

Health Outcome in India: An Analysis of Multidimensional Inequality

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Abstract:- There are two significant sources of inequality among individuals: one is circumstances, which is beyond the control of an individual, and the other one is an effort to an extent within the control of an individual. Roemer (1998) emphasized equal opportunity wherein it describes that differences in circumstances are not a morally acceptable source of inequality. The paper attempts to explore the multidimensional aspects of health. Further, this study intends to contribute to the quantitative analysis of inequality by using dissimilarity indices related to multinomial distributions by measuring and comparing the extent of equality. Prominently older age groups from 45-50 were highly represented in health issues, and hypertension/heart disease, whereas in health issues, injuries were predominantly represented by the age group 55-60 years of age. Health issues were most prominently observed in rural areas compared to urban areas. The highest difference by population representation between rural and urban areas was observed in health issues, injuries and infection.

Keywords:- Age; Causes; Dissimilarity; Health; Inequality; Multidimensional.

❖ *Takeaways:*

- Addressing policies toward the beneficiaries' health outcomes at a multidimensional level
- Focused research to reach the most deprived.
- A comprehensive index emphasizing concentration and exposure

I. INTRODUCTION

There are two significant sources of Inequality among individuals: one is circumstances, which is beyond the control of an individual, and the other is an effort to an extent within the control of an individual. The combination of both these factors plays a crucial role in determining the level of Inequality. This leads to a situation wherein circumstances dilute an individual's effort or an individual effort overtakes the events or vice versa. Thus, equal opportunity is a complex theory leading to Inequality, which leads to comparisons in indicating how different social systems and policies need to cope with disparities.

Ray (1998) highlighted two main reasons for Inequality first, an egalitarian society is desirable, especially if the initial conditions of the lives of individuals are crucial to their development, and second, inequality has functional impacts that can weaken the growth of a country. A policy aiming at greater equity within the health system will lead to a decline in Inequality at the same time Espinoza (2007).

Health inequality is the unjust differences in health between persons of different income and social groups and is attributed to disadvantages such as poverty, discrimination, and lack of access to services and goods. Inequalities in health are present in every society because certain parts and sections of the community are well accessible, whereas other sections or regions are deprived; however, in certain areas which might not have access to healthcare services but there might be few individuals due to their socioeconomic status, who can access at par with their counterparts in areas with better accessibility to health care. In contrast, an individual or group with better access to health care but with lower socioeconomic status or a lack of awareness or self-inflicting damaging lifestyle may not effectively use the health system. This emphasises a holistic view of the health system.

Numerous studies have examined the association between background characteristics such as age, gender, and socioeconomic status to health. For example, inequalities in health outcomes differ between gender and subgroups of the population within males and females and by geographical areas, i.e. rural and urban areas Bora and Saikia (2015). Health inequality was more concentrated among the rich in India for self-reported morbidity Jain et.al. (2012).

Further, studies on multidimensional Inequality are useful in identifying causes and solutions. For examining multidimensional Inequality, Fisher (1956) proposed a multidimensional matrix. Additionally, one needs in-depth analysis to understand different individuals with different health needs; hence just equal treatment to everyone may not solve the problem as specific needs are not shared by all, which again varies from individual to individual within a group. Overall, the concept of equity takes individual circumstances in the context of health.

Health equity requires removing obstacles to health such as poverty, discrimination, and indirect factors such as lack of access to services, decent jobs and jobs with high occupation hazards, quality education, housing, safe environments, and health care. Hence, health equity is achievable by reducing and ultimately eliminating health disparities and determinants that adversely affect excluded or marginalised groups.

Individuals from different backgrounds, social groups, and countries live with varying levels of health. The dimensions along which health inequalities are commonly examined, between and within countries or states, by gender, education, caste, income, occupation, etc. Different theories attempt to explain group-level differences in health, including psychosocial, material deprivation, health behavior,

environmental, and selection explanations Arcaya et al. (2015).

The complexity of multidimensional approaches when the health determinants such as socioeconomic variables, self-damaging individual lifestyles such as binge eating, poor hygiene, frequent exposure to harsh weather conditions, exposure to the occupational hazard, access to health care etc. The varying level of health inequality arises when all these determinants intersect to a varying degree leading to overall health inequalities.

➤ *Need for the Study*

Health inequality describes the differences, degree of variations, and disparities in the health achievements of individuals and groups but can be independent of any assessment of their fairness Kawachi et al. (2002). The approach to measuring health inequality varies from using the classic study of the cross-national relationship between average national income and life expectancy Preston (1975) to a quantitative measure approach to measure differentials in health across all units in a population.

A multidimensional approach to health inequality gives better insight into the well-being inequality within and between populations. Socio-economic and demographic characteristics shape health inequities in India. Socio-economic demographic characteristics differentials leading to striking inequalities might exist due to the intersection of various parameters.

The degree of inequality is measured mainly by Theil Index, the concentration index Wagstaff, (1991), and the Gini coefficient to capture the multidimensional effect. The multidimensional investigation leads to target public health action, emphasising the need for greater investments in health and related socio-economic variables, thereby strengthening the effectiveness of health programs. This paper attempts to examine the degree of health inequalities across various socio-economic parameters in India. The dissimilarity of health outcomes identified by background characteristics will help the policymakers target a focused group. Hence, the paper attempts to explore the multidimensional aspects of health. Further, this study intends to contribute to the quantitative analysis of inequality by using dissimilarity indices related to multinomial distributions by measuring and comparing the extent of equality.

➤ *Objectives*

This study aims to identify the extent of multidimensional inequalities across and within background characteristics of health outcomes.

II. DATA AND METHODS

Inequality does not originate from a single cause but from different socio and economic backgrounds resulting in a complex process. We examine health outcomes in the context of five background characteristics viz age, sex, education, employment, caste, and marital status. The expected multidimensional inequality can be in different

aspects of inequality, such as concentration and dissimilarity. Considering these distinct dimensions of variation, health inequality is inherently multidimensional. For more detailed comparisons, a weighted index of systematic dissimilarity was used due to the small sizes of some of the categories of groups.

We use the data from the Social Consumption in India: Health by the National Sample Survey Organization (NSSO) from their 75th round survey (2017- 18) to examine the quantum of health inequality regarding demographic characteristics. Social group, economic class as well as geographic region.

The analysis is based on information collected through NSS Schedule 25.0 (Household Social Consumption: Health) spread over the entire Indian Union, for which data were collected from 1,13,823 households (64,552 in rural areas and 49,271 in urban areas), covering 5,55,115 persons (3,25,883 in rural areas and 2,29,232 in urban areas).

➤ *Methods*

Theil index of dissimilarity was applied across distributions to assess opportunity inequality in this paper. Theil statistic examines how equality of opportunity is achieved if the conditional distributions of outcomes/advantages are equal across circumstance sets. All possible combinations of outcomes (e.g. health status with educational achievement, social group, etc.)

➤ *Theil statistic T is given by*

$$T = \sum_{p=1}^n \left\{ \left(\frac{1}{n} \right) * \left(\frac{y_p}{\mu_y} \right) * \ln \left(\frac{y_p}{\mu_y} \right) \right\}$$

Where n is the number of individuals in the population, y_p is the proportion of the population of the person indexed by categories p , and μ_y is the population's average by respective categories. If every individual has exactly the same value, T will be zero; thus represents perfect equality and is the minimum value of Theil's T . If it is represented in a particular category, T will equal $\ln n$; this represents utmost inequality and is the maximum value of Theil's T statistic.

Further, we use the basic formula for the index of dissimilarity given by Index of dissimilarity = $\frac{1}{2} * \text{Abs}(\pi_i/\pi_j - \pi_j/\pi_i)$

where

π_i = the population of group i

π_i = the total population in group i for which the dissimilarity index is being calculated.

π_j = the population of group j

π_j = the total population in group j for which the dissimilarity index is calculated.

The dissimilarity index is useful for input into multidimensional analysis and is used to compare distributions of different categories.

For example, both in their statistics the value y_p and in the index of dissimilarity the value P_i and P_j is the proportion of people who are identified by background characteristics, it shows the incidence of multidimensional background

characteristics. Whereas the value μ_y is the average proportion of weighted inequality people suffers at the same time. It shows the intensity of inequality of background characteristics jointly with the incidence of illness.

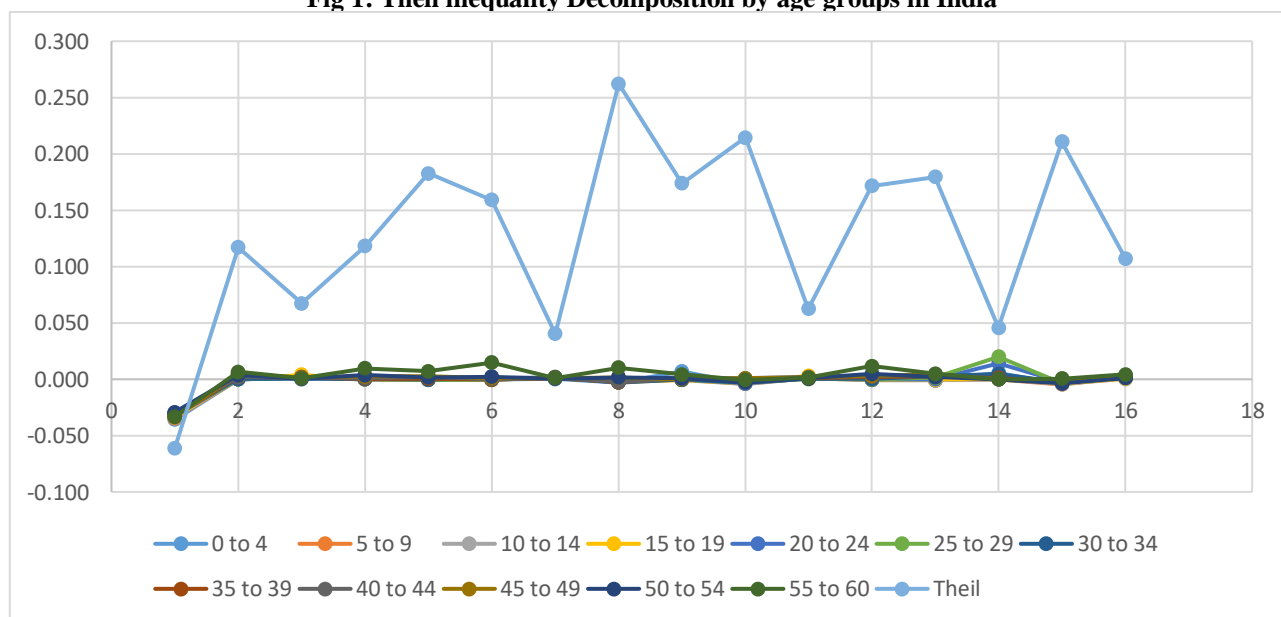
III. RESULTS

Table 1: Index of Dissimilarity by Nature of Ailments and Background Characteristics in India

Ailments	Age group	Occupational categories	Level of education	Marital Status	Social Groups	Gender	Religion
Infection	0.200	0.186	0.030	0.214	0.037	0.025	0.030
Cancers	0.268	0.168	0.084	0.152	0.157	0.011	0.153
Blood Diseases	0.287	0.216	0.077	0.247	0.026	0.020	0.048
Endocrine	0.292	0.158	0.035	0.140	0.067	0.031	0.035
Psycho Neuro issues	0.096	0.104	0.060	0.031	0.038	0.068	0.022
Eye	0.358	0.113	0.149	0.168	0.057	0.028	0.080
Ear	0.248	0.192	0.159	0.174	0.119	0.059	0.109
Hypertension/Heart disease	0.289	0.132	0.036	0.162	0.086	0.064	0.040
Respiratory	0.238	0.164	0.131	0.087	0.062	0.059	0.056
Gastro Intestine	0.143	0.103	0.023	0.054	0.024	0.043	0.037
Skin disease	0.176	0.167	0.044	0.161	0.043	0.040	0.033
Muscular skeleton	0.206	0.122	0.055	0.131	0.032	0.022	0.038
Genito Urinary	0.143	0.119	0.077	0.121	0.039	0.028	0.038
Obstetric	0.646	0.455	0.047	0.212	0.112	-	0.070
Injuries	0.125	0.252	0.083	0.070	0.033	0.224	0.036
Other	0.088	0.065	0.042	0.030	0.058	0.022	0.017

Table 1 shows the index of dissimilarity between background characteristics. The dissimilarity index was highest and most prominently among age groups and occupational categories. The estimates show that ailments due to obstetric causes are more significant among age groups, occupational categories, and marital status than in any categories. This excess dissimilarity among age groups and occupational categories is high among obstetric patients. In contrast, religion, level of education and social groups do not explain much of the low dissimilarity values among different background characteristics.

Fig 1: Theil inequality Decomposition by age groups in India



Theil index derived by age group and health issues shows the highest Theil value for health issues, hypertension/heart disease, gastro intestine and injuries. In the case of hypertension/heart disease, the above-average representation was observed in older age groups from age 45-49 onwards as reflected by the highest positive theil value compared to other lower age groups. Except for the age group 35-39 to 45-49, all the different age groups show below-average health issues gastro intestine as reflected from their

respective negative their values. Health issue injuries were predominantly represented by age group 55-60 which shows positive theil value.

Fig 2: Theil inequality Decomposition by Social groups in India

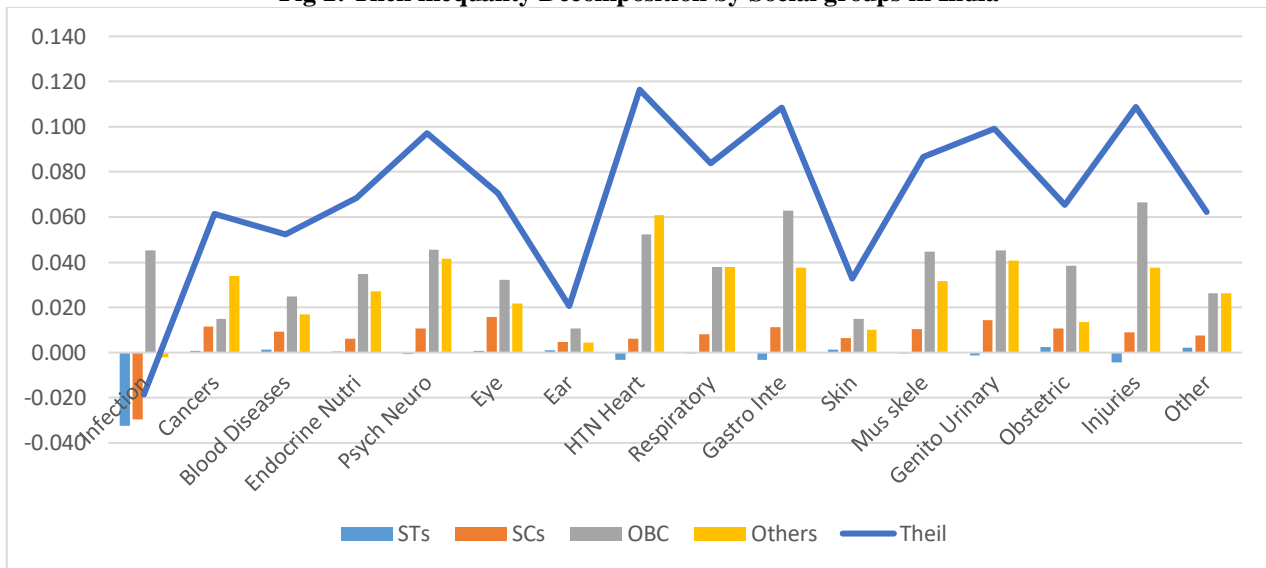
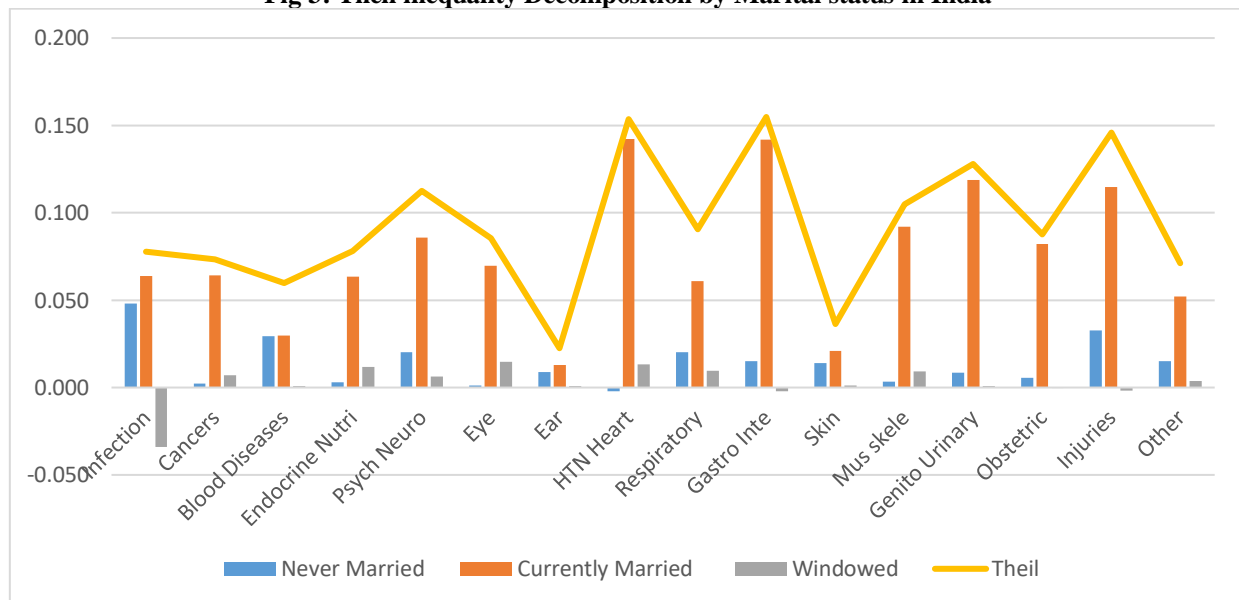


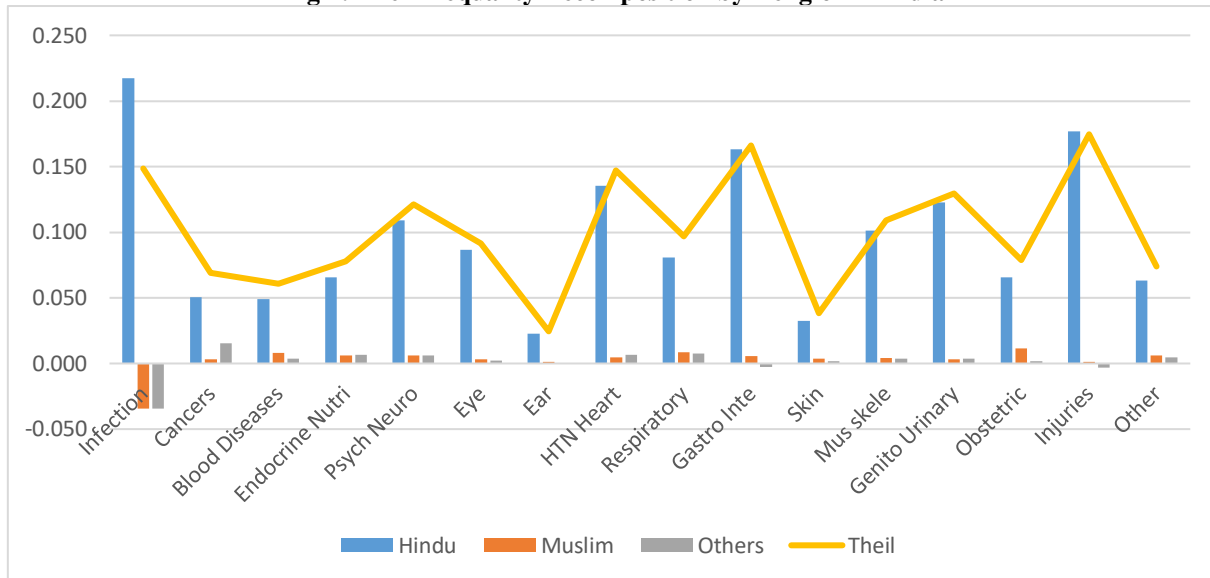
Figure 2 shows the overall theil value was negative and derived for health issue infection by each social group. The theil value derived is negative among social groups STs, SCs and others for health issue infection and positive among caste OBC. This implies that caste OBCs have an above-average representation proportion of the population with health issue infection compared to other social groups. Negative theil value was observed among caste STs for health issues Neurology, Heart disease, Respiratory, Muscular skeleton, Genitourinary and injuries which implies below average representation. The highest total positive theil value was observed for health issues, Heart disease, gastro intestine and injuries. While the highest proportion of heart disease was observed among caste Others as reflected by positive theil value of caste others compared to other castes. Whereas caste OBC shows the highest proportion with health issues, gastro intestine and injuries as reflected by highest positive theil values compared to different castes.

Fig 3: Theil inequality Decomposition by Marital status in India



The highest positive Theil value was observed in health issues, psycho neurology, heart disease, gastro intestine, muscular skeleton, genitourinary and injuries by marital status currently married as observed in figure 3. The negative Theil value was observed among never married in health issues heart disease and among widower in the health issues gastro intestine and injuries which was reflected by their respective negative theil values.

Fig 4: Theil inequality Decomposition by Religion in India



As observed in figure 4, the highest Theil value was derived from health issues, injuries, Gastro urinary, Hypertension/Heart disease, psycho Neuro, infection, and Genito intestine by religion. In the case of injuries and gastro urinary, the proportional representation of religion others was comparatively lower for Hindus and Muslims as depicted by negative theil values. Whereas in the case of health issues infection, there was above average representation of religion Others.

Fig 5: Theil inequality Decomposition by Education in India

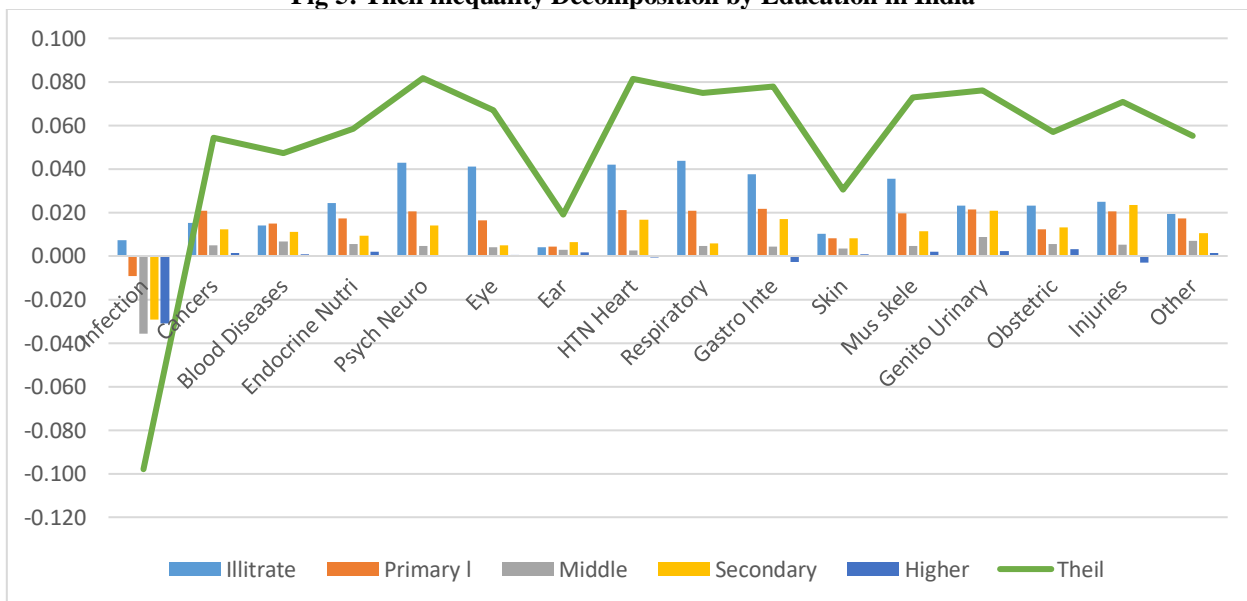
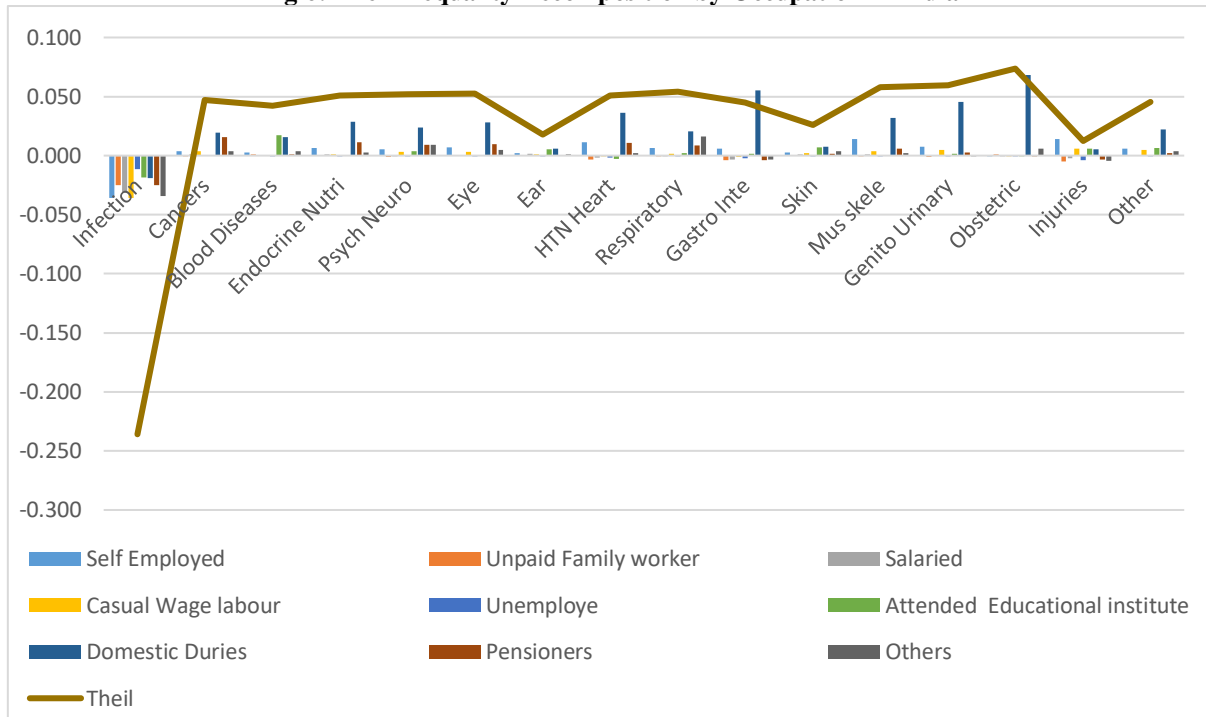


Figure 5 shows total Theil scores derived from education to be the least compared to other background characteristics. Infection was the least among all the categories of education as reflected from respective negative theil value among all the types of education. The below-average representation of health issue infection was observed in all the education categories, and the only above-average representation was observed among illiterates. Below average proportion representation was observed in higher education with health issues of hypertension/heart disease, gastro intestine and injuries as evident from their respective positive theil values.

Fig 6: Theil inequality Decomposition by Occupation in India



Similarly, figure 6 shows below-average representation among all categories of occupation as represented by their respective negative theil value thereby the overall theil value was negative predominantly for health issue infection. Occupation categories such as Unpaid family workers and unemployed show below-average representation in health issues and psycho Neuro, as evident from their respective negative Theil values. Above-average representation in the health issue Hypertension/heart disease was observed among occupation categories of self-employed, domestic duties, pensioners and others. Overall the health issues among the unemployed were negligible as compared to other types of occupation.

Fig 7: Theil inequality Decomposition by Region in India

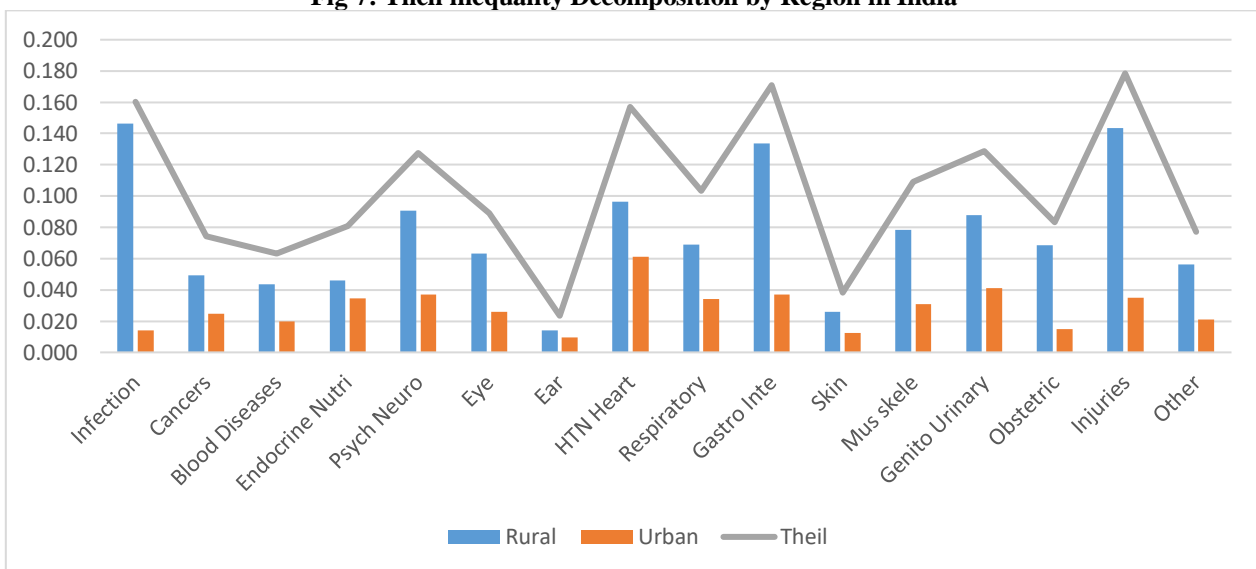


Figure 7 shows the Theil value by region and the health issues observed most prominently among rural areas compared to urban areas. The difference in the representation between rural and urban areas was the least for health issues related to the ear. The highest difference was observed in health issues, injuries and infection, with both the regions showing above-average representation but comparatively more in rural areas.

IV. SUMMARY OF FINDINGS

Prominently older age groups from 45-50 were highly represented in health issues, and hypertension/heart disease, whereas in health issues, injuries were predominantly represented by the age group 55-60 years of age.

Caste STs show the least representation in health issues Neurology, Heart disease, Respiratory, muscular skeleton, Genitourinary and injuries. The highest proportion of heart disease was observed among the caste Others, whereas caste OBC shows the highest proportion with health issues infection, gastro intestine and injuries.

Health issues, psycho neurology, heart disease, gastro intestine, muscular skeleton, genitourinary and injuries were predominantly observed among the currently married population. In contrast, the least number of representation was observed among never married in health issues hypertension/heart disease and among widower in health issues gastro intestine and injuries.

In the case of health issues, injuries and gastro urinary, the proportional representation of religion others were comparatively lower for Hindus and Muslims as depicted by the negative values of Theil. Whereas in case of health issues infection, there was an above-average representation of religion, Hindu and below-average expression of religion Muslim and others.

Overall, theil value derived in education is the least compared to other background characteristics. Except among

illiterates, Infection was the least among all the education categories. Below average proportion representation was observed in higher education with health issues of hypertension/heart disease, gastro intestine and injuries.

Unpaid family workers and unemployed show below-average representation in health issues, psycho Neuro, as evident from their respective negative Theil scores. Above-average representation in the health issue Hypertension/heart disease was observed among self-employed, domestic duties pensioners and others. Overall, the health issues among the unemployed were negligible compared to other occupations.

Health issues were most prominently observed in rural areas compared to urban areas. The difference in the representation between rural and urban areas was the least for health issues related to the ear. The highest difference was observed in health issues, injuries and infection, with both the regions showing above-average representation but comparatively more in rural areas.

Dissimilarity was higher among age groups, and occupational categories.

Table 2

Health Outcome Inequality	Health Outcome Inequality
By Age Groups (older vs younger)	Identifying predominant health issues by region, gender, social groups, genetics etc.
By Social Groups	Identifying predominant health issues by access to health care, occupation-related issues etc.
By Marital status	Health issues with a focus on gender, lifestyle etc.
By Education	Examining the access, awareness and right to health by level of education, employment etc.
By Occupation	Addressing occupation specific health issues
By region	Examining access to health care

V. CONCLUSION

There are several policies targeted toward targeted beneficiaries under different departments. Hence, addressing policies toward the beneficiary’s health outcomes at a multidimensional level may lead to a focused research and reach the most deprived. The results of this study point to further exploiting the dimensions of health outcomes at the micro-level by integrating different government health schemes. A comprehensive index emphasizing concentration and exposure is the need of the hour.

Our health information system prioritizes collecting data on essential demographic and background characteristics and the inherent biological determinants of health to prioritize the overall factors responsible for overall health and well-being. In addition, memerging data with other determinants such as education and employment outcome will highlight how these other determinants contribute to health inequities.

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