

## Original Research Article

# Non-communicable diseases and public health facility utilization: a study in rural Kerala

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**Received:** 07 March 2020

**Revised:** 02 May 2020

**Accepted:** 04 May 2020

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### ABSTRACT

**Background:** The burden of non-communicable diseases increased significantly in India and Kerala carries the highest burden among Indian states. People with chronic non-communicable diseases (NCDs) are particularly vulnerable to socioeconomic inequality due to their long-term expensive health care needs. Provision of health services through public health facilities will reduce the health care expenses and will increase NCD care utilization. This study aimed to assess socioeconomic-factors related to public health service utilization among four major non-communicable disease patients in Pathanmthitta district of Kerala.

**Methods:** A cross-sectional household survey using WHO CSDH frame work conducted among 715 individuals from 3 randomly selected panchayaths in Pathanmthitta district, Kerala. Simple frequencies were used to calculate the prevalence of NCDs in the study population. Chi-square test followed by binary logistics regression was applied (using SPSS 21 statistical package) to examine the effects of demographic and socioeconomic variables of NCD respondents on public health utilization.

**Results:** Among 715 household survey respondents 472 (66%) reported as Non-communicable disease (NCD) patient. The majority (60.5%) of NCD respondents reported using government facility for health care irrespective of their socioeconomic status. Chi-square test analysis, ration card status, age, gender, education, occupation, income and economic dependency show significance ( $p < 0.005$ ). Public health utilization was seen to be high in female (OR=7.1,  $p = 0.000$ ), people with lower education (OR=11.5,  $p < 0.002$ ) and lower income (OR=4.1,  $p = 0.000$ ). Public health facility utilization reported high among partially depended people (OR=39.8,  $p = 0.000$ ).

**Conclusions:** Irrespective of their socioeconomic status NCD patients wants to reduce their financial burden of health care through the utilization of public health facilities. A comprehensive health care financing scheme for chronic NCD patients which is crucial to protect most vulnerable groups.

**Keywords:** Kerala, Noncommunicable diseases, Public health facility utilization

### INTRODUCTION

Non-communicable diseases (NCDs) put a large and growing economic burden in all continents and at all levels of income. The World Economic Forum (2011) discussed the significance of NCDs as one of the major challenges on global economic growth especially in developing countries.<sup>1</sup> People in low-income countries

and those with low socioeconomic status have higher risk of non-communicable diseases than do those in high-income countries or those belongs to higher socioeconomic status.<sup>2</sup> The burden of disability and premature mortality related to chronic non-communicable diseases cannot be reduced without equitable access to essential and quality health care to all who are in need.<sup>3</sup> Despite the great improvements in access to health care in

the last few decades, Indian health system is facing inequalities related to different socioeconomic classes, geography, and gender; and is accelerated by high out-of-pocket expenditures for health care.<sup>4</sup> High out-of-pocket spending (OOPS) is the prominent feature of the Indian health financing system, and there is enough evidence to show that this system continues to put stress on individuals and households and push many households below poverty line status.<sup>5</sup> Currently public health spending in India is very low and is similar to many low-income countries in Asia and Africa.

Sen et al states that, Indian health system will not achieve its goals as long as it is spending less than 2% of GDP to the health sector.<sup>6</sup> Private health expenditure and out of pocket payments varies among states. Kerala noticed high out of pocket expenses compared to other Indian states. According to state health accounts (SHA), households pay more than three quarters of all health care expenses in Kerala (76%), while the government contribution accounts for less than one fifth, (19.6%).<sup>7</sup>

NCD scenario in India shows a reversal of social gradient, where people with lower socioeconomic status (SES) have been associated with the risk of chronic diseases, and their risk factors. Further, the poorer population groups are most likely to be unable to cope with the costs of treatment for NCDs.<sup>8</sup> The unregulated spread of private health services in India are making the poor more vulnerable, who needs better and cheaper services but are not able to afford costly services provided through private health facilities. However, this would be a problem of inequality in health care and for the development of sustainable health services in the country.<sup>9</sup>

Earlier studies in developing countries observed that the rich have greater access to hospital services than the poor, particularly for costly and technically advanced treatment methods. It has been reported that the poorest 20% population use only 10% of public subsidies, while 33% was used by the richest quintile.<sup>10</sup> A study by Xavier et al, stated that public hospital services, were utilized more by the poor in India. However, wide state-specific differences exist. The study found, poor treatment outcomes in acute coronary syndrome patients belongs to economically weaker sections, not because of the difference in risk factors but because of differences in treatments received. The poor were less likely to receive quality, evidence-based health care due to many barriers in availability, accessibility and affordability.<sup>11</sup>

The increasing gaps in health service utilization from public versus private sources shows existing inequalities in the country. The rich having more access to both better quality health care services in the private sector and to subsidized services from government sources. On the other hand, the poor lose out on quality in the public sector and cannot afford private health care services.<sup>12</sup> Utilization of health services differs by the demographic

and socio-economic status of the individual as well, in addition to the availability, accessibility and quality of services in different regions or states.<sup>13</sup> In India the first point of health care contact were mainly private providers because of many reasons. In most Indian states private healthcare providers manage chronic non-communicable patients through high cost interventions and deepening health insecurity especially for the poor.<sup>14</sup> The inverse care law, “whereby those with the greatest need for health care have the greatest difficulty in accessing health services and least likely to have their health needs met”, is highly applicable in India.<sup>15</sup>

Global evidence suggests that socioeconomic determinants of individuals play an important role in the prevalence of non-communicable diseases and its risk factors and utilization of NCD care services. The Government of India has responded to the growing burden of NCDs through the launch of a National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) in 2008 and started NCD clinics under the National Health Mission. During 2010-2012, the program was implemented in 100 districts across 21 states. As on March 2016, the program is under implementation in all 36 states/union territories.<sup>16,17</sup> This paper tried to explore the socio-economic factors related to utilization of public health facilities (NCD clinics) in a rural setting of Kerala.

## METHODS

A community based cross sectional study conducted during the month of September, 2018. Out of 54 panchayats in the district of Pathanamthitta, 3 panchayats randomly picked up. 5 wards from each panchayat selected randomly. Every 10th house was selected from voters list of 2016 for HH survey. The sample size for this cross-sectional study was 730 households.<sup>15</sup> Household's data excluded because of reporting other NCDs (other than cardiac, diabetes, cancer and COPD) and final sample size was 715.

An interview schedule was administered via face-to-face interviews with household members. Written informed consent was obtained prior to the survey. People above the age of 18 and permanent residents of the village was only included for the survey. The respondent was interviewed for any four major NCDs (cardiac, diabetes, cancer and COPD) in the household members within one year of the survey.

The interview schedule was prepared keeping in view with the objectives of this study including questions related to socio-demographic variables and utilization of NCD health services. A pilot study was conducted on 25 households by interviewing head of the households to get the information regarding the NCD care utilization. The main objective of our study was to explore the social determinants of four major (cardiac, diabetes, cancer and COPD) non-communicable diseases and public health

facility utilization in the study area. Ethical Clearance obtained from TISS and panchayth administration. Informed written consent obtained before each interview. Confidentiality of the data maintained throughout the study. Measurements dependent variables. NCD-care utilization was measured through three binary variables, respondents were asked, “Are you on regular medication?”, “Have you received any OP care during the last two weeks?” and “Have you been admitted to hospital during the past 1 year?”. Those who answered “yes” to the above questions were asked about the facility utilized for NCD care (public/private) and reasons for the treatment or/and hospitalization (including duration of stay, diagnosis in relation to those conditions). The reported reasons were coded and classified into NCD-associated and non-NCD-associated conditions.

NCD was defined as a chronic medical condition diagnosed by a doctor at least three months before the survey, for which either the symptom(s) persisted or relevant medical treatment continued. In this study, NCDS were self-reported based on previous diagnosis by a physician. Main independent variables in this study are, ration card status, gender, age, education, occupation, income, economic dependency, marital status, religion and living arrangements and the dependent/outcome variable was health facility utilization.

## RESULTS

The socio-demographic characteristics of the respondents are depicted in Table 1. Out of 715 household survey respondents 472 (66%) reported any four of NCDs.

**Table 1: Socio-demographic profile with any four NCDS in households (n=715).**

| Variables              | Characteristics      | Yes        | No         | P value |
|------------------------|----------------------|------------|------------|---------|
|                        |                      | N (%)      | N (%)      |         |
| Ration card status     | APL                  | 253 (35.3) | 164 (22.9) | 0.000*  |
|                        | BPL                  | 196 (27.4) | 79 (11.0)  |         |
|                        | AAY                  | 23 (3.2)   | 0          |         |
| Gender                 | Male                 | 205 (28.6) | 206 (28.8) | 0.000*  |
|                        | Female               | 267 (37.3) | 37 (5.1)   |         |
| Age groups (in years)  | <50                  | 58 (8.1)   | 98 (13.7)  | 0.000*  |
|                        | 50-60                | 238 (33.2) | 107 (14.9) |         |
|                        | >60                  | 176 (24.6) | 38 (5.3)   |         |
| Religion               | Hindu                | 124 (17.3) | 87 (12.1)  | 0.011   |
|                        | Christian            | 290 (40.5) | 135 (18.8) |         |
|                        | Muslim               | 50 (6.9)   | 14 (1.9)   |         |
|                        | Others               | 8 (1.1)    | 7 (0.9)    |         |
| Educational status     | Primary              | 177 (24.7) | 4 (1.9)    | 0.000*  |
|                        | Secondary            | 138 (19.3) | 68 (9.5)   |         |
|                        | College level (+2,>) | 123 (17.2) | 88 (12.3)  |         |
|                        | Professional         | 34 (4.7)   | 73 (10.2)  |         |
| Employment status      | Govt Employee        | 21 (2.8)   | 7 (0.9)    | 0.000*  |
|                        | Private Employee     | 15 (2.0)   | 50 (6.8)   |         |
|                        | Self Employed        | 30 (4.1)   | 59 (8.0)   |         |
|                        | Farming              | 114 (15.9) | 98 (13.4)  |         |
|                        | House wife           | 188 (26.2) | 29 (3.9)   |         |
|                        | Coolly               | 21 (2.9)   | 7 (0.9)    |         |
|                        | Unemployed           | 98 (13.7)  | 0          |         |
| Income groups (in Rs.) | <3000                | 204 (28.5) | 58 (8.1)   | 0.000*  |
|                        | 3001-5000            | 56 (7.8)   | 74 (10.3)  |         |
|                        | 5001-10000           | 154 (21.5) | 74 (10.3)  |         |
|                        | >10000               | 58 (8.1)   | 37 (5.1)   |         |
| Economic dependency    | Fully independent    | 93 (13.0)  | 190 (26.5) | 0.000   |
|                        | Partially dependent  | 129 (18.0) | 23 (3.2)   |         |
|                        | Fully dependent      | 250 (34.9) | 30 (4.1)   |         |

\*Chi-Square test

Among these majority (35.3%) were belonging to above poverty line (APL) and 27.4% below poverty line (BPL) and only 3.2% were from poorest-i.e. AAY categories 37.3% of NCD respondents were females. 50 to 60 age group reported highest (33.2%) prevalence of NCDs

followed by (24.6%) were in >60 age group. Regarding occupation 26.2% were housewives followed by 15.9% was engaged in farming. Economic dependency reported very high among NCD respondents. 34.9% of NCD respondents were fully dependent and 18% were partially

dependent. The study tried to measure the prevalence of four major non-communicable diseases (NCDs) Cardiac problems, diabetes, cancer and COPD in the Household study population. Out of 472 NCD respondents, 32.4% reported cardiac problems, 18.6% Diabetes, 4.4% some form of Cancer, and 9.3% reported Chronic Pulmonary diseases (COPD). Multimorbidity i.e. cardiac problems with diabetes reported high (35.1%) in the study area. The NCD profile of households in Figure 1.

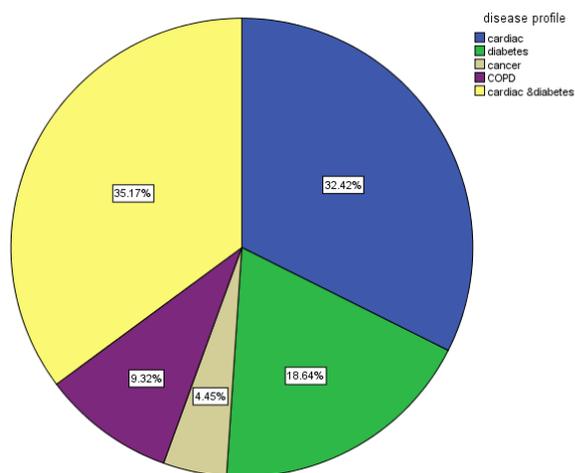


Figure 1: Disease profile in household survey.

Access to adequate and quality health care is one of the means to reduce health inequalities and move towards universal health coverage. There is ample evidence from earlier researches. O'Donnell et al confirms that many people in the developing world denied to get appropriate health care from which they could benefit. The poor in developing countries are less likely to receive adequate health care than well off and inequalities related to income is high.<sup>18</sup> Many times, effective health care interventions were underutilized in the developing world, may be because of less education, information and awareness. People in developing countries face many access barriers to health care and maintenance.

Barriers to accessing health services can stem from the demand side and/or the supply side factors.<sup>19</sup> In this study

we focused mainly on demand-side determinants. The current study used health care utilization as the operational proxy for access. Chronic diseases need regular medication and based on the seriousness of the disease, outpatient (OP) care utilization and frequency in patient (IP) admissions are common among NCD patients. The study report that of 472 NCD respondents in the household survey 465 (98.5%) were on regular medications. Only 1.4% were not taking medications regularly. 92.4 % reported that they received outpatient (OP) care within the concluding two weeks compared to 4.6% who had not received OP care in the last 2 weeks of the survey. However only 36.6% patients were admitted in the hospital for NCD care in last 1 year of the survey. The Table 2 provides further details.

There was a belief that poor people use public health facilities and rich people go to private health facilities for health care. But researches on health care utilization and socio-economic status in developing countries report, that public health facilities utilized more by rich and many poor people seek private health facilities because of many reasons.<sup>20,21</sup> To understand this phenomenon in the current study, health facility utilization among NCD patients was explored in the household survey. The results are in Table 3. Public health facility utilization was high among Non-communicable disease (NCD) patients. The majority (60.5%) of NCD respondents in the Household survey reported using government facility for health care. about 39.4% respondents were using private health care facilities. The study results showed that public health facility utilization was high 35.3% among BPL respondents compared to 20.3% in APL groups. All respondents who belong to AAY (Poorest families) reported utilizing government facility only. This may be because of their extreme vulnerable economic situation. Private health care utilization was high 34.9% among APL group and only a small percentage (4.4%) of BPL families were utilizing private facilities for health care.

As the independent variables are interrelated, separate binary logistic regression was carried out to examine the effect of socioeconomic and demographic variables on public facility utilization.

Table 2: Access to NCD care in households (n=472).

| Variables                                  | Characteristics | Frequency | Percentage (%) |
|--|-----------------|-----------|----------------|
| On regular medication                      | Yes             | 465       | 98.5           |
|  | No              | 7         | 1.4            |
| Received OP care since last 2 weeks        | Yes             | 450       | 95.3           |
|  | No              | 22        | 4.6            |
| Admitted in the hospital since last 1 year | Yes             | 173       | 36.6           |
|  | No              | 299       | 63.3           |
| Total                                      |                 | 472       | 100.0          |

**Table 3: Social determinants and health facility utilization among NCD patients (n=472).**

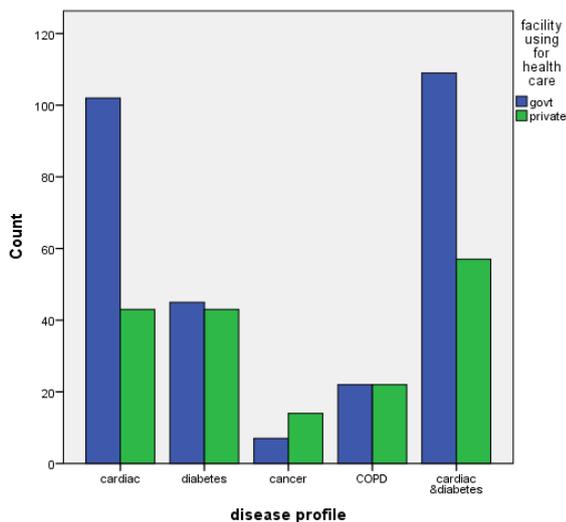
| Variables                    | Characteristics     | Public (n=286) | Private (n=186) | P value |
|------------------------------|---------------------|----------------|-----------------|---------|
|                              |                     | N (%)          | N (%)           |         |
| <b>Ration card status</b>    | APL                 | 96 (20.3)      | 165 (34.9)      | .000*   |
|                              | BPL                 | 167 (35.3)     | 21 (4.4)        |         |
|                              | AAY                 | 23 (4.8)       | 0               |         |
| <b>Gender</b>                | Male                | 111 (23.5)     | 101 (21.3)      | .001*   |
|                              | Female              | 175 (37.0)     | 85 (18.0)       |         |
| <b>Age groups (in years)</b> | <50                 | 43 (9.1)       | 16 (3.3)        | 0.113   |
|                              | 50-60               | 141 (29.8)     | 96 (20.3)       |         |
|                              | >60                 | 102 (21.6)     | 74 (15.6)       |         |
| <b>Religion</b>              | Hindu               | 96 (20.3)      | 36 (7.6)        | 0.003*  |
|                              | Christian           | 161 (34.1)     | 129 (27.3)      |         |
|                              | Muslim              | 29 (6.1)       | 21 (4.4)        |         |
| <b>Educational status</b>    | Primary             | 126 (26.6)     | 43 (9.1)        | 0.000*  |
|                              | Secondary           | 80 (16.9)      | 65 (13.7)       |         |
|                              | College level       | 73 (15.4)      | 50 (10.5)       |         |
| <b>Employment status</b>     | Professional        | 7 (1.4)        | 28 (5.9)        | .000*   |
|                              | Employed            | 23 (4.8)       | 36 (7.6)        |         |
|                              | Farming             | 51 (10.8)      | 71 (15.0)       |         |
|                              | House wife          | 123 (26.0)     | 57 (12.0)       |         |
|                              | Unemployed          | 89 (18.8)      | 22 (5.9)        |         |
| <b>Income (in Rs.)</b>       | <3000               | 167 (35.3)     | 29 (6.1)        | .000*   |
|                              | 3001-5000           | 36 (7.6)       | 28 (5.9)        |         |
|                              | 5001-10000          | 54 (11.4)      | 100 (21.1)      |         |
|                              | >10000              | 29 (6.1)       | 29 (6.1)        |         |
| <b>Economic dependency</b>   | Fully independent   | 36 (7.6)       | 57 (12.0)       | .000*   |
|                              | Partially dependent | 76 (16.1)      | 52 (11.0)       |         |
|                              | Fully dependent     | 174 (36.8)     | 77 (16.3)       |         |
| <b>Marital status</b>        | Married             | 193 (40.8)     | 114 (24.1)      | .001*   |
|                              | Unmarried/Divorced  | 21 (4.4)       | 7 (1.4)         |         |
|                              | Widowed             | 72 (15.2)      | 65 (13.7)       |         |
|                              | Alone               | 0              | 16 (3.3)        |         |
| <b>Living arrangement</b>    | With spouse         | 24 (5.0)       | 0               | .000*   |
|                              | Spouse and children | 162 (34.3)     | 121 (25.6)      |         |
|                              | Children            | 86 (18.2)      | 42 (8.8)        |         |
|                              | Others              | 14 (2.9)       | 7 (1.4)         |         |

\*Chi-square test

**Table 4: Adjusted odds ratio (OR) for public facility utilization in households.**

| Variables               | AOR    | 95% C.I. for EXP(B) |        |        |
|-------------------------|--------|---------------------|--------|--------|
|                         |        | Lower               | Upper  | Sig    |
| <b>Female</b>           | 7.166  | 4.502               | 11.405 | 0.000  |
| <b>Edu-professional</b> |        |                     |        | 0.001  |
| Primary                 | 11.550 | 2.549               | 25.329 | 0.002  |
| Secondary               | 3.594  | 0.860               | 15.021 | 0.080  |
| College                 | 5.712  | 2.236               | 14.589 | 0.000  |
| <b>Income &gt;10000</b> |        |                     |        | 000    |
| <3000                   | 4.122  | 2.178               | 7.800  | 0.000  |
| 3001-5000               | 0.732  | 0.738               | 1.448  | 0.370  |
| 5001-10000              | 1.426  | 0.742               | 2.740  | 0.0287 |
| <b>Eco-independent</b>  |        |                     |        | 000    |
| Partially dependent     | 39.860 | 7.965               | 69.405 | 0.000  |
| Fully dependent         | 15.497 | 3.484               | 28.924 | 0.000  |

The results show that females were 7 times more utilized public health facility than male. People with lower education 11 times more utilized public facility compared to professionally qualified people. Public health utilization is 4 times more in low income people and about 40 times more in economically dependent persons. The current study tried to explore public health facility utilization among people with different disease profile also. Results in Figure 2.



**Figure 2: Disease profile and health facility utilization in households.**

Among 472 NCD respondents 21.6% of respondents had cardiac problems, 9.5% with diabetes and 23.0% respondents with multimorbidity utilized public health facilities. However, in case of cancer, respondents reported a higher utilization of private facility 2.9% compared to 1.4% who used public facilities.

**DISCUSSION**

Although the management of chronic non-communicable diseases is well established, many patients, particularly those who are poor- and economically deprived groups, do not have access to established treatment measures. Consequently, are poorly controlled due to constraints in accessing continuous health care, which is very essential for the survival of NCD patients. The current study found health care utilization was high in the study area. This can be explained by other reasons also. Even though the out of pocket spending is high, per capita public health spending on healthcare has been relatively higher in Kerala compared to other states. Furthermore, Kerala has better healthcare infrastructure than the rest of India. Also, Kerala is an economically advanced state with high literacy; people are likely to have relatively greater knowledge and ability to pay for outpatient care. Higher level of health care utilization reported may be because of the high literacy and health awareness in the state. A health system that provides equitable health care to all

who are in need is the principle goal of Universal health coverage. Horizontal equity in healthcare utilization is defined as ‘equal treatment for equal medical need, irrespective of other characteristics such as age, gender, income, religion, place of residence, etc. Although several achievements in health care have been observed, the distribution of health care utilization is still inequitable in Indian states. A study by Ghosh et al reported that Kerala almost achieved horizontal equity (same care for the people who are in same need) in OP care utilization and small difference observed in inpatient care.<sup>20</sup> Another study from Asia pacific region says that public health facilities and free wards were utilized more by affluent people and is significant in India indicating overutilization of free and subsidized care by the non-poor. Overall health care utilization and health related expenditures are also higher among the higher income groups.<sup>21</sup> This study did not support this view as there is evidence against it.

Earlier studies reported that, the characteristics of the population opting for health services differs significantly among different income groups and it varies among states. In rural areas, the impact of income level of population seems more prominent and highly significant for opting public health facilities. The current study also supports this evidence. People who belonged to below poverty line (BPL) category and those who have less income utilized public health facilities more.

With respect to gender there is an increasing concern for women’s health in India, but their exposure to illness continues to be high. Women was disproportionately affected by NCDs as compared to men across the region, and a large gap exists in NCD prevalence between men and women.<sup>22</sup> The current study also supports this evidence. Choice of health facility for female is based on the socio-cultural factors and economic freedom among female. Many societies female faces more economic barriers than male and it will adversely affect the choice for quality health care. That may be the reason female reported more public health facility utilization than male in this study. A study by Joe et al reported that there is significant socioeconomic gradient in the distribution of distressed financing with huge disadvantage seen among female, and elderly people.<sup>23</sup> This study also supported this evidence. Female especially housewives and elderly utilized public health facilities more because they want to reduce the financial burden of health care.

The level of education among the NCD patients was found to contribute significantly to their choice of private or public health services. Private health care utilization was high among people with higher educational status. Also, with an increase income, the probability of utilizing private health services also increases. This supports the evidence that higher education and with high income, people will have greater economic security, which translates to seeks better health facility for NCD care.

Economic dependency was also reported high among NCD affected groups and people who wanted to reduce the economic burden through utilization of public health facilities. Economic dependency and public health facility utilization shows high significance. Similar to earlier studies, NCD prevalence tended to be higher in women than men, and the greatest burden was reported among housewives and farmers.<sup>24</sup> Public health facility utilization also reported high among these groups. It is widely recognized that burden of non-communicable diseases (NCDs) increases in all regions of the world. The major burden of NCDs cannot be reduced without equitable access to essential and quality health care. The treatment of patients with NCDs is different from the treatment of acute diseases. Patients with Non-communicable diseases (NCDs) generally need long-term care, often for life, and must have reliable medicine supply systems to avoid a break in therapy and have appropriately trained health workers to initiate and to continue care.

## CONCLUSION

The study results showed, relatively higher utilization of public health services by NCD patients irrespective of their socioeconomic status. People wanted to reduce their financial burden through the utilization of public NCD clinics. This study points to the need for strengthening the public health system with essential NCD drugs and trained manpower, which can reduce the financial burden of NCD patients. A comprehensive health care financing scheme for chronic NCD patients which is also crucial to protect most vulnerable groups from financial catastrophe due to chronic health conditions.

We acknowledge that there is no universally accepted definition of access to health services; we used the definition by Peters et al, which implies ‘the timely use of service according to need’. In our research, “utilization of NCD care” was used as an operational proxy for access to NCD care.<sup>19</sup>

## ACKNOWLEDGEMENTS

The authors would like to thank Prof. Surindar Jaswal for her immense support and guidance in this study. They also thanks to 5 ASHA workers who supported in data collection.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Nair D, Raveendran K. Non-communicable diseases and public health facility utilization: a study in rural Kerala. *Int J Community Med Public Health* 2020;7:2254-61.