**OPEN ACCESS**

Manuscript ID:
ASH-2023-11016266

Volume: 11

Issue: 1

Month: July

Year: 2023

P-ISSN: 2321-788X

E-ISSN: 2582-0397

Received: 18.04.2023

Accepted: 28.06.2023

Published: 01.07.2023

Citation:
Jancintha Maria Florence, J, and A. Sangamithra. " Determinants of Healthcare Services of Cardiovascular Disease Patients in Coimbatore: A Logistic Regression Approach." *Shanlax International Journal of Arts, Science and Humanities*, vol. 11, no. 1, 2023, pp. 19-25.

DOI:
https://doi.org/10.34293/sijash.v11i1.6266



# Determinants of Healthcare Services of Cardiovascular Disease Patients in Coimbatore: A Logistic Regression Approach

**J. Jacintha Maria Florence**
*Assistant Professor, Department of Economics*
*Nirmala College for Women, Coimbatore, Tamil Nadu, India*

**A. Sangamithra**
*Professor, Department of Economics*
*Bharathiar University, Coimbatore, Tamil Nadu, India*
*https://orcid.org/0000-0003-4761-8150*

**Abstract**
*A healthy population, therefore, may be defined as one that safeguards the health of its members. The health of the population may be a resource for the well-being of its members. Any development process must take into account health. Cardiovascular diseases form the major component of chronic diseases and therefore contribute most to the economic impact: these strike individuals in their productive ages, need high treatment costs and result in premature deaths. Patients place importance on the caliber of services and take into account a variety of factor in the selection of hospital such as the availability of the competent specialists, the reputation of the hospital, professional management, range of services offered, availability of latest technology and equipment, cost and convenience, proximity to home, courteous behaviour of staff and professionalized care.*
**Keywords: Health, Cardiovascular Disease, Economic Impact, Healthcare Services.**

## Introduction

A long life and good health are the greatest blessings that human beings can pray for. Health is the level of functional or metabolic efficiency of a living being. In humans, it is the general condition of a person's mind, body and spirit, usually meant to be free from illness, injury or pain. A healthy population, therefore, may be defined as one that safeguards the health of its members. The health of the population may be a resource for the well-being of its members. Health is an important input in any process of development (Chaparwal et al 1999). Health is both an input and output linked with development and therefore, should not be viewed in isolation from the overall goals of development. Either directly or indirectly, individually or collectively, consciously or unconsciously, health is linked with all aspects of daily living. Good health, as people know from their own experience, is a crucial part of well being.

## Definition of Health

The domain of the term 'Health' is as large and complex as the entire scope of human activities. Good health is a pre-requisite to human productivity and development process. A healthy community constitutes the infrastructure needed for building economically viable society. Health is vital for ethical, artistic, material and spiritual development of man. The World Health Organisation (1948) has defined health as ''A state of complete physical, mental and social well being and not merely an absence of disease or infirmity."

**Economic impact of Cardiovascular Disease**

Cardiovascular diseases are important components of chronic diseases worldwide. The most common definition of chronic disease is a disease that is ongoing or recurring but is not caused by infection and is not passed on by contact. Many chronic diseases are also often associated with lifestyle or environmental factors, unlike infectious diseases. Cardiovascular diseases form the major component of chronic diseases and therefore contribute most to the economic impact: these strike individuals in their productive ages, need high treatment costs and result in premature deaths. Thus, macroeconomic consequences of cardiovascular disease are mainly assessed through calculations of years of productive life lost due to deaths and disability from cardiovascular disease in a particular population group. The increasing prevalence of cardiovascular disease is going to put a huge economic burden on a country, both in terms of medical costs of an increasing array of technologically advanced treatment, and productivity losses due to premature deaths and disability (Indrani Gupta et al., 2006).

**Objectives of the Study**

The main purpose of the present study is to examine the choice of healthcare services and source of treatment for the cardiovascular patients. Keeping this in view, the following specific objectives have been set for the study.

- To examine the Socio-Economic background of the sample respondents
- To identify the principal factors that determine the choice of health care services.

**Data Sources and Methodology**

The present study constitutes area of the study, sampling frame, sampling design, preparation of instruments, data collection procedures and statistical tool used. In order to fulfill all the objectives of the present research work, with a view to have a thorough study an attempt is made by the researcher to study the sample patients at Coimbatore City by taking two leading hospitals, one from private (K Govindaswamy Naidu Medical Trust Hospital (KG)) and another from Coimbatore Medical College Hospital (CMCH) in the heart of Coimbatore City. Since the aim of justified (judgement) sampling is to get a representative sample, the researcher identified the patients who could be a true representative of the population. The researcher was able to contact and elicited the needed information from 1010 sample patients. i.e. 610 from the Private hospital [i.e. K Govindaswamy Naidu Medical Trust Hospital] and 400 from Government Hospital [i.e. Coimbatore Medical College Hospital respectively. For achieving the aims and objectives, survey method was used to collect due information from the sample cardiovascular patients, for which an interview schedule was prepared. Most of the questions in the interview schedule were structured as close-ended questions. The interview schedule was prepared based on the objectives of the study and at the outset it was pre-tested with 25 cardiovascular patients and analysed.After data collection, the surveyed data were manually edited, coded and then entered into SPSS spreadsheets. After verification, the preliminary analysis of data was carried out on the basis of frequency distributions and cross-tabulations and the statistics such as the percentages and chi-square test of significance were used. The determinants of health care service for the treatment of cardiovascular disease was analysed through Logistic Regression Techniques.

**Table 1 Relationship between Socio - Economic Characteristics and Choice of Health Care Services of the Cardiovascular Patients**

| Socio - economic Characteristics | | Health Care Services | | |
|---|---|---|---|---|
| | | Government | Private | Total |
| Age | 45 and Below | 84 | 174 | 258 |
| | | Below | (67.4) | (100.0) |
| | 46 - 60 | 172 | 250 | 422 |
| | | (40.8) | (59.2) | (100.0) |
| | Above 60 | 144 | 186 | 330 |
| | | (43.6) | (56.4) | (100.0) |
| | **Chi - Square value: 7.833** | | **df:2** | **Sig: .05** |
| Social Status | SC/ST | 171 | 126 | 297 |
| | | (57.6) | (42.4) | (100.0) |
| | MBC | 58 | 259 | 317 |
| | | (18.3) | (81.7) | (100.0) |

| | | | | |
|---|---|---|---|---|
| Social Status | BC | 171 | 225 | 396 |
| | | (43.2) | (56.8) | (100.0) |
| | **Chi - Square value: 102.393** | | **df:2** | **Sig: .001** |
| Nativity | Rural | 107 | 301 | 408 |
| | | (26.2) | (73.8) | (100.0) |
| | Urban | 293 | 309 | 602 |
| | | (48.7) | (51.3) | (100.0) |
| | **Chi - Square value: 51.221** | | **df:1** | **Sig: .001** |
| Educational Status | Illiterate | 338 | 171 | 509 |
| | | (66.4) | (33.6) | (100.0) |
| | Primary | 18 | 104 | 122 |
| | | (14.8) | (85.2) | (100.0) |
| | Secondary | 40 | 262 | 302 |
| | | (13.2) | (86.8) | (100.0) |
| | Higher education | 4 | 73 | 77 |
| | | (5.2) | (94.8) | (100.0) |
| | **Chi - Square value: 310.184** | | **df:3** | **S Sig: .001** |
| **Socio - economic Characteristics** | | **Health Care Services** | | |
| | | **Government** | **Private** | **Total** |
| Size of the Family | 2 | 62 (47.3) | 69 (52.7) | 131 (100.0) |
| | 3 | 88 (54.0) | 75 (46.0) | 163 (100.0) |
| | 4 | 217 (38.2) | 351 (61.8) | 568 (100.0) |
| | 6 and Above | 33 (22.3) | 115 (77.7) | 148 (100.0) |
| | Chi - Square value: 36.365 | | df:3 | Sig: .001 |
| Occupation | At home | 130 54.9) | 107 (45.1) | 237 (100.0) |
| | Agri-cultural activity | 45 (20.8) | 171 (79.2) | 216 (100.0) |
| | Salaried/ Business man | 225 (40.4) | 332 (59.6) | 557 (100.0) |
| | **Chi - Square value: 55.001** | | **df:2** | **Sig: .001** |
| Total Income | Below 15,000 | 399 (58.6) | 282 (41.4) | 681 (100.0) |
| | Above 15,000 | 1 (0.3) | 328 (99.7) | 329 (100.0) |
| | **Chi - Square value: 315.071** | | **df:1** | **Sig: .001** |
| | **400 (40.0)** | | **610 (60.0)** | **1010 (100.0)** |

**Source: Figures in parenthesis indicate percentages**

The above table portraits the relationship between the socioeconomic characteristics and choice of health care services of the cardiovascular patients. Out of 1010 sample cardiovascular patients, a majority of 67 per cent of patients of the age group of 45 and Below received treatment in private hospital, whereas only 33 per cent of the same age group received treatment in government hospital. Regarding the cardiovascular patients of the age group of 46 - 60 years, the 59 per cent of also preferred to take treatment in private hospital and 41 per cent of the same age group availed treatment in government hospital. Similarly, only 56 per cent of the cardiovascular patients who is Above 60 years had treatment in private hospital and 44 per cent of them received treatment in government hospital. Hence age of the sample respondents positively influence in selection of health care services with ($p<0.05$) level of significance. While analyzing the social status of the sample respondents a majority of 57 per cent of them of Backward Caste preferred to avail treatment in private hospital, on the other hand only 43 per cent of the same community got treatment in government hospital. While analyzing the SC/ST categories, a majority of 58 per cent of them got treatment in private hospital and only 42 per cent of them obtain treatment in government hospital showing high level of ($p<.001$) significance. As far as nativity is concerned 60 per cent of the sample respondents were from urban area out of which 52 per cent of them preferred to get treatment in private hospital and a majority of the rural residents had treatment in private hospital with ($P<0.001$) level of significance. The rural people though they are from rural background and their earning is very low they preferred to get treatment in private hospital due to the severity of the disease and though the cost of

the treatment is high they get money from private financial institutions and money lenders in spite of high rate of interest.

It is interesting to note that higher the educational qualification, higher the preference to avail treatment in private hospital and a majority of 67 per cent of the illiterate people preferred to get treatment in Government hospital where as only 34 per cent of the illiterates had treatment in private hospitals with chi - square value is highly significant with (p< 0.001) and emphasizes the fact that education plays a vital role in choosing the health care services. As far as size of the family is concerned families with 4 and Above may have more earning members i.e. 53 per cent in the family. Hence the preference for private hospital is more when compared to families with 3 members with (P<.001) level of significance. The patients those who are at home i.e. nearly 55 per cent of them had received treatment in government hospital this may be due to their ability to pay is less or zero whereas remaining 45 per cent of them preferred to get treatment in private hospital may be due to other source of income and support of family members. While analyzing the pattern of choice of health care service among the agricultural laborers 80 per cent of them availed treatment in private hospital in spite of their less earnings and this is possible for them by getting finance from private financial institutions even though the rate of interest is high. While analyzing the salaried persons nearly 60 per cent of them preferred to get treatment in private hospitals due to affordability and due to health insurance which is a shock absorber for the government servants and some of the policy holders with( P<0.001) level of significance.

**Logistic Regression Results on Choice of Health Care Services by the Respondents**

An challenge is made to find out the principal issues that are likely to determine the respondents choice of health care services for the treatment of cardiovascular problems. For this purpose, the type of health services utilized has been considered as dependent variable, which has been treated as dichotomous, viz., those who visited private health facility (by assigning a score of „1") and those who availed services from government health facility (giving a score of „0"). All the other variables under consideration are measured in categories. In such a condition, adopting the binary logistic regression analysis is more apt and therefore, such an analysis is carried out. Though based on the theoretical importance, all the independent variables are suppose to include in the logistic model, two variables have not been considered because of their higher correlation with related variables. The two variables are: type of family and personal monthly income. While the first one is highly correlated with the family size, the latter one is with total monthly family income. The results of logistic regression analysis are presented in the below table.

**Table 2 Logistic Regression Results on Choice of Health Care Services by the Respondents**

| Explanatory Variables | Beta | Odds Ratio | Level of Sig. |
|---|---|---|---|
| **Current Age** *(Ref: ≤ 45Years)* | - - | 1.000 | - - |
| 46 – 60 Years | - - 0.654 | 1.906 | **0.05** |
| Above 60 Years | 0.256 | 1.292 | 0.491 |
| **Gender** *(Ref: Males)* | - - 0.604 | 1.000 | - - |
| Females | | 1.830 | **0.05** |
| **Explanatory Variables** | **Beta** | **Odds Ratio** | **Level of Sig.** |
| **Caste** *(Ref: Scheduled Castes / Tribes)* Most | - - 1.464 | 1.000 | - - |
| Backward Castes | | 4.324 | 0.001 |
| Backward Castes / Forward Castes | 0.339 | 1.403 | 0.226 |
| **Nativity Status** *(Ref: Rural)* | - - | 1.000 | - - |
| Urban | - 1.482 | 0.227 | **0.001** |

| | | | |
|---|---|---|---|
| **Educational Status** *(Ref: Illiterate)*<br>Primary School Secondary School<br>Higher Secondary School and Above | - - 3.423<br>3.715<br>4.113 | 1.000<br>30.663<br>41.045<br>61.149 | - -<br>**0.001**<br>**0.001**<br>**0.001** |
| **Occupational Status** *(Ref: At Home )*<br>Agriculture<br>Others | - - 3.190<br>- 0.060 | 1.000<br>24.281<br>0.942 | - -<br>*0.001*<br>0.863 |
| **Total Income** *(Ref: ≤ 15000 )*<br>15,000 + | - - 7.097 | 1.000<br>1208.753 | - -<br>**0.001** |
| **Family Size** *(Ref: 2 )*<br>3<br>4 – 5<br>6 + | - -<br>- 1.546<br>- 0.730<br>- 0.322 | 1.000<br>0.213<br>0.482<br>0.725 | - -<br>**0.001**<br>**0.05**<br>0.477 |
| **Log likelihood Chi - square (df)**<br>**Significance Level N**<br>**Cox & Snell R Square**<br>**Nagelkerke R Square** | **78.408**<br>**7.766 (15)**<br>**.001**<br>**010**<br>**5 8.1**<br>**78.6** | | |

Among the sample respondents, it is obvious to note that, controlling for all the variables used in the model, the odds of their choice of availing medical and health care services (for cardiovascular disease) from private hospitals are 1208 higher (OR = 1209.753) among those whose monthly family income is Above Rs. 15,000 than those whose monthly family income is Rs. 15000 or less. These results are also turn out as highly significant ($p<0.001$). Another pertinent finding noticed here is that the positive role of respondents‟ educational status on their choice of health care facilities. For instance, it is conspicuous to note that the odds of making use of private health facility for cardiovascular disease are 30, 41 and 61 times, respectively higher among those who studied up to primary school, secondary school and higher secondary school and Above levels as compared to their illiterate counterparts. These results indicated the consistent increase in the odds of availing medical and health services from private health facilities with in increase in their level of education. All these results have also turned out to be as highly significant ($p<0.001$ in each case).

Another expected pattern of results with regard to choice of health facility is in the case of respondents‟ caste background. It is conspicuous to note that respondents who belong to most backward castes as well as backward / forward castes are higher likelihood to prefer private health centres than those who belong to scheduled castes / tribes. These results are obvious because of the better socio - economic status of respondents who belong to former two communities as against to those from the latter category of communities. However, the results turned out as highly significant only in the case of most backward castes and choice of private health facility ($p<0.001$).An interesting finding of this study is that females tend to make use of private health facilities for cardiovascular disease than their male counterparts and this finding is turned out as moderately significant ($p<0.05$).

The likelihood of availing medical and health care services from private health facilities is comparatively higher among those respondents who belong to the age group of 46 - 60 years as well as those who are in the age group of Above 60 years as against to those who are in the age category of 45 years or less. However, the results in this regard turned out significant only in the case of those who belong to 46 - 60 years in comparison with 45 years or less at a moderate extent ($p<0.05$). Conversely, the probability of visiting to private medical and health care centres appears to be much lower among those respondents whose nativity is urban areas as compared to rural areas and this result also turned out to be as highly significant ($p<0.001$).

Respondents who have family sizes of 3, 4 - 5 and 6 and Above have shown a propensity to visit private health facility to a lesser extent than those who have a family size of 2 members only. These results emerged as significant to a higher extent in the case of those who have 3 members in the family ($p<0.001$) and to a moderate extent ($p<0.05$) in the case of those who have 4 - 5 members, whereas insignificant for those who have a family size of 6 or more members. Occupational status of the respondents showed mixed results in relation to their choice of health facility. For instance, while those respondents who are engaged in agriculture and related activities tend to make use of private health facility to a higher extent than those who are not - working (at home), such pattern is reversed in the case of those respondents who occupied the jobs related to non - agriculture sector (household industry / trade / business and employees in government and private establishments). However, the results turned out highly significant ($p<0.001$) only in the case of those who are from agriculture sector in comparison to those at home.

## Conclusion

In this analysis, all the sample respondents are availing allopathy treatment. Many lives have been saved, and quality of life returned, thanks to highly skilled allopathy doctors and modern medical technologies. These doctors are highly trained in the modern medical system. The present analysis shows that a majority of the patients going to private hospitals selected the hospital based on the performance of the doctors. This may be because many of the private hospitals are promoted by well - qualified and experienced doctors. Giving importance to the quality of services, patients consider various factors in the selection of hospital such as the availability of the competent specialists, the reputation of the hospital, professional management, range of services offered, availability of latest technology and equipment, cost and convenience, proximity to home, courteous behaviour of staff and professionalized care. It is the confidence in the competence of the doctor, which is closely followed by the quality of service provided and the reputation of the hospital that is attracting more numbers of patients in the present days.

## References

Ahuja, Rajeev, and Alka Narang. “Emerging Trends in Health Insurance for Low-Income Groups.” *Economic and Political Weekly*, vol. 40, no. 38, 2005.

Ahuja, Rajeev, and Indranil De. “Health Insurance for the Poor: Need to Strengthen Healthcare Provision.” *Economic and Political Weekly*, vol. 39, no. 41, 2004.

Aluli, Noa Emmett, et al. "Cardiovascular Disease Disparities in Native Hawaiians." *Journal of the Cardiometabolic Syndrome*, vol. 2, no. 4, 2007, pp. 250-53.

Asgary, Ali, et al. “Estimating Rural Households Willingness to Pay for Health Insurance.” *The European Journal of Health Economics,* vol. 5, no. 3, 2004, pp. 209-15.

Bala, Adarsh, and B.M. Gupta. “Mapping of Indian Neuroscience Research, A Scientometric Analysis of Research Output during 1999-2008.” *Neurology India,* vol. 58, no. 1, 2010, pp. 35-41.

Becker, Gary S. “A Theory of the Allocation of Time.” *The Economic Journal*, vol. 75, no. 299, 1965, pp. 493-517.

Begom, R., and R.B. Singh. “Prevalence of Coronary Artery Disease and Its Risk Factors in the Urban Population of South and North India.” *ACTA Cardiologica*, vol. 50, no. 3, 1995, pp. 227-40.

Bhargava, S.K., et al. “Relation of Serial Changes in Childhood Body-Mass Index to Impaired Glucose tolerance in Young Adulthood.” *Journal of Medicine*, vol. 350, 2004, pp. 865-75.

Bhatia, M.L. “Prevalence of Coronary Heart Disease in India: A Contemporary View.” *Indian Heart Journal*, vol. 47, no. 4, 1995, pp. 339-42.

Bircher, Johannes. “Towards a Dynamic Definition of Health and Disease.” *Medicine, Health Care and Philosophy*, vol. 8, no. 3, 2005, pp. 335-41.

Carral, Florentiono. “Increased Hospital Expenditures in Diabetic Patients Hospitalized for Cardiovascular Diseases.” *Journal of Diabetes and Its Complications*, vol. 17,

no. 6, 2003, pp. 331-36.

Chaddha, S.L., et al. "Epidemiological Study of Coronary Heart Disease in Urban Population of New Delhi." *Indian Journal of Medical Research*, vol. 92, 1990, pp. 424-30.

Chadha, S.L., et al. "Urban-Rural Differences in the Prevalence of Coronary Heart Disease and Its Risk Factors in Delhi." *Bulletin of the World Health Organisation*, vol. 75, no. 1, 1997.

Chodick, Gabriel, et al. "The Direct Medical Cost of Cardiovascular Diseases, Hypertension, Diabetes, Cancer, Pregnancy and Female Infertility in a Large HMO in Israel." *Health Policy*, vol. 95, no. 2-3, 2010, pp. 271-76.

Dalal, P.M. "Strokes in the Elderly: Prevalence, Risk /Factors the Strategies for Prevention." *Indian Journal of Medicine*, vol. 106, 1997, pp. 325-32.

**Author Details**

**Dr. J. Jacintha Maria Florence,** *Assistant Professor, Department of Economics, Nirmala College for Women, Coimbatore, Tamil Nadu, India,* ***Email ID****: jacimaria1980@gmail.com*

**Dr. A. Sangamithra,** *Professor, Department of Economics, Bharathiar University, Coimbatore, Tamil Nadu, India,* ***Email ID****: a.sangamithra@gmail.com*