# Chapter 3 RESEARCH METHODOLOGY

## Chapter 3

#### RESEARCH METHODOLOGY

#### 3.1. Statement of the problem:

The incidence of catastrophic health expenditure is witnessed by households across the globe in all developed, underdeveloped, and developing countries with different intensities (Xu, et al., 2007). But such occurrences are extensively high in the second and third world countries. Health financing requirements depend on several factors that vary across countries, and hence, every country needs a customized health financing strategy to address the existing gap. OOP is a burning issue for India as well, despite the implementation of several initiatives at both the central and regional levels. The repercussions of OOP health are devastating as estimates show that high OOP has pushed 3.5 percent (50.6 million) people below the poverty line; the poor have been further pushed into the poverty cycle (Hooda, 2017). According to the National Health Accounts report (2019) for the year 2016-17, the per capita health expenditure for India is Rs. 4,381. Government per capita health expenditure is Rs. 1,418, which is around 32.4 percent of the total health expenditure. OOP Expenditure on health by households is Rs. 2,570 per capita, i.e., 58.7 percent of total health expenditure. Disequilibrium between Government health expenditure and OOP health expenditures confirms the presence of heavy financial burden per capita, without any adequate financial protection. To address the issue of financial protection against health care costs adequately, it is very much essential to make an estimate of average household out-of-pocket health expenses and identify the factors which more likely to increase the financial risk for the households.

National Institution for Transforming India (NITI Aayog), the policy think tank established by the Government of India to achieve the Sustainable Development Goals, recently came up with a Health Index to assess the performance of the health sector in the different states of the country. The health index represents a composite score of 23 principal indicators grouped into three domains, i.e., health outcomes, governance, and information, reflecting the essential aspects of the health sector for each of the districts. The estimated index values further illustrate the heterogeneity and complexity of health performance across states of India. Based on the composite health score from Health Index Round IV (2019-20), Assam has been listed into the "Aspirant" states category, despite positive improvements in incremental performance (NITI Aayog, 2021). In

addition to that, the SDG India Index report (2021) has also affirmed Assam to be one of the worst-performing states of the country. The report further reveals that in the health domain (SDG 3), Assam has scored the lowest (59) of all states. Assam is lagging far behind most of the states of India, which raises concern as there have been several financial interventions that are already in operation. Repeated low ranking in primary health indicators like Infant Mortality Rate, Maternal Mortality Ratio, and Neonatal Mortality Rate also clearly implies that Assam is consistently delivering poor performance in the sector.

The report prepared by ICMR<sup>13</sup>, PHFI<sup>14</sup>, and IHME<sup>15</sup> (2017) under the India State-level Disease Burden Initiative has also noticed a striking health status and disease inequalities between the states of India based on the disease burden trend from 1990 to 2016. The report is a clear indication that the states of this country are at different levels of health and overall development; thus, the level of risk factors for each of these states is different. In the last few decades, the country's disease patterns have gradually shifted, and now non-communicable diseases (NCDs) and injuries contribute the highest to the overall disease burden. But there are still many states that are still juggling with the burden of communicable, maternal, neonatal, and nutritional diseases. Assam is one such state where the proportion of total disease burden from CMNNDs is 38.5 percent, NCDs is 51.2 percent, and injuries is 10.3 percent. In light of the specific health situation prevailing in the states, one can say that addressing the health issues at the regional level would be the best approach, and the state-specific action plan will be more appropriate.

All these also intimate that the financial risks are also likely to be very high for the state with such health risks. The overall scenario of financial security against health risk is already relatively low across the country. According to the latest NITI Aayog report, despite having multiple health schemes in place with the potential to cover 70 percent of the total population, the actual coverage is pretty low in India (Kumar & Sarwal, 2021). Thus, we can't expect the situation to be better in this region. According to the National Family Health Survey (NFHS-4) report (2017), the households covered by a health scheme or health insurance are only 12.6 percent in the urban area; the situation is far worse in rural Assam with merely a 10 percent coverage rate. There is a huge gap that

<sup>&</sup>lt;sup>13</sup> ICMR: Indian Council of Medical Research

<sup>&</sup>lt;sup>14</sup> PHFI: Public Health Foundation of India

<sup>&</sup>lt;sup>15</sup> IHME: Institute for Health Metrics and Evaluation

needs to be addressed by the researchers and policymakers. Hence, this study proposes a systematic assessment of the health care expenses, financing pattern, and its repercussions at the state level for Assam and intends to provide suggestions to address the issues better.

## 3.2. Aim of the study:

Considering the heterogeneity across the states of India, state-specific estimation of household health expenses is very crucial at current times. Hence, this study provides a detailed insight into the extent of the financial burden borrowed by rural households due to OOP health expenses and the various means of financing adopted to meet the healthcare requirements. The study has explored how healthcare expenses are likely to affect the financial condition of households in the long-run. The study has also investigated where the health insurance or health scheme stands as a tool for financial assistance in rural settings.

## 3.3. Objectives of the study:

The objectives of the study are

- a) To estimate the household healthcare expenditure in both public and private health care facilities
- b) To examine the health financing pattern for household healthcare expenses
- c) To assess the impact of out-of-pocket health expenses on the financial condition of the households
- d) To formulate modalities for minimizing out-of-pocket health expenses

#### 3.4. Period of study

The primary data collection for the study was done, from 1st March 2019 to 29<sup>th</sup> February 2020.

## **3.5.** Scope of the study:

a) Geographic Scope:

Though Assam is urbanizing, its pace is quite slow. According to Census 2011, approximately an overwhelming 86 percent of the state's population resides in rural areas, and only 14 percent are urban residents. Apart from that, according to the "CRISIL Inclusix Score" (CRISIL, 2018), the level of financial inclusion and insurance penetration in Assam for the year 2016 is below average. The NFHS-4 report (2017) has even pointed out the high level of disparity regarding health insurance/scheme coverage between urban and rural populations, as mentioned earlier. The rural Assam covers most of the state's population, and only 10 percent coverage by any health insurance or scheme is pretty low,

given the 12.6% coverage among the urban households. Thus, the financial risk associated with health is much more concerning for rural households of Assam. Considering the relatively higher financial risk, the focus of the study will be the rural households of Assam.

#### b) Academic Scope:

The study has been planned following the international guidelines provided by United Nations and World Health Organization, to eliminate potential conflicts in identifying the various components and factors associated with household health expenditure and also to adapt the proper tools for assessing the outcomes as per objectives. The purpose of this study is to capture a full view of the different aspects of healthcare spendings in rural settings. In the existing works of literature on health expenses, the academicians have mostly relied on secondary/panel data for the estimation of health expenses at different levels and also for quantifying the incidence of financial catastrophe because of health expenses. Considering the lack of availability of the latest data on health expenditure and its various components, we have utilized primary data on health expenses for estimation purposes and identifying the coping strategies for capturing the current scenario at the state. We have noticed that there is a dearth in literature exploring the public opinion on various aspects of health expenses endured by the households at large. Hence, to fill up the gap, instead of solely relying on quantifying the impact of healthcare costs, the study design attempts to capture public opinion in the matter as well. The study will provide insights into rural households' perceptions about their current health spendings and its consequences. These findings will contribute a fresh perspective on the matter from a different standpoint to the existing body of knowledge.

## **3.6.** Limitation of the study:

The study solely focused on the different health care expenses and share of those expenses across the different financing strategies adopted by rural households. We collected the expense-related information based on respondents' recalling ability. In most of the IP cases, since the expenses are relatively higher, the respondents found it hard to provide the detailed break-up of the cost components like OT charges, service fees, cost of medicine, and diagnostic costs. So, for IP cases, we have considered the total direct cost of treatment, unlike OP cases. We have kept the study restricted to different types of treatment only; this study has not explored other aspects like types of ailments, the severity of the medical conditions in depth.

## 3.7. Research Design:

In light of the objectives, we have adopted an empirical and descriptive approach for the research design.

#### 3.8. Source of data collection:

The required data to fulfill the four objectives of the study were collected from primary sources. The necessary data on household health care expenses were collected from the household members who are familiar with the household's expenses and financing decisions. All the additional information required to support the study findings were compiled from several secondary sources like reports from national/international organizations, government survey reports, e.g., World Health Reports, National Family and Health Survey (NFHS) Reports of India, NSS (58th, 71st, and 75th round) data, IRDA Reports, CRISIL Reports, as well as Demographic Health Survey (DHS) Program Database and Global Health Observatory data repository.

## 3.9. Variables for the Study

The preliminary list of variables considered for the study has been extracted from the standard questionnaires used by various national and international organizations. Additional relevant variables are also identified and added to the list with the help of a comprehensive review of existing works of literature at global, national, and regional levels. The list of variables for the study is further revised with the help of the pilot study findings. The final list of variables reflecting the various aspects of the study are as follows (Table 8):

Table 8: Variables for the Study

Category	Variable
Household Demographics	<ul> <li>Size of the family</li> <li>Social Group</li> <li>Religion</li> <li>Headcount of senior citizens in the family</li> <li>Annual income of the household</li> </ul>
Disease/Treatment Pattern	<ul> <li>Number of IP cases in a public facility (in a year)</li> <li>Number of IP cases in a private facility (in a year)</li> <li>Number of IP cases in both public &amp; private facility (in a year)</li> <li>Total Number of IP cases (in a year)</li> <li>Number of OP cases in a public facility (in a month)</li> <li>Number of OP cases in a private facility (in a month)</li> <li>Number of cases in both public &amp; private facility (in a month)</li> <li>Total Number of OP cases</li> <li>Death count in a family during or post treatment</li> <li>Number of death cases during or post-treatment in a public facility</li> </ul>

	<ul> <li>Number of death cases during or post-treatment in a private facility</li> <li>Number of death cases during or post-treatment in both public &amp; private facility</li> <li>Total Number of death cases during or post-treatment</li> <li>Number of chronic cases in family</li> <li>Number of chronic patients in the family</li> <li>IP cost of treatment         <ul> <li>Direct Cost</li> </ul> </li> </ul>	
Healthcare Cost Components	<ul> <li>Indirect Cost         <ul> <li>Total Cost</li> </ul> </li> <li>OP cost of treatment         <ul> <li>Direct cost: Consultation fees, Cost of Diagnostic Tests, Cost of Medicines</li> <li>Indirect Cost</li> <li>Total Cost</li> </ul> </li> <li>Money spent by the households every month on healthcare with or without prescription and self-medications</li> </ul>	
Financing Strategies Adopted	<ul> <li>Current income of any household members</li> <li>Household Savings</li> <li>Sold items/Sale of Assets</li> <li>Borrowing from relatives/friends (with interest)</li> <li>Borrowing from relatives/friends (without interest)</li> <li>Borrowing from moneylenders</li> <li>Payment or reimbursement from a health insurance plan/health scheme</li> <li>Credit from SHGs/MFIs &amp; other FIs</li> <li>Compromise with treatments</li> <li>Compromise with food consumption and food-related expenses</li> <li>Cut off other non-food expenditures</li> </ul>	
Impact of OOP Health Expenses on the Households	<ul> <li>Incidence of Catastrophic Health Expenses</li> <li>Households' perception regarding their OOP spendings</li> <li>Households' opinion regarding the consequences faced due to OOP expense</li> </ul>	
Financial Security Coverage	Chemes	

# 3.10. Research instrument:

The primary data required for the study were collected through the interview method. During the survey, the head of the households or those familiar with the households' finances were interviewed using a detailed interview schedule (see Annexure A). The interview schedule covered questions about the household demographics, health conditions of the household members, healthcare-seeking patterns, details of costs of

different types of treatment (direct as well as indirect costs). These segments of the interview schedule are designed with the help of the structure/pattern of following standard questionnaires used at national and international level:

- a) National Family Health Survey (NFHS)-4
- b) World Health Survey Household Questionnaires
- c) Demographic and Health Survey (DHS) format
- d) Healthcare Utilization and Healthcare Expenditure Survey: Assam (April–June: 2014) conducted by OKD Institute of Social Change and Development on behalf of National Health Systems Resource Centre, Ministry of Health and Family Welfare, Government of India

The following sections of the interview-schedule also comprised questions about financing measures adopted by the rural households for the reported cases and their opinion about healthcare costs incurred in the past years and its repercussions. The study has also proposed the concept of contributory health financing schemes as a measure to minimize the OOP health expenses. The schedule had questions to assess the willingness of rural households to participate in a contributory health scheme and their opinion on service/cost coverage of such policies. These questions are formulated and added to the questionnaire on the basis of the existing literature.

## 3.11. Sampling design:

The rural population of Assam is the target population of the study, and rural households are the sampling units. The representative sample is selected from the target population using a multi-stage sampling method combining both probabilistic and non-probabilistic sampling techniques.

#### Stage 1: District Sampling

Out of the four dimensions of the UHC framework associated with protection against health risks, two most relevant dimensions, with respect to the study, have been used to calculate an index value for each of the districts of Assam. These districts are ranked based on their index values and further grouped into three categories. The method adopted for the computation of the indices has been proposed by Ram and Shekhar (2006). Ram and Shekhar (2006) had developed and used this method for ranking and mapping of districts of India based on socio-economic and demographic indicators. The process has been illustrated below.

The two dimensions used for developing the composite index are

- (i) Dimension 1: Number of rural households among the rural population with at least one member enrolled under any health scheme or health insurance, Source: NFHS-4 for 2015-16. The first dimension represents for the extent of financial protection available for the rural population from the various districts.
- (ii) Dimension 2: Aggregate household health care expenditure, Source: Assam Human Development Report (HDR) 2014. The second dimension is an indicator of the degree of financial burden of health care on the rural population.

Firstly, separate indices for each district considering the indicators for the two dimensions were calculated. For the set of indicators positively associated with the protection against health risk (here dimension 1), the formula for index value is as follows:

Index Value=
$$\frac{X_{id} - Min(X_{id})}{(Max(X_{id}) - Min(X_{id}))}$$

where,  $X_{id}$  is the value of the  $i^{th}$  indicator for  $d^{th}$  district of the state for i=1,2,3... m: d=1,2,3... n.

For the set of indicators negatively associated with the protection against health risk (here dimension 2), the formula for index value is as follows:

Index Value=
$$\frac{\text{Max}(X_{id})-X_{id}}{(\text{Max}(X_{id})-\text{Min}(X_{id}))}$$

The two districts Chirang and Dima Hasao are not considered further for sampling due to information unavailability. <sup>16</sup>

Finally, a composite index for each of the districts was computed by combining indices for all the two dimensions considered through a simple average.

Composite Index= $\frac{1}{2}$  ×Sum of Indices for two dimensions of each of the districts

Based on the composite index, the 24 districts were further divided into three categories of financial risk, i.e., high, moderate, and low, using the percentile values of the index values.

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<sup>&</sup>lt;sup>16</sup> The Assam HDR survey 2014 did not consider these two districts while calculating the aggregate household health care expenditure because of very low sample size.

Table 9: Composite Index formulation for District Categorization

	D	imension				
District	Aggregate	Number of rural				
	household	households among				
	health care	the rural				Financial
	expenditure	population with at	Index 1	Index 2	Composite	Risk
District	(expressed	least one member	muex 1	muex 2	Index	Category
	in rupees)	enrolled under any				Category
		health scheme or				
		health insurance				
		(expressed in %)				
Morigaon	2733	26.20	0.0213	0.0000	0.01	
Barpeta	1218	25.20	0.0000	0.0410	0.02	
Tinsukia	3940	17.10	0.0383	0.3730	0.21	
Goalpara	1377	12.60	0.0022	0.5574	0.28	Low
Nagaon	3554	12.60	0.0329	0.5574	0.30	
Sivasagar	7622	13.90	0.0901	0.5041	0.30	
Jorhat	4127	12.00	0.0409	0.5820	0.31	
Nalbari	5796	10.40	0.0644	0.6475	0.36	
Golaghat	4487	9.10	0.0460	0.7008	0.37	
Sonitpur	5878	9.40	0.0656	0.6885	0.38	
Dhubri	2494	7.70	0.0180	0.7582	0.39	
Hailakandi	7002	9.20	0.0814	0.6967	0.39	
Dhemaji	9722	10.00	0.1197	0.6639	0.39	
Kokrajhar	1847	6.90	0.0089	0.7910	0.40	Moderate
Bongaigaon	6344	8.30	0.0721	0.7336	0.40	
Kamrup	4755	6.70	0.0498	0.7992	0.42	
Karbi	2934	6.00	0.0241	0.8279	0.43	
Anglong	2934	0.00	0.0241	0.0219	0.43	
Lakhimpur	17075	10.10	0.2231	0.6598	0.44	
Karimganj	2719	5.00	0.0211	0.8689	0.44	
Darrang	3204	4.70	0.0279	0.8811	0.45	
Baksa	4789	3.70	0.0502	0.9221	0.49	
Udalguri	3133	2.60	0.0269	0.9672	0.50	High
Cachar	4406	1.80	0.0449	1.0000	0.52	
Dibrugarh	72285	7.30	1.0000	0.7746	0.89	

The 25th percentile value for the composite index values, for the 24 districts, is 0.31. The districts with the composite index values up to 0.31 were placed under the "Low-Risk" category. Districts having the composite index value between 0.31 and 0.44 were considered under the "Moderate Risk" division. Consequently, the district composite index values higher than the 75th percentile value, i.e., 0.44, were taken under

the "High Risk" category. The distribution of the 24 districts, between these three categories, is mentioned in the table (Table 9). The first district of each of the three categories was selected, so that the sample contained appropriate representation of rural population exposed to all three levels of financial risks. At the end of the first step of sampling, the resultant district sample included Darrang from the "High Risk" category, Nalbari "Moderate Risk" category, and Morigaon from the "Low Risk" category.

Stage 2: First State Sampling Unit (FSSU) - Community Development (CD) Block Sampling

The study specifically emphasized on understanding the rural scenario in the subject matter, and the rural population of distribution is not uniform throughout the state. Hence, to get a better representation of the targeted population in the sample, CD blocks with high proportion of rural population were considered for the sampling process. Thus, in the second stage of sampling, from each of the three districts, those CD blocks were selected, which have 95 percent or more rural population. Each of these three districts has seven CD blocks in total. Based on this criterion, the number of CD blocks eligible for the study from Morigaon, Nalbari, and Darrang district are 5, 4, and 6, respectively. So, from these three districts, 15 CD blocks were selected for the next stage of sampling.

Stage 3: Second Stage Sampling Unit (SSSU) - Village Sampling

From each of the selected CD blocks, 10 percent of the total villages were selected from that specific block, by using a random number generator to curtail the potential selection bias in the process due to the non-probability sampling methods used in the previous stages. Finally, we chose 32, 27, and 49 numbers of districts from Morigaon, Nalbari, and Darrang district, respectively. Thus, a sample of 108 villages were finalized to carry out the household sampling.

Stage 4: End Stage Sampling Unit (ESSU) - Household Sampling

At the final stage of the sampling process, 10 number of households were randomly selected from each of the selected villages. For the final household selection, the random number generator was used against the list of houses maintained by the ASHA (ASHA (Accredited Social Health Activist) workers of those villages, so the potential selections bias can be minimized in this stage as well. As a result, we selected 320, 270, and 490 households from the Morigaon, Nalbari, and Darrang district, respectively, totaling up to a sample of 1080 respondents for our study.

Table 10: Detailed Household Sampling

Stages	Criteria	Morigaon	Nalbari	Darrang
Stage II: Community Development (CD) Block	The CD blocks with a rural population of	5 Nos.	4 Nos.	6 Nos.
Sampling First Stage Sampling Unit (FSSU)	95 percent or above were selected.	(Out of 7)	(Out of 7)	(Out of 7)
Stage III: Village Sampling Second Stage Sampling Unit (SSSU)	10 percent of the villages from each of the selected blocks were randomly selected.	32 Nos. (16+11+2+0+3)	27 Nos. (3+3+12+9)	49 Nos. (1+18+9+6+7+8)
Stage IV: Household Sampling End-Stage Sampling Unit (ESSU)	sehold households were selected randomly from each of the villages		270	490
Total Number of Households Selected			1080	

# 3.12. Pilot Survey

The developed questionnaire was pilot tested in one of the sample districts with a sample of 85 households. The pilot survey was carried out between October 2018 to November 2018 in the Nalbari district. The purpose of this pilot study was to get an estimate of the perceived time-cost of answering the questionnaire and the perceived difficulty as well as the understandability of the questions contained therein. Based on the feedbacks received from the respondent, minor modifications were done to the questionnaire. The pilot survey also showed that time needed to completely the record the responses for each interview schedule was around 15-20 minutes. Later on, using the data collected during the pilot survey, the reliability test was carried out for the same. For the reliability testing of the variables measured in 5-point Likert scale, the researcher used the Cronbach Alpha method. The reliability test results at the end of the pilot survey are given in the table below (Table 11). According to Sekaran (1992) and Pallant (2020), Cronbach Alpha's value above 0.60 suggests that the items have a good internal stability and consistency. Thus, based on the estimates, it can be said that the scales used in the questionnaire are reliable for further data collection

Table 11: Reliability Test Results

Ordinal	Purpose of the Scale		Cronbach's
Scale Set			Alpha
1	To measure the attitude towards health care expenditures at the household level	13	0.717
2	To measure the perception of the households with enrolment regarding the concept of health insurance	7	0.835
3	To measure the awareness level of the households with enrolment about their current scheme/policy	8	0.787
4	To measure the opinion of the households with enrolment regarding about the scheme they are currently enrolled in	9	0.856
5	To measure the outlook towards Health Insurance as a financing measure for healthcare costs for households without a single enrolment	9	0.696

Moreover, the Karl Pearson's correlation test between scale items was carried out to check the convergent and discriminant validity of the questionnaire. Convergent Validity is measure indicates that the items theoretically related to each other are observed to be related to each other as well. On the other hand, discriminant validity suggests that the theoretically non-related items actually un-related to each other. The three things considered while assessing the results are statistical significance (p value < .05, 0.1), valence (positive or negative) and value (-1< r <1). According to the estimates 17, the correlation values for all the scales showed were found to be statistically significant, indicating that the questionnaire is valid for further data collection.

## 3.13. Data Analysis and Parameters used for the Study

Both descriptive and inferential statistics are used to understand the collected data and justify the objectives for the study. Primarily basic descriptive statistics are used to summarize the data gathered from primary and secondary sources. A series of Chi-Square tests, t-tests, and ANOVA tests has been carried out to identify the relationships between different variables and determine the extent of variability with fixed/random effects, respectively. Moreover, correlation and regression analysis have been used to identify the specific variables influencing a household's healthcare expenses, household health financing decisions, and their impact on their economic conditions.

#### 3.14. Terminology:

There are several terms associated with health care expenditure and health care financing frequently mentioned in the study. In order to better under the context of the

<sup>&</sup>lt;sup>17</sup> The validity test results (Karl Pearson' Correlation estimates) are available in ANNEXURE B)

study, it is essential to have a basic understanding of these terminologies. All the important terms, used throughout the study, have been described in the following table (Table 12). The descriptions are based on the standard definitions, extracted from various sources.

Table 12: Terminology Description

Sl. No	Term	Description	
1	Out-of-pocket (OOP) health expenses of a household	Direct payments made by the household to health care providers at the time of using the services; excluding any prepayment for health services in the form of taxes, specific insurance premiums, contributions and, where possible, net of any reimbursements to the individual who made the payments	
2	Catastrophic Health Expenditure	Out-of-pocket spending on health care that exceeds a certain proportion of a household's income with the consequence that houses suffer the burden of disease (Ekman, 2004)	
3	Household impoverishment due to health expenses	When healthcare expenditure has caused it to drop below the poverty line, a household is said to have been impoverished by medical expenses (Xu, et al., 2007).	
4	Total Household Health Expenditure	Sum of direct health expenditure and indirect health expenditures	
5	Direct Health Expense	For both IP and OP Treatments:  • Service fee (includes doctors' fee/bed charge/OT charge)  • Cost of Diagnostic Test  • Cost of medicines and consumables	
6	Indirect Health Expense	<ul><li>Transportation Cost</li><li>Cost of food and Lodging of the escorts/attendants/patient</li></ul>	
7	Public Health Care provider	Sub-Centre, Primary Health Centre, Community Health Centre, Sub Division Hospital, District Hospital, Medical College Hospital, ESI Hospital, CGHS Wellness Centre/Dispensary	
8	Private Health Care provider	Private doctor/ clinic, Private nursing home, PPP Hospital, Private Laboratories/Diagnostic Centres	

Source: Compiled by the Author

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