Women and Child Health: Analysis of NFHS-4 Data

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***Abstract*—Will be included after completion of the project.**

I. Introduction

The Indian scenario is disconcerting with reference to woman and children health. India continues to be amongst the countries that demonstrate the highest prevalence of neonatal mortality in the world, with about 0.75 million neonates dying every year. Annually, five lakh children die in India due to vaccine preventable diseases and another 89 lakh remain at risk due to partial or no immunisation. 58.6% of children, 53.2% of non-pregnant women and 50.4% of pregnant women were found to be anaemic in 2016, as per the NFHS.

A literature review reveals that decline in fertility due to higher contraception use has a positive impact on the overall health of women and children. In regions with lower fertility rate, pregnant women tend to get regular antenatal checkups, their children are immunised, and the child mortality rate is low.[1]

Nutritional malignancies like stunting and anaemia have been shown to cause irreversible health effects in the sufferer like reduced cognitive development and various acute and chronic diseases. In the Damot Sore district, Southern Ethiopia, stunting was found to be affected by anaemia, number of children in the household, and unsafe drinking water.[2]

This study uses exploratory data analysis techniques to explore the inter-relationship between factors like contraception, child mortality, stunting, immunisation, etc. State and Central governments can use the insights obtained here in taking efficacious policy decisions that could permanently improve the lives of their citizens, especially those who are underprivileged.

II. Problem Definition

To explore the effects of factors like Literacy, Sanitation, Contraception use, and Antenatal care on attributes like Rate of Anaemia in Women and Children, Child Stunting, and Child Immunisation.

III. Data Preprocessing

This section describes the preprocessing techniques used on the dataset, and the reasons for selecting those techniques.

A. Data Cleaning

Data cleaning is the process of preparing data for analysis by removing or modifying data that is incorrect, incomplete, irrelevant, duplicated, or improperly formatted. This data may hinder the process of analysis or provide inaccurate results.

The Dataset contained district wise information about a certain number of households surveyed. We divided the features in various categories, according to the relevance in our study. Data was cleaned by removing those attributes which contained a disproportionate number of 'NA' values. Those rows which had 0 households surveyed were also removed. Finally, rows that were missing values in at least one category were removed. The cells which still contained missing values were replaced by the means of the features they fell under.

B. Attribute Subset Selection

Attribute Subset Selection is the process to reduce the dimensions of data by using only a subset of all its features. It involves the removal of irrelevant and redundant features.

We utilised our domain knowledge to remove features that were irrelevant. Some features were removed based on their correlation with other features. Our correlation threshold was 0.7.

C. Unsupervised Discretisation

Discretisation is the process of transferring continuous functions, models, variables, and equations into discrete counterparts. We did both Equal-Interval and Equal-Frequency Discretisation.

D. Feature Creation

The NFHS-4 data was available state wise. We merged it and added some features:

- State
- Zone
- Region

E. Normalisation

Since the data was available in percentage, and for some attributes per-thousand, we used decimal scale normalisation to convert it to the range 0 to 1.

IV. Data Visualisation

We have used all the major visualisation techniques (histogram, boxplot, pie-chart, scatter plot, etc.) to discover relationships between gender, literacy, health, etc. We obtained some interesting avenues to explore through these visualisations. It made apparent the how the interplay of factors is different in urban and rural households, how some states show anomalous behaviour.

We discovered a few interesting relationships like that of sanitation with stunting, the disproportionate female sterilization, and the use of contraceptives with increased awareness of breast and cervix cancer in women.

References

[1] P. Arokiasamy. *Fertility Decline in India: Contributions by Uneducated Women Using Contraception*. URL: https://www.jstor.org/stable/40279313?seq=1#metadata_info_tab_contents.

[2] Bereket Geze Malako. *Stunting and anemia among children 6–23 months old in Damot Sore district, Southern Ethiopia*. URL: https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-018-0268-1.