



Access and Utilisation of Health Care among Tribes in Rural Areas in Kerala, India: An Econometric Questionnaire Case Study

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The state of Kerala in India is known for its impressive health indicators with modest level of income. But it has often been pointed out that marginalised communities like tribals still remains outliers of Kerala's health success story. Though the state has wide coverage of health care institutions, concerns have been raised about the accessibility of health care among tribal communities who live in places away from the main stream. Thus, this paper analyses the access and utilisation of health care among eight prominent tribal communities of three tribal dominated districts of Wayanad, Idukki and Palakkad of Kerala. The study used primary data collected from 596 tribal headed households that approximately covers one per cent of the total households of each tribal community. The study found that mean distance to avail the services of the health care institution of PHC is 3.69 kilo meters. There is statistically significant difference in the mean distance

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and it is highest among the Adiyar community and is the lowest among the Irular. The analysis of access to nearest government hospital and private hospital having the facilities of in-patient treatment follows similar pattern. Allopathy is the preferred system of medicine among the tribal households and majority prefer government taluk or district hospital for in-patient treatment. The bivariate analysis of the choice of provider showed that households belonging to forward socioeconomic category with a literate head, with chronic and/or acute ailments and are more immediacy to private facilities tend to choose private providers for health care treatment.

Keywords: Tribal communities; access to health care; preference to health care; health care utilization; choice of provider.

1. INTRODUCTION

Good health is unanimously recognized to be of intrinsic value and constitutes an integral part of development. Good health status is one among the basic human rights of any individual. By augmenting the capability of the population, it can lead to social and economic progress of the country. Healthy labour force increases the participation rate as well as hours worked and health is a prominent factor in determining labour productivity. Inadequate access to health care facilities is often regarded as a prominent factor for the poor health status of vulnerable communities in the society. Kerala, a small state in India, with her unique development experience, has impressive health indicators compared to the other states of the country and has received international attention for her high levels of human development. But it has been pointed out that the much-acclaimed Kerala model of health has failed to encompass the marginalised and outlier communities in the state (Kurien, 1995; Government of Kerala, 2006; Verghese, 2009; Kerala State Planning Board, 2009). Though the state is known for its relatively equitable provision of public resources, marginalised communities remain outliers of its development process. In this context this study takes an analytical look at the access and utilisation of health care among the tribal communities who is considered as the most deprived among the marginalised communities of the state

2. MATERIALS AND METHODS

The study is based on the primary data collected from households of eight prominent non-primitive tribal communities in the tribal dominated districts of Wayanad, Idukki and Palakkad of Kerala. These eight communities together constitute 51.86 per cent of total tribal population in the state. The three districts selected are the main habitats of tribal population in the state and they

cover major tribal communities of Kerala as well. From the Census (2011) data, we have estimated the number of households of each tribal community. The sample is formed in such a way as to ensure one per cent representation of the total households of each tribal community under study. Thus, the study covers 596 tribal households in three districts. Wayanad district was chosen to study five tribal communities namely Paniyan, Adiyar, Kuruman, Kurichiyan and Uraly Kuruma. Idukki district was chosen for two communities that is Mala Arayan and Muthuvan and Palakkad district was chosen for the study of one tribal community namely Irular.

Along with the measures of descriptive statistics, One-Way Analysis of Variance (ANOVA) was used to test for the equality of means. The post hoc test of Dunnett's T3 was employed for the multiple pair wise comparison. Further, a binary logistic regression was used to investigate the probability of utilising private health care facilities by the tribal households.

3. RESULTS AND DISCUSSION

3.1 Accessibility of Health Care

Kerala has extensive coverage of health care institutions which was one of the major contributory factors in the health success story of the state. The greater coverage of institutions and facilities had led to easy and better physical access to health care to the people of the state (Panikar, 1992; George, 2005). But concerns have been raised about the accessibility of health care among marginalised communities like tribal communities who live in places away from the main stream. It is pointed out that there are inequalities in the effective access to health care institutions among the marginalised group in all societies and is more pronounced in developing countries (Sen, 1999). Though Kerala has made noteworthy progress in health indicators, the scheduled tribe population of the state still

suffers from both communicable and non-communicable diseases (Shabeer et al., 2017). It is pointed out that tribal communities lag behind in social-economic spheres of lives as they are at different stages of social and economic development compared to the remaining population (Gowri Priya et al., 2023).

The health care availability and accessibility are significant aspects that influence the affordability and utilisation of health care and in turn affecting the health outcome. Studies have shown that the availability of health care institutions with easy accessibility has helped to attain higher health care utilisation in the state (Krishnan, 1991; Navaneetham et al., 2009). But with respect to communities like scheduled tribes, health care availability and accessibility are low (Simon, 2007). Further, physical inaccessibility is a serious constraint among the tribal population as they live in geographically challenged areas. These marginalised face geographical isolation as they live in forested and rural areas of the state (Abedin 2024). Broadly, accessibility includes the components of geographical or locational accessibility, economic or financial accessibility and social accessibility. The scope of this paper confines to geographical accessibility.

To trace out the access to health care, an attempt is made to examine the distance to the nearest health care institutions like primary health centre, government hospitals that offer in-patient treatment and private hospitals. Primary Health Centre (PHC) is the cornerstone for the provision of health care services at the grass root level. There are 886 PHCs functioning in the state (Kerala State Planning Board, 2025). These are institutions extensively used by the people from lower strata of society as a first referral centre for diagnosis in the event of ill health. Table 1 summarises the descriptive statistics of distance to the PHCs among tribal communities measured in kilo meters.

The mean distance that the tribal population had to travel to avail the services of the health care institution of PHC is 3.69 kilo meters, which is reasonably small reflecting the extensive coverage of public health care providers in the state. The mean distance to the PHC is highest among the Adiyar community and is the lowest among the Irular tribal community. Since the data is approximately normally distributed (N=596, Skewness = 0.89), in order to understand the differences of access to PHC at community level we have used the tool One Way Analysis of Variance (ANOVA). The results are presented in Table 2.

Table 1. Descriptive Statistics of Distance to the Primary Health Centre (in Kilo Meters)

Sub caste	Mean	Standard Deviation	Standard Error	95 per cent Confidence Interval for Mean	
				Lower Bound	Upper Bound
Paniyan	3.28	2.37	0.17	2.95	3.62
Adiyar	5.88	1.47	0.29	5.29	6.48
Kuruman	3.52	2.33	0.32	2.88	4.15
Kurichiyar	3.90	1.80	0.20	3.49	4.31
Uraly Kuruman	4.00	2.08	0.42	3.14	4.85
Mala Arayan	3.61	1.35	0.14	3.32	3.89
Muthuvan	4.44	0.71	0.09	4.26	4.61
Irular	3.19	1.82	0.23	2.73	3.65
Scheduled Tribe (combined)	3.69	2.01	0.08	3.53	3.86

Source: Primary data

Table 2. Results of One Way ANOVA

Sum of Squares	Degrees of freedom	Mean Square	F Statistic	P Value
216.805	7	30.972	8.314	.000**
2190.562	588	3.725		
2407.367	595			

** Significant at 1 per cent level of significance

The results of ANOVA is significant ($F = 8.314$, $P < 0.01$) and we can reject the null hypothesis (H_0) that the mean distances are the same. Thus, there is statistically significant difference in the average distance to PHC among tribal communities. To investigate into the communities in which the differences exist we have used the post hoc test of Dunnett's T3, which does not assume equality of variances, for multiple pair wise comparison. The results are summarised in the Table 3.

The multiple pair wise comparison shows that the mean distance of Adiyam community is statistically different and is higher when compared to all the other seven tribal communities. Further, there is a statistically significant difference in the average distance between Muthuvan community with respect to Paniyan and Irular. The PHC provides only a preliminary diagnostic service in limited scale and do not usually have facilities for in-patient treatment. Thus, we have also explored the distance to the nearest government hospital that offers in-patient treatment. The descriptive statistics is shown in the Table 4.

The analysis of access to nearest government hospital having the facilities of in-patient treatment using the variable of distance indicates that tribal community has to cover an average distance of 11.17 kilo meters to reach the nearest government hospital. The pattern among the tribal communities follows almost the same as in the case of distance to PHC. Like the earlier analysis, the Adiyam households are far away from the government hospital with a mean distance of 25.35 kilo meters followed by Kurichiyam. Along with the analysis of access to public health care facilities, the study also examined the access to the private hospital. It is interesting to note that mean distance to the private hospital is significantly less than that of government hospital, indicating the extent to which the private health care sector has expanded its operation in the state, even in the geographically remote area (Table 5). The average distance is highest among the Kurichiyam community. But the critical question is whether the tribal households depend upon the private providers for their medical treatment. This pertinent issue will be examined in the subsequent sections.

3.2 Preference and Utilisation of Health Care

It is imperative to understand the health seeking behaviour of tribal population in order to trace out

the reasons behind their relatively poor health indicators. Thus, this section examines the preferences of the system of treatment and providers of health care services followed by the analysis of utilisation of in-patient and out-patient health care facilities and the underlying contributory factors which influence the choice of provider. The Table 6 brings out the preferences of the system of medicine by the tribal households.

An overwhelmingly higher proportion of tribal households prefer the allopathic form of medicine. The reliance on the traditional system of tribal medicine is meagre. Yet, significant proportions of Adiyam and Uraly Kuruma community prefer this type of medicine. In fact, nearly one third of the Adiyam household favour traditional or ayurvedhic type of medicine. We also explored whether there is any deviation from the preference when the treatment is offered to children and aged. Table 7 summarises the findings.

Allopathy is the preferred system of medicine for both children and aged among the tribal households. At the same time, majority of Adiyam household prefer homeopathic treatment for their children. 15.38 per cent of the community prefers traditional tribal medicine for aged members. More than 7 per cent of the households among Adiyam, Kuruman and Kurichiyam community prefers ayurvedhic treatment for aged. The reasons for the selection of the system of medicine were also sought, which is shown in the Fig. 1.

The most important reason for the selection of the system of medicine is quick remedy followed by easy access. The cross tabulation carried out showed that the most important reason behind choosing allopathy as the preferred choice is that it provides quick remedy to ailment (70.49 per cent). Majority of the households that choose ayurvedhic system of medicine (56.25 per cent) viewed that it has no side effect. The traditional tribal medicine was preferred due its low cost and homeopathy was preferred by households as it was believed to have no side effect. Similarly, the study also examined whether there occurred any changes in the system of medicine followed by the households. Only 32 households constituting 5.4 per cent of the total have changed the type of medicine they followed. Majority of the households changed their system of medicine due to long duration of healing,

followed by the fact that treatment is not available in the system of medicine they followed. Combining the earlier findings on the reason for the selection, tribal households expect quick healing while choosing the system of medicine.

Table 3. Multiple Comparison of Distance to PHC (Dunnett T3 Post Hoc Test)

(I) Sub Caste		Mean Difference (I-J)	Standard Error	P value	95 per cent Confidence Interval for Mean Difference	
					Lower Bound	Upper Bound
Paniyan	Adiyan	-2.60035	.40274	.000**	-3.8609	-1.3398
	Kuruman	-.23425	.29648	1.000	-1.1622	.6937
	Kurichiyani	-.61958	.25821	.374	-1.4278	.1886
	Uraly Kuruman	-.71574	.40979	.903	-1.9984	.5669
	Mala Arayan	-.32685	.24557	.996	-1.0955	.4418
	Muthuvan	-1.15324	.27771	.001**	-2.0225	-.2840
	Irular	.09072	.28107	1.000	-.7890	.9705
Adiyan	Kuruman	2.36610	.46073	.000**	.9240	3.8082
	Kurichiyani	1.98077	.43709	.000**	.6127	3.3489
	Uraly Kuruman	1.88462	.54065	.015*	.1924	3.5769
	Mala Arayan	2.27350	.42974	.000**	.9284	3.6186
	Muthuvan	1.44712	.44888	.037*	.0421	2.8521
	Irular	2.69107	.45097	.000**	1.2795	4.1026
Kuruman	Kurichiyani	-.38533	.34169	1.000	-1.4548	.6842
	Uraly Kuruman	-.48148	.46691	1.000	-1.9429	.9800
	Mala Arayan	-.09259	.33224	1.000	-1.1325	.9473
	Muthuvan	-.91898	.35665	.248	-2.0353	.1973
	Irular	.32497	.35927	1.000	-.7996	1.4495
Kurichiyani	Uraly Kuruma	-.09615	.44360	1.000	-1.4846	1.2923
	Mala Arayan	.29274	.29859	1.000	-.6419	1.2273
	Muthuvan	-.53365	.32553	.948	-1.5526	.4853
	Irular	.71030	.32841	.581	-.3176	1.7382
Uraly Kuruman	Mala Arayan	.38889	.43636	1.000	-.9769	1.7547
	Muthuvan	-.43750	.45522	1.000	-1.8624	.9874
	Irular	.80645	.45728	.895	-.6248	2.2377
Mala Arayan	Muthuvan	-.82639	.31560	.224	-1.8142	.1614
	Irular	.41756	.31856	.997	-.5795	1.4147
Muthuvan	Irular	1.24395	.34394	.009**	.1674	2.3205

** Significant at 1 per cent level of significance

* Significant at 5 per cent level of significance

Table 4. Descriptive Statistics of Distance to the Government Hospital

Sub caste	Mean	Standard Deviation	Standard Error	95 per cent Confidence Interval for Mean	
				Lower Bound	Upper Bound
Paniyan	9.69	8.74	0.62	8.47	10.93
Adiyan	25.35	9.59	1.88	21.47	29.22
Kuruman	14.35	8.11	1.10	12.14	16.57
Kurichiyani	18.53	7.48	0.85	16.84	20.21
Uraly Kuruman	15.20	9.69	1.94	11.19	19.20
Mala Arayan	7.66	5.12	0.54	6.58	8.73
Muthuvan	5.38	1.00	0.13	5.13	5.62
Irular	7.34	3.49	0.44	6.45	8.23
Scheduled Tribe (combined)	11.17	8.74	0.36	10.47	11.87

Source: Primary data

Table 5. Descriptive Statistics of Distance to Private Hospital

Sub caste	Mean	Standard Deviation	Standard Error	95 per cent Confidence Interval for Mean	
				Lower Bound	Upper Bound
Paniyan	7.52	6.95	0.50	6.54	8.50
Adiyan	7.77	1.97	0.39	6.98	8.56
Kuruman	9.80	3.24	0.44	8.91	10.68
Kurichiyar	12.23	10.83	1.23	9.79	14.67
Uraly Kuruman	8.64	1.32	0.26	8.10	9.18
Mala Arayan	6.54	4.92	0.52	5.51	7.57
Muthuvan	5.38	1.00	0.13	5.13	5.62
Irular	7.40	6.85	0.87	5.66	9.14
Scheduled Tribe (combined)	8.01	6.68	0.27	7.47	8.55

Source: Primary data

Table 6. Preference of the System of Medicine (in percentage)

Sub Caste	Traditional/tribal	Ayurvedhic	Homeopathic	Allopathic
Paniyan	1.52	1.52	3.55	93.40
Adiyan	23.08	7.69	0.00	69.23
Kuruman	5.56	3.70	1.85	88.89
Kurichiyar	3.85	2.56	0.00	93.59
Uraly Kuruman	20.00	0.00	0.00	80.00
Mala Arayan	0.00	5.56	1.11	93.33
Muthuvan	0.00	0.00	3.13	96.88
Irular	0.00	3.23	0.00	96.77
Scheduled Tribe (combined)	3.36	2.68	1.85	92.11

Source: Primary data

Table 7. Preference of the System of Medicine for Children and Aged (in percentage)

Sub Caste	Children				Aged			
	Traditional/tribal	Ayurvedhic	Homeopathic	Allopathic	Traditional/tribal	Ayurvedhic	Homeopathic	Allopathic
Paniyan	1.52	0.51	3.05	94.92	1.02	1.52	3.05	94.42
Adiyan	18.75	7.69	60.00	33.57	15.38	7.69	0.00	76.92
Kuruman	0.00	1.85	0.00	98.15	1.85	7.41	0.00	90.74
Kurichiyar	2.56	5.13	0.00	92.31	2.56	7.69	0.00	89.74
Uraly Kuruman	20.00	0.00	0.00	80.00	20.00	0.00	0.00	80.00
Mala Arayan	0.00	4.44	2.22	93.33	0.00	5.56	1.11	93.33
Muthuvan	0.00	0.00	3.13	96.88	0.00	0.00	3.13	96.88
Irular	0.00	1.61	0.00	98.39	0.00	3.23	0.00	96.77
Scheduled Tribe (combined)	2.68	2.18	1.68	93.46	2.35	3.69	1.51	92.45

Source: Primary data

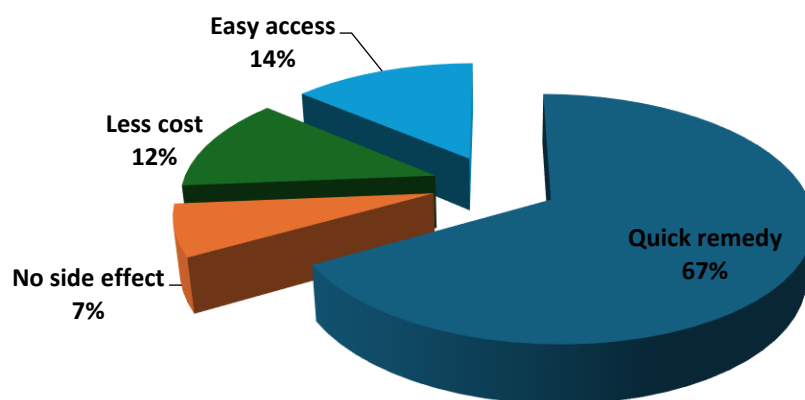


Fig. 1. Reasons for the Selection of the System of Medicine

Table 8. Preference of Providers of In-patient Treatment

Sub Caste	Govt Taluk or District Hospital		Govt Medical College		Private Hospital	
	Number	Percentage	Number	Percentage	Number	Percentage
Paniyan	149	75.63	17	8.83	31	15.74
Adiyan	22	84.61	2	7.69	2	7.69
Kuruman	37	68.52	0	0	17	31.48
Kurichiyar	52	66.67	6	7.69	20	25.64
Uraly Kuruman	25	100.00	0	0.00	0	0.00
Mala Arayan	55	61.11	5	5.56	30	33.33
Muthuvan	52	81.25	8	12.50	4	6.25
Irular	39	62.90	5	8.06	18	29.04
Scheduled Tribe (combined)	431	72.32	43	7.21	122	20.47

Source: Primary data

The study has investigated the preference for in-patient treatment among tribal community between different providers. Table 8 summarises the preference of household among different providers of in-patient treatment or hospitalisation.

Majority of tribal household prefer government taluk or district hospital for in-patient treatment. When we consider the share of medical colleges as well, almost 80 per cent of tribal household prefer public hospitals for in-patient treatment. The preference towards public providers is very high among the backward communities like Muthuvan, Uraly Kuruman and Adiyan. At the same time, 20.47 per cent of tribal households favour private hospital. The preference for private providers is significant among the forward communities like Mala Arayan, Kuruman and Kurichiyar. Interestingly, nearly 30 per cent of Irular community favour private hospitals. From

the focus group discussion, it is inferred that the private charitable trust hospitals functioning in the Attappady region of Palakkad district, who offer nearly free health care to tribal community, was the reason for such a preference pattern. The preference of private system of in-patient treatment can have significant influence on health care payment and financing pattern.

After probing the preferences of tribal households towards the type of medicine and providers of health care, the study now examines the utilisation of health care facilities by the households. For the calculation of health care utilisation, we followed the reference period as 30 days prior to the survey. Table 9 summarises the pattern of utilisation of public providers, including primary health centres, taluk hospitals, district hospitals and government medical colleges by the tribal households for out-patient treatment.

Table 9. Utilisation of Public Health Care Facilities for Out-patient Treatment (in 30 Days Reference Period)

Sub Caste	Number of Visits					
	0	1	2	3	4	5 and above
Paniyan	69 (35.03)	26 (13.20)	43 (21.83)	18 (9.14)	19 (9.64)	22 (11.17)
Adiyan	11 (42.31)	2 (7.69)	2 (7.69)	2 (7.69)	3 (11.54)	6 (23.08)
Kuruman	21 (38.89)	6 (11.11)	13 (24.07)	1 (1.85)	13 (24.07)	0 (0.00)
Kurichiyar	36 (46.15)	8 (10.26)	10 (12.82)	6 (7.69)	8 (10.26)	10 (12.82)
Uruly Kuruman	3 (12.00)	0 (0.00)	7 (28.00)	3 (12.00)	5 (20.00)	7 (28.00)
Mala Arayan	40 (44.44)	16 (17.78)	16 (17.78)	13 (14.44)	5 (5.56)	0 (0.00)
Muthuvan	29 (45.31)	13 (20.31)	10 (15.63)	6 (9.38)	4 (6.25)	3 (1.13)
Irular	28 (45.16)	11 (17.74)	9 (14.52)	10 (16.13)	2 (3.23)	2 (3.23)
Scheduled Tribe (combined)	237 (39.77)	82 (13.76)	110 (18.46)	59 (9.90)	59 (9.90)	49 (8.22)

Note: Figures in the parentheses are percentages

Source: Primary data

Table 10. Utilisation of Private Providers for Out-patient Treatment (in 30 Days Reference Period)

Sub Caste	Number of Visits					
	0	1	2	3	4	5 and above
Paniyan	148 (75.13)	21 (10.66)	17 (8.63)	6 (3.05)	3 (1.52)	2 (1.02)
Adiyan	22 (84.62)	2 (7.69)	2 (7.69)	0 (0.00)	0 (0.00)	0 (0.00)
Kuruman	30 (55.56)	11 (20.37)	7 (12.96)	3 (5.56)	2 (3.70)	1 (1.86)
Kurichiyar	56 (71.79)	11 (14.10)	6 (7.69)	2 (2.56)	0 (0.00)	3 (3.85)
Uruly Kuruman	23 (92.00)	2 (8.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Mala Arayan	48 (53.33)	20 (22.22)	11 (12.22)	6 (6.67)	3 (3.33)	2 (2.22)
Muthuvan	55 (85.94)	4 (6.25)	4 (6.25)	0 (0.00)	0 (0.00)	1 (1.56)
Irular	43 (69.35)	10 (16.13)	4 (6.45)	1 (1.61)	4 (6.45)	0 (0.00)
Scheduled Tribe (combined)	425 (71.31)	81 (13.59)	51 (8.56)	18 (3.02)	12 (2.01)	9 (1.51)

Note: Figures in the parentheses are percentages.

Source: Primary data

60.23 per cent of tribal households have utilised and availed the services of government health care institutions during the period of one month leading up to the survey. Majority of the households make at least two visits during the reference period. The utilisation of public providers is highest among the Uraly Kuruman community. This is on account of its high rate of prevalence of morbidity.

Table 10 bring out the pattern of utilisation of private providers in the form of private clinics including consultation at home by the physician and private hospitals by the tribal households for the out-patient treatment.

Nearly 30 per cent of the tribal households have made use of private health care facilities for out-patient health care treatment. 13.59 per cent of the households made at least one visit to private provider. The utilisation of private health care facilities is relatively higher among communities such as Mala Arayan and Kuruman which are socioeconomically better-off than others. The utilisation is lowest among the Uraly Kuruman community since majority of them use public health care facilities.

From our computation of hospitalisation rate among tribal population, it was found that there were 269 hospitalisation events among the tribal population of 2594 under the study. The Table

11 reveals the pattern of utilisation of in-patient care or hospitalisation by the tribal households between different providers of care.

The pattern of utilisation of in-patient treatment by the tribal household demonstrates the significant difference (Chi-square 70.707, $P < 0.01$) between different providers of in-patient care. Combining the shares of government hospital and medical colleges, the share of public provider is 77.32 per cent. It can be noted that private sector does have a share of 22.68 in in-patient treatment. Similar to the utilisation of out-patient, the proportion of private provider is relatively higher among communities like Mala Arayan and Kuruman.

3.3 Choice of Provider: Bivariate Analysis

The choice of health care provider is a key factor in determining the affordability of treatment and the impact of health care payment on the households. In the earlier examination of the utilisation of in-patient health care facilities, it was found that 28.69 per cent of the households have made at least one visit to private providers. In order to predict the variables that exert influence on the choice of provider, the model of binary logistic regression is used. The attempt is to investigate the probability of utilising private health care facilities by the tribal households.

Table 11. Utilisation of In-patient Treatment

Sub Caste	Govt Taluk/District Hospital	Govt Medical College	Private Hospital	Total
Paniyan	62 (69.66)	15 (16.85)	12 (13.48)	89 (100.00)
Adiyan	6 (60.00)	2 (20.00)	2 (20.00)	10 (100.00)
Kuruman	15 (50.00)	4 (13.33)	11 (36.67)	30 (100.00)
Kurichiyar	19 (46.34)	12 (29.27)	10 (24.39)	41 (100.00)
Uraly Kuruman	7 (70.00)	3 (30.00)	0 (0.00)	10 (100.00)
Mala Arayan	21 (50.00)	5 (11.90)	16 (38.10)	42 (100.00)
Muthuvan	11 (64.71)	4 (23.53)	2 (11.76)	17 (100.00)
Irular	15 (50.00)	7 (23.33)	8 (26.67)	30 (100.00)
Scheduled Tribe (combined)	156 (57.99**)	52 (19.33**)	61 (22.68**)	269 (100.00)

Note: Figures in the parentheses are percentages.

** Significant at 1 per cent level of significance

Source: Primary data

Table 12. Results of Logistic Regression Model of the Choice of Provider

Variables	Coefficient	Standard Error	Z-Statistic	P value
Constant	-1.646972	0.350361	-4.700794	0.0000**
Sub caste	0.719840	0.242333	2.970457	0.0030**
Education status of Head of the household	0.453664	0.218569	2.075612	0.0379*
Habitat	-0.389366	0.267503	-1.455553	0.1455
Chronic ailments	0.752970	0.199216	3.779671	0.0002**
Acute ailments	0.817955	0.281826	2.902337	0.0037**
Distance to private hospital	-0.038119	0.019177	-1.987755	0.0468*
Distance to government district hospital	-0.004026	0.014983	-0.268735	0.7881
Distance to government taluk hospital	0.054158	0.017602	3.076781	0.0021**
Number of observations		596		
McFadden R-squared		0.105963		
LR statistic		75.70463		
Prob(LR statistic)		0.000000		
Mean dependent var		0.286913		
S.E. of regression		0.427117		
Sum squared resid		107.0858		
Log likelihood		-319.3688		
Deviance		638.7375		
Restr. log likelihood		-357.2211		
Hosmer-Lemeshow Statistic		5.4869	Prob. Chi-Sq(8): 0.7045	

The dependent variable is binary outcome variable coded 1, if the household has made at least one visit to private provider, 0 otherwise. The explanatory variables used in the model are sub caste (coded 1 for households belonging to Mala Arayan, Kurichiyar and Kuruman, 0 for other households), status of education of the head of the household (coded 1 if the head is illiterate, 0 otherwise), habitat (coded 1 for households which are scattered, 0 otherwise), chronic ailments (coded 1 if any member of the household is chronically ill, 0 otherwise), acute ailments (coded 1 if any member of the household is having an illness of acute nature, 0 otherwise) and the three variables of distance, namely distance to government hospital, distance to taluk hospital and distance to private hospital to capture the effects accessibility which are measured in continuous scale. The null hypothesis for the model is H_0 : all the coefficients are simultaneously zero. The results of the logistic regression are summarised in the Table 12.

Since the value of likelihood ratio statistic (LR Statistic) is 75.70463 and P value is practically zero, the null hypothesis that all the coefficients are simultaneously zero is refuted. Thus, it can

be said that all the eight variables included in the logit model are important determinants of the choice of provider. The good of fit of the model is verified with Hosmer-Lemeshow test and the statistic is 5.4869 with probability of 0.7045.

From the estimated coefficient it can be inferred that sub castes do have a significant influence ($P < 0.01$) in determining the choice of provider and that households belonging to higher socioeconomic category have a greater probability of resorting to private health care treatment. Households with literate heads have significantly higher probability of resorting to private treatment. Place of stay of the tribal household does not exert any significant influence on the dependent variable. The presence of a member with chronic ailment that requires prolonged treatment significantly increased the probability of using private facilities. Following the similar pattern, prevalence of acute episodes in the household increases the probability of choosing private provider. The coefficients of three continuous variables included in the model to capture the accessibility of health care facilities, reveals that distance to government district hospital do not have any influence on the choice of health care

provider. As expected, the distance to private hospital is significant and the coefficient is negative implying that, as the distance to private hospital decreases, the probability of choosing private health care facilities increases. The distance to government taluk hospital is also highly significant and as the distance to government hospital increases, there is greater probability of choosing private health care facilities. Thus, the binary logistic model brings out that households belonging to forward socioeconomic category with a literate head, with chronic and/or acute ailments and are more immediacy to private facilities tend to choose private providers for health care treatment.

4. CONCLUSION

The accessibility to health care institutions in terms of geographical proximity is low among the communities such as Muthuvan and Adiyar. In terms of utilisation of health care facilities, allopathic system of medicine is preferred to other forms of medicine. The reliance on the traditional tribal medicine is very low among the households. The public providers are more chosen than private providers for both out-patient and in-patient care. The bivariate analysis confirmed that the educated households hailing from superior socioeconomic background tend to have higher probability of choosing private providers for medical treatment that will exert unambiguous influence on the financing of health care among the tribal folks.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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