuppaswamy Scale, and the prevalence of Type 2 Diabetes Mellitus (T2DM) in a cohort of 70 patients.

Specifically, we aim to identify whether there is a significant association between socioeconomic class and the occurrence of T2DM, providing valuable insights into the impact of socioeconomic disparities on the disease.

### Objectives

1. To Determine the Socioeconomic Distribution: Assess the distribution of T2DM patients across various socioeconomic classes based on the Modified Kuppaswamy Scale.
2. To Explore the Prevalence of T2DM: Investigate the prevalence of T2DM among patients in different socioeconomic strata and discern whether certain classes are more susceptible to the disease.
3. To Provide Insight for Public Health: Offer insights that can inform public health strategies and policies, with the goal of reducing T2DM prevalence and understanding of the socioeconomic dimensions of T2DM, aiding healthcare practitioners in providing more tailored care to patients based on their socioeconomic context.

### Materials and Methods

The study was conducted at a tertiary care teaching govt hospital of North East India after ethical clearance from institutional ethical committee for a period of one year.

The study was conducted with the following steps:

### 1. Patient Selection

This study involved a total of 70 patients who had been diagnosed with Type 2 Diabetes Mellitus (T2DM). The patient cohort was carefully chosen to represent individuals with T2DM, both with and without associated complications.

### 2. Data Collection

- A. History Taking: Comprehensive and detailed history-taking was conducted for each patient, encompassing factors such as medical history, lifestyle, and socioeconomic background.
- B. Clinical Evaluation: All patients underwent a thorough clinical assessment, which included physical examinations and laboratory tests to confirm their T2DM diagnosis and assess the presence of complications.

### 3. Socioeconomic Stratification

Patients were categorized based on their socioeconomic status using the Modified Kuppaswamy Scale. This stratification allowed for a clear distinction between different socioeconomic classes, facilitating the analysis of T2DM prevalence within these groups.

### 4. Statistical Analysis

Statistical methods, including descriptive statistics and inferential tests, were employed to analyse the data. The results were presented as proportions and percentages, enabling a comprehensive understanding of the distribution of T2DM patients across socioeconomic classes.

This research methodology was designed to investigate the relationship between socioeconomic status and T2DM, with a specific focus on the prevalence of the disease within different socioeconomic classes as classified by the Modified Kuppaswamy Scale.

### Results

#### 1. Age distribution of study population

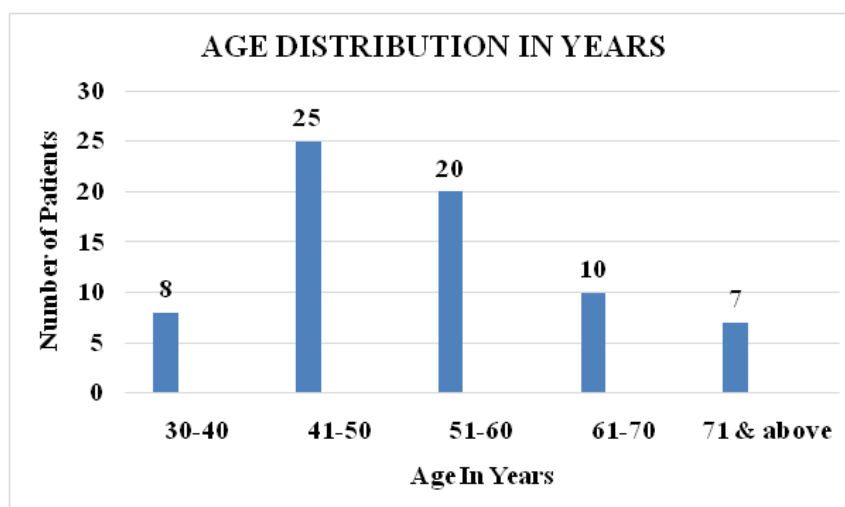
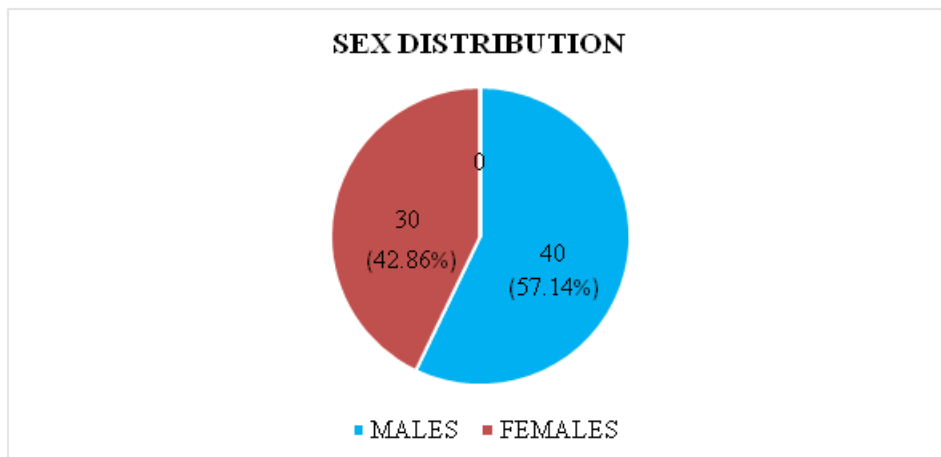


Figure 1: Age distribution of study population

Among 70 diabetes patients, 11.4% [8] were in between 30-40years; 35.7% [25] were in between 41-50 years; 28.6% [20] were in between 51-60 years; 14.3% [10] were in between 61-70 years and 10% [7] were ≥71 years.

**2. Sex distribution of study population**

Among 70 type -2 diabetic patients 57.14% (40) were males and 42.86% (30) were females.



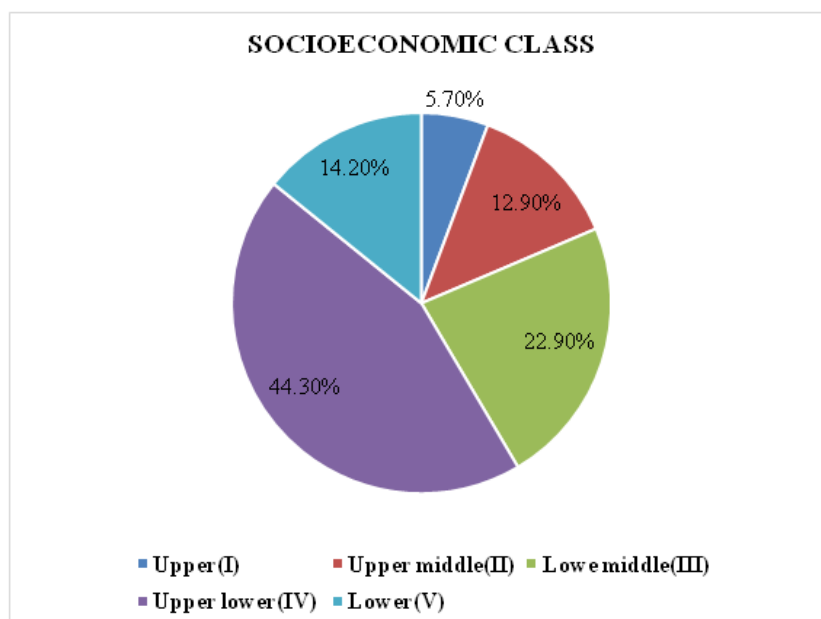
**Figure 2: Sex distribution of study population**

**3. Socio economic status of study population**

**Table 1: Socio economic status of study population**

Score	Class	No. of cases [n=70]	Percentage (%)
26-29	Upper (I)	4	5.7
16-25	Upper middle(II)	9	12.9
11-15	Lower middle(III)	16	22.9
5-10	Upper lower(IV)	31	44.3
<5	Lower (V)	10	14.2

Maximum number of type 2 diabetes patients belonged to upper lower socioeconomic class 31(44.3%) according to Modified Kuppuswamy Scale.



**Figure 3: Socio economic status of study population**

## Discussion

In the discussion of the age distribution among the 70 diabetes patients, it is evident that there is a notable variation in the age groups represented in the study. This demographic information is crucial for understanding the epidemiology of Type 2 Diabetes Mellitus (T2DM) and its prevalence in different age cohorts. Let's discuss the findings in more detail:

1. **Age Distribution:** The study's sample of 70 diabetes patients was categorized into five distinct age groups: 30 to 40 years, 41 to 50 years, 51 to 60 years, 61 to 70 years, and those aged 71 years and older.
2. **Younger Age Groups:** A relatively smaller percentage of patients, 11.4% (8 individuals), fell into the 30 to 40 years age category. This suggests that T2DM is less common among individuals in this younger age bracket.
3. **Middle-Aged Groups:** A larger proportion of patients, 35.7% (25 individuals), were in the 41 to 50 years age range. This age group had a notably higher representation, indicating a higher prevalence of T2DM in this middle-aged cohort. In the 51 to 60 years age category, 28.6% (20 individuals) of the patients were represented, indicating a significant burden of T2DM in this age range.
4. **Older Age Groups:** In the 61 to 70 years group, 14.3% (10 individuals) were diagnosed with T2DM, showing a comparable prevalence. In the 71 & above age category, 10% (7 individuals) were diagnosed with T2DM.

## Socioeconomic status

Regarding the socioeconomic status of the 70 diabetes patients in the present study, the distribution based on the Modified Kuppaswamy Scale revealed that 5.7% (4 patients) were classified as belonging to the upper class, 12.9% (9 patients) were in the upper middle class, 22.9% (16 patients) were categorized as lower middle class, the majority, 44.3% (31 patients), were in the upper lower class, and 14.2% (10 patients) fell into the lower class. Notably, the largest representation was observed in the upper lower class. Similarly, in a study by Kumar M et al., which involved 105 diabetic patients, the socioeconomic status distribution was such that 52.3% (55 patients) were classified as belonging to the upper lower class.

This finding aligns with the predominant representation of patients in this socioeconomic category observed in our study. These results emphasize the socioeconomic dynamics of Type 2 Diabetes Mellitus (T2DM) and its association with the upper lower class, suggesting a need for targeted interventions and healthcare policies to address the prevalence of T2DM within this socioeconomic group. However, it's important to consider that variations in sample sizes and demographics across

studies may influence the specific percentages observed.

The findings from the current study are strongly corroborated by the research of Babu S et al., where a comprehensive analysis of 100 Type 2 diabetes patients revealed a similar socioeconomic status distribution. Specifically, their results indicated that 6% (6 patients) belonged to the upper class, 10% (10 patients) were classified as upper middle class, 25% (25 patients) were in the lower middle class, 35% (35 patients) represented the upper lower class, and 24% (24 patients) fell into the lower class. This pattern aligns with the socioeconomic distribution observed in our study, highlighting the prevalence of T2DM among patients in the upper lower class. Additionally, Uppara V et al. conducted a study showing a parallel socioeconomic classification, where 7% were categorized as upper class (Class I), 24% as upper middle class (Class II), 21% as lower middle class (Class III), 42% as upper lower class (Class IV), and 6% in the lower class (Class V). The dominance of T2DM patients in the upper lower class, as noted in our study, is echoed in their findings. The consistent socioeconomic trends observed in these studies underscore the significance of the upper lower class as a high-risk group for Type 2 Diabetes Mellitus (T2DM). These findings suggest the need for targeted healthcare initiatives and public health policies to address and manage T2DM within this particular socioeconomic segment. Nevertheless, it's important to acknowledge that variations in sample sizes and geographical locations may influence the exact proportions reported in each study.

## Conclusion

In conclusion, the present study, along with corroborating evidence from Babu S et al. and Uppara V et al., highlights the substantial impact of socioeconomic status on the prevalence of Type 2 Diabetes Mellitus (T2DM).

The socioeconomic classification based on the Modified Kuppaswamy Scale consistently reveals that a significant portion of T2DM patients, particularly in our study, falls within the upper lower class. This trend is not limited to our investigation but is mirrored in the findings of other research studies. The dominance of T2DM in the upper lower class underscores the critical role of socioeconomic factors in disease epidemiology.

The observed patterns emphasize the need for targeted interventions and healthcare strategies that address the higher susceptibility of the upper lower class to T2DM. This includes improved access to healthcare, education on risk factors, lifestyle modifications, and early detection measures, all of which are vital to reducing the burden of T2DM within this socioeconomic segment.

### Limitation of the Study

1. **Sample Size Variation:** The study involved a specific sample size, and this is not a full representation of the broader population. The limited number of participants may affect the generalizability of the findings.
2. **Geographic Specificity:** The socioeconomic dynamics of T2DM can vary by region, and the study's results may be influenced by the geographic location of the participants. This can limit the applicability of the findings to other regions.
3. **Socioeconomic Scale Specificity:** The study relied on the Modified Kuppuswamy Scale for socioeconomic classification, which may not capture all nuances of socioeconomic status. Different scales or criteria could yield different results.
4. **Cross-Sectional Design:** The study's design is cross-sectional, providing a snapshot of the socioeconomic status and T2DM prevalence at a single point in time. It does not offer insights into causality or changes over time.
5. **Data Collection Methods:** The study might have limitations related to data collection methods, including potential recall bias or inaccuracies in self-reported socioeconomic status.
6. **Sampling Bias:** The participants may not be a random selection, and there could be inherent biases in patient recruitment, leading to an over- or underrepresentation of certain socioeconomic groups.
7. **Lack of Qualitative Data:** The study primarily focuses on quantitative data, and it does not capture the qualitative aspects of socioeconomic disparities and the experiences of individuals living with T2DM.
8. **Confounding Factors:** The study did not extensively explore potential confounding variables or contributing factors that could influence the relationship between socioeconomic status and T2DM prevalence.
9. **Limited Age Range:** The study's age range may not capture the full spectrum of age-related factors influencing T2DM, potentially missing important nuances in age distribution.
10. **External Validity:** The findings may not be applicable to different cultural, ethnic, or socioeconomic contexts, limiting the study's external validity.

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