

Socio-Economic Factors Influencing Health Insurance Adoption A Quantitative Study in Ajara (Town)

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Abstract: Health insurance plays an important role in reducing financial risks associated with medical expenses and improving access to healthcare services. In India, a significant portion of healthcare expenditure is financed through out-of-pocket payments, which often leads to financial strain for households. Although various government and private health insurance schemes have been introduced to increase financial protection and move toward universal health coverage, adoption levels remain uneven across different socio-economic groups. This study investigates awareness, enrollment, utilization, and satisfaction regarding health insurance among households in Ajara, a semi-urban town. Primary data were collected from 384 respondents selected using Yamane's sampling formula from a population of 3651 families. The analysis employed a combination of descriptive statistics and inferential statistical techniques including Chi-Square tests, Kruskal–Wallis tests, Exploratory Factor Analysis (EFA), Structural Equation Modeling (SEM), Random Forest classification, and K-Means clustering. The findings indicate that gender has a statistically significant association with awareness, while age and income show weaker relationships. The Random Forest model further highlights trust, education, and age as major predictors of awareness. Factor analysis identified awareness barriers, financial barriers, and trust barriers as key determinants influencing insurance adoption. Structural Equation Modeling demonstrates that awareness significantly influences enrollment, which subsequently affects utilization and satisfaction with insurance services. The results suggest that improving public awareness, strengthening trust in insurance institutions, and simplifying claim procedures can enhance health insurance adoption. These findings provide valuable insights for policymakers and healthcare administrators in designing more effective and inclusive insurance programs.

Keywords: Health Insurance Adoption, Socio-Economic Determinants, Insurance Awareness, Claim Settlement, Policyholder Satisfaction, Healthcare Financing, Semi-Urban Population

I. INTRODUCTION

A. Background of the study,

Health is a fundamental component of human well-being and an essential factor in social and economic development. Access to quality healthcare services ensures a healthier population, which in turn contributes to increased productivity and improved standards of living. However, healthcare expenses can impose a significant financial burden on households, particularly in developing countries where a large proportion of medical costs are paid directly by individuals. In India, a substantial share of healthcare expenditure continues to be financed through out-of-pocket payments, which often leads to financial stress and, in many cases, pushes vulnerable households into poverty. Health insurance has emerged as an important mechanism for providing financial protection against unexpected medical expenses. It allows individuals and families to pool financial risks and access healthcare services without facing severe economic hardship. By covering medical expenses such as hospitalization, diagnostics, and treatments, health insurance reduces the financial risk associated with illness and promotes timely healthcare utilization. As a result, health insurance systems are considered



an important component of modern healthcare financing and play a crucial role in achieving universal health coverage (UHC).

Over the past few decades, the Government of India and private insurers have introduced several health insurance schemes aimed at increasing healthcare accessibility and reducing financial vulnerability. Government initiatives such as public health insurance programs and subsidized insurance schemes have attempted to expand coverage among economically weaker sections of society. Similarly, private insurance companies have developed a variety of health insurance products to cater to individuals, families, and corporate employees. Despite these efforts, the penetration of health insurance in many parts of the country remains limited. One of the major reasons for the limited adoption of health insurance is the presence of socio-economic and informational barriers. Many individuals are either unaware of the available insurance schemes or lack sufficient knowledge about how insurance works. Factors such as education level, income, occupation, and social background often influence the awareness and understanding of insurance products. In addition, lack of trust in insurance providers, complex documentation procedures, and concerns about claim settlement processes can discourage individuals from enrolling in insurance programs. These challenges are particularly visible in Towns where access to financial information and healthcare services may be limited compared to metropolitan areas. Towns often represent a transitional socio-economic environment where populations experience characteristics of both rural and urban communities. In such regions, variations in income levels, educational attainment, and employment opportunities can significantly influence financial decision-making, including the adoption of health insurance. Understanding the factors that influence health insurance awareness and adoption in Town communities is therefore important for designing effective policy interventions. Analyzing the socioeconomic determinants of insurance adoption can help identify the barriers preventing households from enrolling in insurance schemes and highlight the factors that encourage participation. The present study focuses on Ajara, a Town region, where households experience varying levels of socio-economic development and access to healthcare services. By collecting primary data from residents of the region, the study seeks to examine the level of awareness, enrollment, and utilization of health insurance schemes. The research also investigates how demographic characteristics such as age, gender, education, and income influence individuals' attitudes toward health insurance

B. Problem statement.

Health insurance plays an important role in protecting households from unexpected medical expenses and reducing the financial burden of healthcare. Despite the availability of various government and private health insurance schemes in India, a large number of households remain uninsured. In many cases, lack of awareness, limited income, low trust in insurance providers, and complicated claim procedures prevent people from adopting health insurance.

In Town regions such as Ajara, the level of awareness and participation in health insurance schemes varies across different socioeconomic groups. Factors such as education, income, occupation, and trust in insurance institutions may influence whether individuals enroll in insurance programs. Understanding these factors is essential for improving the effectiveness of health insurance policies and increasing coverage.

Therefore, the present study aims to analyze the socio-economic factors influencing health insurance awareness, enrollment, utilization, and satisfaction among households in Ajara. By using statistical methods, the study seeks to identify the major determinants and barriers affecting the adoption of health insurance.

C. Objectives of the study

To assess the level of awareness of health insurance among different socio-demographic groups.

To identify socio-economic factors influencing enrollment and utilization.

To evaluate satisfaction and trust levels among insured households.

To identify major barriers preventing adoption of health insurance.

To develop statistical models predicting awareness and enrollment.



II. LITERATURE REVIEW

Recent studies highlight the growing importance of health insurance as a mechanism for improving financial protection and access to healthcare services, particularly in developing economies where out-of-pocket medical expenditure remains high. (1) Bhat and Jain (2006) examined the determinants of health insurance demand in micro-insurance schemes in India and found that socioeconomic factors such as income, education, and employment status significantly influence individuals' willingness to enroll in insurance programs. Their findings suggest that awareness and affordability are major drivers of insurance adoption among low- and middle-income households. (2) Devadasan et al. (2007) investigated community-based health insurance programs in South India and identified key barriers to enrollment, including lack of awareness, financial constraints, and limited trust in insurance institutions. The study emphasized that effective communication strategies and community participation are essential for improving enrollment rates in voluntary insurance schemes. (3) A study conducted by Ghosh (2013) analyzed the determinants of health insurance coverage in India using data from the National Sample Survey. The research revealed that education, occupation, and household income play significant roles in influencing insurance participation. The study also highlighted that individuals employed in formal sectors are more likely to be insured compared to those working in informal sectors. (4) Dror and Jacquier (1999) explored the concept of micro-insurance and its potential to provide financial protection to low-income populations. Their research demonstrated that community-based health insurance schemes can reduce financial vulnerability caused by unexpected healthcare expenses, but successful implementation depends on awareness, trust, and affordability of premiums. (5) A study by Kumar et al. (2011) examined the level of awareness and utilization of health insurance among urban populations in India. The researchers found that although awareness levels were increasing due to media exposure and government programs, a significant gap still existed between awareness and actual enrollment in insurance schemes. The study recommended strengthening public awareness campaigns to improve participation. (6) Wagstaff et al. (2016) analyzed the impact of health insurance programs on healthcare utilization and financial protection in developing countries. Their findings indicated that insurance coverage increases the use of healthcare services and reduces catastrophic health expenditure among households. However, the study also emphasized that socio-economic inequalities continue to influence access to insurance benefits. (7) The World Health Organization (WHO) Global Health Expenditure Report (2022) highlighted that many developing countries still rely heavily on out-of-pocket healthcare spending. The report emphasized that expanding health insurance coverage is essential for achieving universal health coverage (UHC) and improving equitable access to healthcare services. (8) Mishra and Bhatnagar (2018) studied the socio-economic determinants of health insurance adoption in India and found that awareness, trust in insurance providers, and previous healthcare experiences significantly affect individuals' decisions to purchase insurance. Their study also indicated that education improves financial literacy and encourages individuals to adopt risk-mitigation strategies such as insurance. (9) Rangarajan and Srivastava (2019) analyzed the development of health insurance systems in India and emphasized the importance of government-supported schemes in expanding insurance coverage among economically weaker sections of society. Their study suggested that policy interventions, subsidy programs, and improved service delivery are necessary to increase insurance penetration. (10) Recent research by the Ministry of Health and Family Welfare (2023) on National Health Accounts estimates revealed that although insurance coverage has expanded through schemes such as Ayushman Bharat, disparities still exist across socio-economic groups. The report emphasized that awareness programs, better healthcare infrastructure, and simplified claim procedures are required to ensure wider participation in health insurance schemes.

Overall, the existing literature suggests that health insurance adoption is influenced by a combination of socio-economic, demographic, and psychological factors, including education, income, employment status, awareness, and trust in insurance institutions. While previous studies have explored these determinants in urban and rural populations, limited research has focused specifically on semi-urban regions, where socio-economic characteristics differ from both metropolitan and rural settings. Therefore, the present study aims to analyze the factors influencing health insurance awareness, enrollment, and utilization among households in Ajara using statistical and analytical methods



III. DATA AND METHODOLOGY

Research Design

This study employed a cross-sectional research design, where data were collected from respondents at a single point in time. The purpose of the study was to analyze the socio-economic factors influencing health insurance awareness, enrollment, utilization, and satisfaction among households in Ajara, a semi-urban town.

The research specifically focused on understanding the level of awareness of health insurance schemes, the extent of participation in such schemes, and the key demographic and socio-economic factors that influence individuals' decisions to adopt health insurance.

The study also examined respondents' satisfaction levels with different types of insurance schemes and identified barriers that prevent households from enrolling in insurance programs. By analyzing these factors, the study aims to provide insights into the challenges and opportunities for improving health insurance coverage in semi-urban communities.

Study Area and Population

This study was conducted in Ajara town, located in the Kolhapur district of Maharashtra, India. Ajara represents a semi-urban region where households experience varying levels of socio-economic development and access to healthcare services.

The target population for the study consisted of households residing in Ajara town. According to local administrative records and survey estimates, the total number of households considered for the study was approximately 3651 families. The respondents selected for the study included adult members of households who were capable of providing information regarding health insurance awareness, enrollment status, healthcare expenditure, and satisfaction with insurance services.

Sample Size Determination

The sample size for this study was calculated using Yamane's sampling formula (1967), which is commonly used in social science research for determining an appropriate sample size from a finite population.

The formula is given as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = required sample size

N = total population size

e = margin of error For this study:

N = 3651 households

e = 0.05 (5% margin of error)

Substituting the values into the formula produced a required sample size of approximately 384 respondents.

Therefore, the study collected responses from 384 individuals, ensuring adequate representation of the population and improving the reliability of the statistical analysis.

Data Collection

Primary data for this study were collected from residents of Ajara through a structured questionnaire survey. The questionnaire was designed to collect information related to:

Demographic characteristics (age, gender, marital status)

Socio-economic characteristics (education level, occupation, income)

Awareness of health insurance schemes

Enrollment status and type of insurance coverage

Utilization of health insurance services

Satisfaction levels with claim settlement and support services



Perceived barriers to health insurance adoption

The survey was conducted using a combination of Google Forms and direct personal interaction with respondents to ensure a higher response rate and accurate data collection.

Data collection was carried out over a period of several days, during which respondents from different parts of Ajara town were approached to participate in the survey. Randomly selected respondents were invited to participate, and all participants were informed about the purpose of the study before completing the questionnaire.

The use of both online and in-person data collection methods helped ensure that respondents from different socio-economic backgrounds were included in the sample. This approach improved the representativeness of the dataset and increased the reliability of the results.

Data Processing

After data collection, the responses were processed and organized for statistical analysis. The data processing stage involved several steps to ensure accuracy and consistency of the dataset.

The major steps included:

Data Cleaning – Removing incomplete or inconsistent responses.

Handling Missing Values – Addressing missing entries to ensure dataset completeness.

Data Coding – Converting categorical variables into numerical formats for statistical analysis.

Data Normalization – Standardizing variables to prepare the dataset for machine learning algorithms.

Outlier Detection – Identifying unusual values using statistical methods to maintain data reliability.

The processed dataset was then prepared for further statistical and machine learning analysis.

Statistical Analysis

The cleaned dataset was analyzed using both traditional statistical techniques and advanced analytical models in order to identify patterns and relationships within the data. The following methods were applied in the study:

Chi-Square Test of Independence

This test was used to examine the relationship between awareness of health insurance and demographic variables such as age group, gender, and income level.

Kruskal–Wallis Test

A non-parametric statistical test used to determine whether satisfaction levels differed across different types of insurance schemes, including government, private, and employer-based insurance.

Exploratory Factor Analysis (EFA)

Used to identify underlying factors influencing barriers to health insurance adoption.

Structural Equation Modeling (SEM)

Applied to examine relationships between awareness, enrollment, utilization, and satisfaction.

K-Means Clustering

Applied to segment respondents into groups with similar socio-economic and behavioral characteristics.

These analytical methods provided both descriptive and predictive insights into the factors influencing health insurance adoption.

Software Used

The analysis of the dataset was carried out using several software tools to ensure accurate data processing and statistical modeling.

The software used in this study include:

Python – Used for statistical analysis, machine learning models, and data visualization.



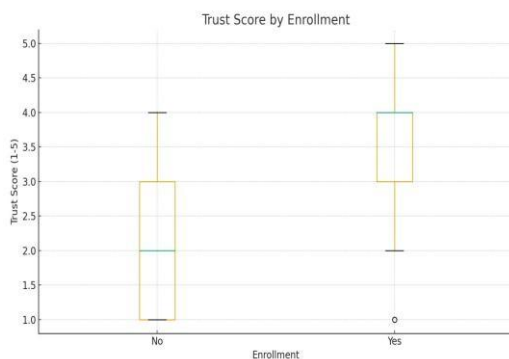
Microsoft Excel – Used for data entry, data cleaning, and preliminary descriptive analysis.

Jupyter Notebook / Anaconda Environment – Used for executing Python-based statistical and machine learning workflows.

The combined use of these tools allowed for efficient data processing and advanced analytical modeling for the study.

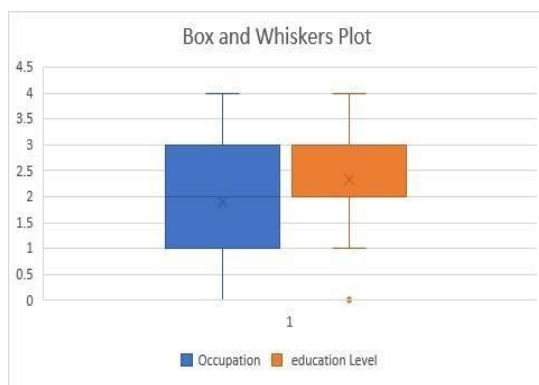
IV. GRAPHICAL ANALYSIS

This section presents the results obtained from graphical analysis, statistical hypothesis testing, and advanced analytical techniques used in the study. These results help to understand the demographic characteristics of the respondents and identify the factors influencing health insurance awareness, enrollment, and satisfaction.



1. Association Of Trust With Enrollment

Trust is positively associated with enrollment: insured families report higher trust. Lack of insurance aligns with lower trust, possibly because of unfamiliarity, negative perceptions, or lack of exposure to insurance benefits.

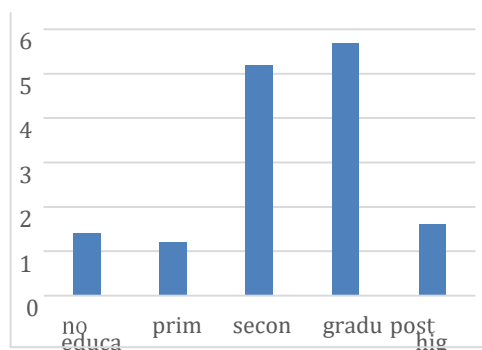


2. Employment And Literacy Factor Involved

Both distributions show similar spread and centrality, but education is slightly skewed toward higher levels (median above occupation). Occupation shows more variability (unemployed through business owners), while education is concentrated around secondary/graduate levels. The presence of an outlier in education (0) suggests very few without formal schooling.

The chart suggests that the surveyed population is largely employed (especially salaried or business owners) and reasonably educated (mostly secondary to graduate). Very few respondents are unemployed or without education. The balance indicates that the study population has a fair degree of socioeconomic stability, which

could influence their awareness and enrollment in health insurance schemes.

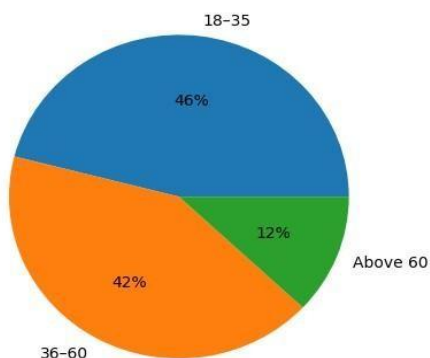


3. Education Level And Enrollment

The sample is dominated by individuals with graduate and secondary-level education, together making up the majority of respondents. Very few participants reported having only primary or no formal education. This indicates that the dataset reflects the perspectives of a more educated population, which may influence results on health insurance awareness and trust—since education is often linked to higher awareness and better access to insurance.



Age Distribution of Respondents

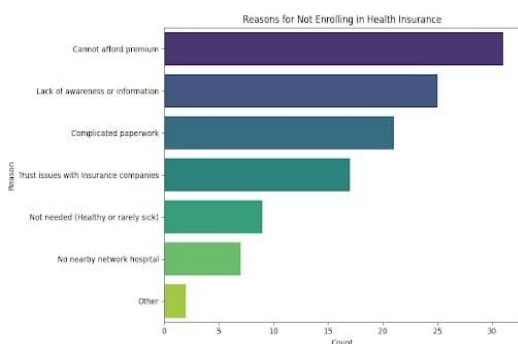


4. Agewise Distribution

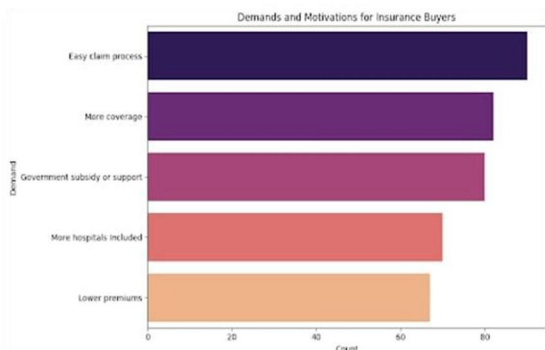
The survey sample is dominated by younger (18–35) and middle-aged (36– 60) participants, together making up 88% of the sample. Older adults (above 60) are underrepresented.

This suggests that findings—especially regarding health insurance awareness and trust—will mostly reflect the views of working-age populations rather than retirees or elderly individuals.

5.Reasons For Non-Enrollment



This bar chart ranks why people stay away. The biggest reason is "Cannot afford premium," followed closely by "Lack of awareness." Basically, people either don't have the cash or they don't understand how the plans work. It shows that just telling people about insurance isn't enough; it also has to be cheaper.



6. Demands And Motivations For Insurance Buyers

This graph shows what would actually make people sign up. Interestingly, "Easy claim process" is at the very top— even higher than "Lower premiums." This tells us that people aren't just looking for a cheap deal; they are terrified of the paperwork and want to know that if they get sick, getting their money back will be fast and easy.

V. STATISTICAL ANALYSIS

A. Chi-square test

The Chi-Square Test of Independence was used to determine whether awareness of health insurance is associated with demographic variables such as age group, gender, and income

Test	Statistic	Interpretation
Awareness vs Age	$\chi^2 = 2.25, p = 0.325$	No significant association
Awareness vs Gender	$\chi^2 = 4.39, p = 0.036$	Significant association



Awareness vs Income	$\chi^2 = 8.14, p = 0.087$	Moderate association
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No significant association between age group and awareness. Awareness levels are similar across different age groups. Awareness is significantly associated with gender.

Males appear more likely to report being aware compared to females

The association between awareness and income approaches significance ($p < 0.10$) but does not reach the conventional 0.05.

Higher-income groups show slightly higher awareness.

Kruskal- wallis test

Satisfaction by Insurance Scheme (Kruskal–Wallis Test):

The Kruskal–Wallis test, a non-parametric statistical method, was used to determine whether there are significant differences in satisfaction levels across different types of health insurance schemes.

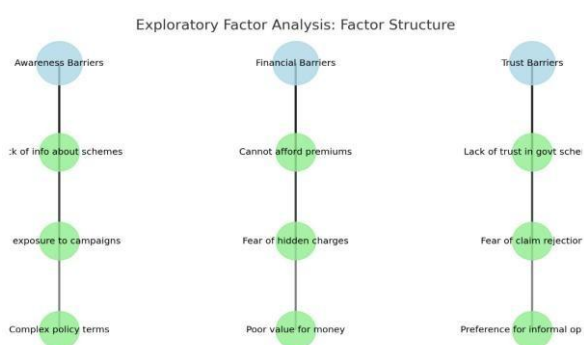
The schemes considered in this analysis include:

Government insurance schemes, Private insurance schemes, Employer-based insurance schemes

Scheme	Mean Satisfaction	SD	Enrollment
Government	2.77	0.46	69
Private	2.63	0.50	16
Employer	2.50	0.71	2

The Kruskal–Wallis test indicates that type of insurance scheme does not significantly influence satisfaction levels among respondents. This suggests that overall perceptions of insurance services remain relatively consistent across different insurance provider

C. Exploratory factor analysis (EFA)



Exploratory Factor Analysis (EFA) is a statistical technique used to identify the underlying structure of a large set of observed variables by grouping them into a smaller number of latent factors. Its main purpose is data reduction, summarizing information, and discovering latent variables that explain the relationships among the observed variables. EFA is a multi-step process that involves calculating factor loadings, deciding on the number of factors to retain, and potentially rotating the factors to improve their interpretability.

The factor analysis highlights that barriers to health insurance uptake can be meaningfully grouped into three latent

constructs: Awareness Barriers reflect a lack of exposure to information and difficulty in understanding insurance products. Financial Barriers emphasize affordability concerns and perceptions of hidden or excessive costs. Trust Barriers underline psychological and institutional skepticism toward formal insurance schemes. Together, these findings provide actionable insights:

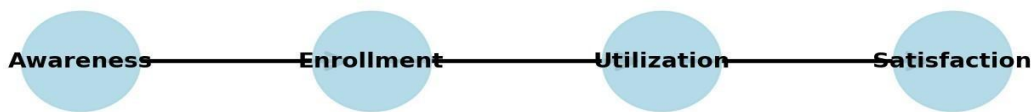


Policymakers should invest in awareness campaigns that simplify insurance terms. Subsidies or flexible payment plans may mitigate financial constraints. Enhancing transparency and accountability in claim processing could rebuild trust.

D. Structural equation modeling (SEM)

Structural Equation Modeling (SEM) analysis is a powerful multivariate statistical technique used to test complex hypothesized relationships between multiple measured and latent (unobserved) variables. It combines principles of factor analysis and regression analysis to build a single, comprehensive model that estimates the direct and indirect effects among variables simultaneously.

Structural Equation Model: Awareness → Enrollment → Utilization → Satisfaction



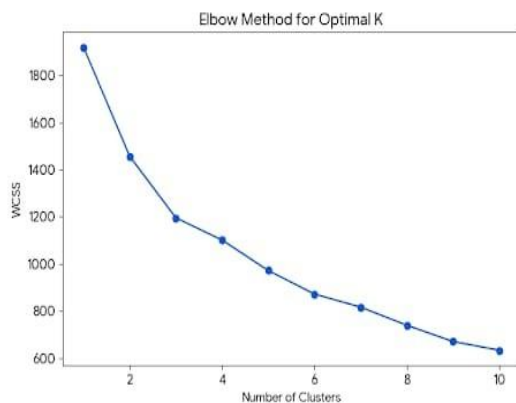
Awareness significantly predicts Enrollment. Hence, increasing public knowledge of health insurance schemes directly increases the likelihood of enrollment.

Enrollment has a strong positive effect on Utilization, confirming that access is a prerequisite for usage.

Utilization positively predicts Satisfaction, showing that actual service experience drives beneficiaries’ perceptions. The indirect pathway highlights that Awareness contributes to Satisfaction primarily through its influence on Enrollment and Utilization.

E. K-means clustering

To identify distinct consumer profiles within the health insurance market, a K-Means Clustering Analysis was performed on the expanded dataset (N=384). This unsupervised machine learning technique partitions respondents into groups based on similarities in their demographics (Age, Education, Income) and psychological attributes (Trust Score, Satisfaction).



Cluster 0: The Skeptical Professionals (38.5% of sample)



This segment consists of younger, highly educated individuals. While they are generally satisfied with their service, their trust score is moderate. This suggests that while they use health insurance, they may remain critical of the industry's transparency or efficiency.

Cluster 1: The Loyal Established (42.2% of sample)

Comprising the largest portion of the sample, this group includes older individuals with moderate education. They exhibit the highest levels of trust and satisfaction. This segment represents the "brand loyalists" who likely value the security provided by insurance over the technicalities of the policy.

Cluster 2: The Vulnerable/Distrustful (19.3% of sample)

This is the most critical segment for policy intervention. Despite having moderate education levels, they show significantly low trust (1.46/5) and satisfaction. Their lower income rank suggests that financial barriers combined with a lack of institutional trust prevent them from fully engaging with insurance products.

VI. OVERALL CONCLUSION

Trust is positively associated with enrollment: insured families report higher trust. Lack of insurance aligns with lower trust, possibly because of unfamiliarity, negative perceptions, or lack of exposure to insurance benefits. The dataset reflects the perspectives of a more educated population, which may influence results on health insurance awareness and trust—since education is often linked to higher awareness and better access to insurance. Regarding health insurance awareness and trust—will mostly reflect the views of working-age populations rather than retirees or elderly individuals. Gender is the main demographic factor associated with awareness of health insurance in this dataset, with males reporting higher awareness. Income may also play a role, but the evidence is not statistically strong. Age does not appear to influence awareness significantly. There are no significant differences in satisfaction levels across Government, Private, and Employer schemes. Policymakers should invest in awareness campaigns that simplify insurance terms. Subsidies or flexible payment plans may mitigate financial constraints. Enhancing transparency and accountability in claim processing could rebuild trust. Designing large-scale awareness campaigns to boost initial uptake. Strengthening service delivery mechanisms to ensure smooth utilization. Enhancing transparency and responsiveness to maximize satisfaction.

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