

## **Utilisation of Different Types of AYUSH System of Medicine in North-East India: Evidence from NSS 79th (2022-2023) round on AYUSH**

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### **ABSTRACT**

*Background: India's healthcare system is pluralistic in nature. Among these, one of the important systems is AYUSH. North-East India has unique sociocultural traditions and has a sound alternative complementary medicine practice, which falls under the AYUSH systems. However, empirical findings on the utilisation of different types of AYUSH systems in North-East India remain limited. Objectives: This study aims to find the utilisation patterns of different AYUSH systems in North-East India and analyse the socioeconomic and demographic factors influencing individuals' choice of particular AYUSH systems. Methods: for this study, the NSS 79<sup>th</sup> round data set was used and applied multinomial logistic regression. For this regression, four mutually exclusive outcome categories are Ayurveda, Homoeopathy, Naturopathy and Other systems like Yoga, Unani, Siddha and Sowa-Rigpa. Independent variables are age, gender, locality, marital status, education, religion, social caste group, and economic status, which is based on usual monthly household consumer expenditure and means of livelihood. Results: Ayurveda (58.06%) appeared as the most utilised AYUSH system, followed by Homoeopathy and Naturopathy. Utilisation of AYUSH systems of medicine is dominated by females, rural respondents and married individuals. Those who have attained primary/middle school level education utilise more AYUSH systems. People who are of a poor economic status exhibited more utilisation of Ayurveda, Homoeopathy and Naturopathy. Conclusion: The study exhibited that strong heterogeneity is present in AYUSH utilisation across socioeconomic and demographic groups in North-East India. This study furnishes some policy measures to enhance the utilisation of AYUSH healthcare in this region.*

**Keywords:** Utilisation of AYUSH, NSS 79th round, North-East India, Multinomial logistic regression.

## **Introduction**

Health universally represents one of human beings' most vital and precious assets. It is the backbone of human development. The basic human necessities are good health and efficient access to healthcare services (Lee & Mills, 1983). In recent times, mention things have been taken under the Sustainable Development Goal (SDG). The principal objective of SDG 3 is "Ensure healthy lives and promote quality of life for all at all ages". In the field of health, healthcare utilisation mainly attributes the use of health services to manage or mitigate health problems, receive treatment, and undergo diagnosis. Utilisation of the healthcare system is mainly influenced by socioeconomic status, availability of healthcare services (Peters et al., 2002), sociocultural beliefs or behaviour (Goddard & Smith, 2001). Different types of medicine are present in healthcare utilisation, like modern, traditional, conventional etc. The Indian healthcare system is diverse, comprising all the mentioned systems. In the Indian healthcare system, traditional-complementary-alternative medicine (TCAM) is collectively associated under AYUSH healthcare systems, which comprise Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa, and Homoeopathy. AYUSH encompasses both curative and preventive perspectives, aligned with holistic well-being in healthcare utilisation. Regionally, India is divided into six regional parts like northern, eastern, western, central, southern and north-eastern parts. Out of these six parts, North-East India has a unique sociocultural tradition and folk medicine practices. Despite these, very little work is done in the field of utilisation of AYUSH healthcare in this region. Most existing studies on AYUSH healthcare utilisation based on binary outcomes, like user and nonuser or allopathy and AYUSH user. The main objective of this study is to determine, out of seven AYUSH systems, which systems are largely utilised by North-East Indian individuals and to analyse the socioeconomic determinants affecting the choice of a particular AYUSH system.

## **Methods**

Data Source- For this study, data were taken from the National Sample Survey (NSS) 79<sup>th</sup> round, 2022-2023 on AYUSH, a nationwide household survey conducted by the Ministry of Statistics and Programme Implementation (MoSPI) under the Government of India. Under this survey, there are two data files at the household and individual levels, respectively. The work involves merging the former with the latter to include household-level characteristics in the analysis of individual-level data. This merged file contains 10,757,930 individuals/observations (after weighting, where the weight= 'Multiplier/100') in North-East India. This analysis is done for the North-Eastern region of India. The North-Eastern region consists of Assam, Arunachal Pradesh,

Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim. For this analysis, the sample is bounded with individuals aged 15 to 59 years, excluding senior citizens and children.

### **Variable**

Let, individual  $i$  utilised,  $Y_i$  system of AYUSH medicine. The dependent variable is categorical with four unordered outcomes and mutually exclusive,

$Y_i$  takes the following values:

0 = Other Systems (reference category)

1 = Ayurveda

2 = Homoeopathy

3 = Naturopathy

"Other Systems" was specified as the baseline category, against which the likelihood of using the mentioned AYUSH systems was compared. "Other Systems" consists of Yoga, Unani, Siddha and Sowa-Rigpa/Amchi.

Independent variable ( $X_i$ ): a set of some demographic and socioeconomic covariates was included, comprising the Andersen Behavioural Model of Health Services utilisation and past studies (Soleimanvandiazar et al., 2024; Xu et al., 2021). Age group coded as 15-29, 30-44, 45-59 years. One of the important demographic variables is gender, which is stratified as Male and Female. Gender disparities in healthcare-seeking behaviour and compliance with Traditional, Alternative, and Complementary Medicine (TCAM) are appropriately documented in prior global and Indian studies (Das et al., 2018; Ray et al., 2018). Under locality, rural and urban sections are taken. Marital status was categorised into two parts: currently married and others. This mentioned status was incorporated to determine its effect on economic dependency and healthcare-seeking behaviour. Education is one of the important socioeconomic characteristics. Education level recoded as illiterate, primary level, secondary level, and graduate/above; these stratifications sometimes serve as a proxy for awareness and health literacy (Bayati et al., 2018; Svendsen et al., 2020; Thakur et al., 2019). Social group segmentation affects both access to and attitudes toward healthcare utilisation. Groups are Scheduled Tribes (ST), Scheduled Casts (SC), Other Backwards Classes (OBC), and others (Chatterjee et al., 2023; Thapa et al., 2021). Economic status was derived from the usual monthly household consumer expenditure. This status is classified as poor, lower middle, upper middle and rich class. Employment-oriented respondents' types were segmented as self-employed respondents and regular wage/salaried respondents.

**Multinomial Logistic Regression Model**

$$\text{Log} [P(Y_i=0)/P(Y_i=j)] = \beta_{0j} + \sum(k = 1 \text{ to } K)\beta_{kj}X_{ik}, j=1,2,3$$

This model estimates the log-odds of choosing AYUSH system j relative to the “Other Systems of AYUSH” (reference category). Where:  $P(Y_i=j)$  is the probability that individual i utilised system j.  $P(Y_i=0)$  is the probability of utilising Other Systems.  $\beta_{0j}$  is the intercept for outcome j.  $\beta_{kj}$  is the coefficient with the kth explanatory variable for outcome j.  $X_{ik}$  represents the kth covariate for respondent i. Three logit equations were i) Ayurveda vs. Other Systems ii) Homoeopathy vs. Other Systems iii) Naturopathy vs. Other Systems.

The predicted probability of Individual i choosing system j is

$$P(Y_i=j) = \exp\{\beta_{0j} + \sum(k = 1 \text{ to } K)\beta_{kj}X_{ik}\} / [1 + \sum(m=1 \text{ to } 3) \exp\{\beta_{0m} + \sum(k=1 \text{ to } k) \beta_{km}X_{ik}\}], j=1,2,3$$

For the reference category, the probability is given as:

$$P(Y_i=0) = 1 / [1 + \sum(m=1 \text{ to } 3) \exp\{\beta_{0m} + \sum(k=1 \text{ to } k) \beta_{km}X_{ik}\}]$$

All analysis was conducted in R and Python.

**Results and Discussion**

**Table 1**

Dependent Variables	Weighted Frequency	%
Ayurveda	6247455	58.06
Homoeopathy	1846611	17.18
Naturopathy	1707785	15.87
Other Systems	956079	8.89

*Source: Self-elaboration of data from the NSS 79th Round on AYUSH.*

Table 1 represents all dependent variables: Ayurveda (58.06%), Homoeopathy (17.18%), Naturopathy (15.87%) and Other Systems (8.89%), like Yoga, Unani, Siddha, Sowa-Rigpa/Amchi, in multinomial logistic regression. This result exhibits the dominant position of Ayurveda in the utilisation of the AYUSH system of medicine in North-East India.

**Table 2**

Background Characteristics	Ayurveda Frequency (%)	Homoeopathy Frequency (%)	Naturopathy Frequency (%)	Other Systems Frequency (%)	Total AYUSH Frequency
<b>Age</b>					
15-29 years	1791600(52.83%)	697418(20.56%)	593956(17.51%)	308171(9.10%)	3391145
30-44 years	2440093(59.15%)	628578(15.24%)	677225(16.42%)	379261(9.20%)	4125157
45-59 years	2014042(62.16%)	521907(16.10%)	436157(13.46%)	269522(8.28%)	3241628
<b>Gender</b>					
Male	2735281(57.67%)	816215(17.21%)	768833(16.22%)	422601(8.91%)	4742930
Female	3511554(58.37%)	1031572(17.15%)	938340(15.60%)	533533(8.88%)	6014999
<b>Locality</b>					
Rural	5062901(57.43%)	1484973(16.84%)	1510145(17.13%)	757752(8.59%)	8815771
Urban	1182806(60.92%)	362887(18.69%)	197628(10.15%)	198838(10.24%)	1942159
<b>Education</b>					
Illiterate	478356(57.55%)	124348(14.96%)	164993(19.85%)	63587(7.65%)	831200
Primary/Middle School	3043340(57.67%)	911894(17.28%)	877064(16.62%)	445393(8.44%)	5277163
Secondary/Higher Secondary	2184776(59.55%)	631769(17.22%)	550688(15.01%)	301209(8.21%)	3668810
Graduate and above	540004(55.06%)	179773(18.33%)	114748(11.70%)	146231(14.91%)	980756
<b>Marital Status</b>					
Others	1742735(57.05%)	593325(19.43%)	450912(14.74%)	268428(8.78%)	3054400
Married	4503653(58.47%)	1254535(16.28%)	1257616(16.32%)	687726(8.93%)	7703530
<b>Religion Group</b>					
Hindu	3372378(60.05%)	883351(15.74%)	817280(14.56%)	542941(9.65%)	5615950
Christian	1515175(67.26%)	334451(14.85%)	282867(12.56%)	119649(5.33%)	2252142
Others	1360332(47.04%)	629035(21.77%)	606866(21.00%)	293605(10.19%)	2889838
<b>Social Group</b>					
ST	2339613(64.52%)	473579(13.06%)	419412(11.56%)	393578(10.87%)	3626182
SC	549887(66.58%)	149138(18.06%)	88619(10.73%)	38184(4.63%)	825828
OBC	1562728(61.21%)	408199(15.99%)	390721(15.31%)	190414(7.49%)	2552062
Others	1795125(47.82%)	816563(21.76%)	808864(21.55%)	333306(8.87%)	3753858
<b>Economic Group</b>					
Lower Middle	1522990(58.88%)	452394(17.49%)	271333(10.49%)	339874(13.13%)	2586591
Upper Middle	1033320(58.80%)	284438(16.19%)	200068(11.39%)	238874(13.62%)	1756700
Poor	3055227(55.64%)	992369(18.07%)	1162335(21.17%)	281130(5.12%)	5491061
Rich	634607(68.77%)	118860(12.87%)	73336(7.94%)	96775(10.42%)	923578

<b>Means of Livelihood</b>					
Self-employed	2902472(58.96%)	723649(14.7%)	862472(17.52%)	434189(8.82%)	4922781
Salaried/Regular wage	3343540(57.3%)	1123849(19.26%)	844929(14.48%)	522245(8.95%)	5835149

*Source: Self-elaboration of data from the NSS 79th Round on AYUSH.*

Table 2, Across age-wise distribution, the 30-44 years age group respondents took the largest position of total AYUSH users, followed by 15-29 years and 45-59 years. The share of Ayurveda utilisation holds the maximum share in North-East India. The gender wise distribution among AYUSH users exhibits a strong frequency among female respondents. Overall, 44% of total AYUSH users were male. Among female respondents, utilisation of Ayurveda (58.37%) is in significant position, followed by Homoeopathy, Naturopathy and Other systems of AYUSH medicines. This type of female-centric pattern may reflect that women are more likely to use traditional systems of medicine as a preventive and holistic healthcare system. Utilisation of AYUSH system of medicine in North-East India is more prevalent in rural (81.94%) areas. Utilisation of Ayurveda (57.43%), Homoeopathy (16.84%) and Naturopathy (17.13%) also exhibit rural dominance. It points out that AYUSH services have a strong presence beyond urban regions. Respondents with primary/middle school education took the largest share of total AYUSH users, followed by secondary/higher secondary, graduate and illiterate individuals. Ayurveda utilisation is most significant one among all educational clusters. Utilisation of AYUSH systems of medicine is more prevalent to married individuals. Individuals belonging to Hindu religious groups have captured the largest positions, followed by Others like Muslim, Jainism, Buddhism, etc, (26.86%) and Christianity (20.93%) in North-East India, who utilised more AYUSH systems of medicine. Caste group-wise distribution showed social stratification in AYUSH utilisation. Utilisation of the AYUSH systems of medicine in North-East India is more prevalent among the others group like general or unreserved people. Whereas, ST and Other Backward Classes (OBCs) people took second and third largest position in AYUSH utilisation. The significantly higher representation of Scheduled Tribes, unreserved and OBC people may represent the higher reliance on the traditional system of medicine due to geographical isolation, cultural familiarity, limited access and awareness to other biomedical services, and sociocultural beliefs. Economic stratification was based on the usual monthly household consumer expenditure, which created with quartile. Rich and poor individuals who utilise the AYUSH system of medicine are 8.58% and 51.04% respectively. Ayurveda utilisation is significantly dominant among lower and upper middle groups people. AYUSH utilisation was mainly concentrated among salaried/regular wage earner groups. Those who are self-employed and salaried/regular wage earner people constituted ayurveda dominance.

Table 3

Background Characteristics	Ayurveda Vs. Other Systems (95% CI)	Homoeopathy Vs. Other Systems (95% CI)	Naturopathy Vs. Other Systems (95% CI)
<b>Age</b>			
15-29 years (Ref)	1.000	1.000	1.000
30-44 years	1.196(0.924-1.548)	0.812(0.604-1.091)	0.882(0.647-1.202)
45-59 years	1.332(1.011-1.754) *	0.901(0.660-1.229)	0.734(0.524-1.028)
<b>Gender</b>			
Female (Ref)	1.000	1.000	1.000
Male	0.977(0.802-1.191)	1.008(0.807-1.261)	1.078(0.856-1.356)
<b>Locality</b>			
Rural (Ref)	1.000	1.000	1.000
Urban	0.886(0.721-1.089)	1.137(0.883-1.464) *	0.712(0.538-0.944) *
<b>Education</b>			
Graduate and above (Ref)	1.000	1.000	1.000
Secondary/Higher Secondary	2.096(1.530-2.872) ***	1.639(1.149-2.338) **	2.072(1.380-3.110) ***
Primary/Middle School	1.889(1.373-2.598) ***	1.480(1.035-2.116) *	1.851(1.226-2.795) **
Illiterate	2.100(1.345-3.279) ***	1.569(0.919-2.677)	2.916(1.684-5.0480) ***
<b>Marital Status</b>			
Married (Ref)	1.000	1.000	1.000
Others	1.082(0.840-1.392)	1.131(0.850-1.506)	0.878(0.643-1.199)
<b>Religion Group</b>			
Hindu (Ref)	1.000	1.000	1.000
Christianity	4.307(3.170-5.851) ***	5.396(3.857-7.548) ***	5.191(3.570-7.549) ***
Others	0.685(0.540-0.869) **	0.875(0.663-1.156)	0.739(0.552-0.990) *
<b>Social Group</b>			
ST (Ref)	1.000	1.000	1.000
SC	4.896(3.018-7.942) ***	7.944(4.715-13.380) ***	4.879(2.562-9.293) ***
OBC	2.703(2.021-3.615) ***	4.141(2.971-5.771) ***	4.058(2.807-5.866) ***
Others	2.142(1.630-2.816) ***	4.949(3.626-6.757) ***	5.402(3.798-7.684) ***

<b>Economic Group</b>			
Lower Middle (Ref)	1.000	1.000	1.000
Upper Middle	0.916(0.715-1.172) 2.399(1.884-3.054)	0.848(0.626-1.148)	1.082(0.774-1.513)
Poor	***	2.745(2.100-3.587) ***	4.984(3.734-6.654) ***
Rich	1.294(0.898-1.865)	0.799(0.522-1.221)	1.028(0.623-1.697)
<b>Means of Livelihood</b>			
Self-employed (Ref)	1.000	1.000	1.000
Salaried/Regular wage	1.049(0.868-1.268)	1.514(1.219-1.881) ***	0.936(0.748-1.172)

Note: Ref-Reference category; \*\*\* $p \leq 0.001$ , \*\* $p \leq 0.01$ , \* $p \leq 0.10$ , Number of Observations(n)=27115, Wald  $\chi^2(51) = 674.28$  prob> $\chi^2$ : 0.000, PseudoR2=0.0501; Log pseudolikelihood=-11502143.

Source: Self-elaboration of data from the NSS 79th Round on AYUSH.

Table 3, Ayurveda, Homoeopathy, Naturopathy and Other systems of AYUSH medicine were taken as outcome variables and different socioeconomic factors were taken as independent determinants. This study exhibits that substantial heterogeneity is present in the utilisation of AYUSH systems of medicine in North-East India, across age, gender, education levels, religion, means of livelihood, social and economic status, etc. Both age categories 30 to 44 years (Odds Ratio [OR]=1.196,95%CI:0.924-1.548) and 45 to 59 years (OR=1.332,95%CI:1.011-1.754) have higher odds ratios compared to younger adults to utilise Ayurveda relative to other systems of AYUSH medicines. This age continuum was not found for Homoeopathy and Naturopathy. This may be because older adults have more chronic diseases like non-communicable diseases, joint disorders, musculoskeletal pain, lifestyle-related problems, etc. Respondent may believe that treatment of these ailments strongly coincides with Ayurveda, in contrast with Homoeopathy and Naturopathy. These results are consistent with past evidence in other countries (Xin et al., 2020) that traditional, complementary and alternative systems of medicine are more commonly used by middle and older-aged persons. Females utilised more Ayurveda, than males (OR=0.977,95%CI:0.802-1.191) compared to other systems of AYUSH medicines. As such no specific differences present in Homoeopathy and Naturopathy utilisation across gender. These results may signify the feminisation of Ayurveda healthcare utilisation in North-East India. Ayurveda with comparison to other systems of AYUSH medicines, may provide more integrative, preventive and holistic healthcare systems for females. Gender specific patterns are also visible for traditional, complementary, alternative and biomedical systems care in a worldwide pattern (Ampomah et al., 2022; Gyasi et al., 2018). Those who live in rural areas exhibited higher odds of using Ayurveda and Naturopathy compared to other systems of AYUSH medicines than urban regions in North-East India. People who live in urban area, utilised more Homoeopathy system of healthcare in North-East India. These differences between rural and urban-centric utilisation may be because of more sociocultural beliefs in Ayurveda and

Naturopathy in remote areas. The education gradient signifies a strong association with AYUSH utilisation across all systems in North-East India. In comparison to graduate respondent, those who are primary, secondary and illiterate standard educated utilised nearly 2 times as much Ayurveda and Naturopathy as other systems of AYUSH medicines. In Homoeopathy utilisation, those who are illiterate, and primarily to secondary standard educated are utilised nearly 1.5 times more than the graduate respondents. Education increases the ability to choose and judge different types of healthcare utilisation. Maybe because of this, those who are higher educated respondents have higher health literacy, awareness, and significant access towards the different bio-medical systems of medicine, compared to the AYUSH healthcare systems medicine. Notably, the utilisation of Ayurveda, Homoeopathy and Naturopathy Vs. Other systems of AYUSH medicines of the highest educated respondents in terms of odds ratio decreases, may be because these individuals utilise the mentioned healthcare systems as a complementary rather than primary healthcare option. Respondents who are single, widowed or non-married showed higher odds for Ayurveda and Homoeopathy utilisation compared to Other AYUSH systems and slightly lower odds for Naturopathy. Religion emerged as one of the important factors of socioeconomic variables. Christian had higher odds of using Ayurveda (OR=4.307, 95% CI:3.170-5.851), Homoeopathy (OR=5.396,95% CI:0.3.857-7.548) and Naturopathy (OR=5.191,95%CI:3.570-7.549) compared to Hindus. The very high odds for Ayurveda, Homoeopathy and Naturopathy utilisation among Christianity may signify community-level beliefs, practices and reliance on this. Scheduled Caste, Other Backwards Class (OBC) and others groups exhibit higher odds of using Ayurveda, Homoeopathy and Naturopathy utilisation. This may reflect lower cost barriers, higher availability, perceived safety and more awareness of the mentioned category. Economic status exhibited heterogeneous associations with AYUSH utilisation in terms of Ayurveda, Homoeopathy and Naturopathy in North-East India. Respondents from poor groups had higher odds of utilising mentioned healthcare systems than other group of respondents. Across the means of livelihood groups, those who are salaried or regular wage earners held higher odds in utilisation of Ayurveda and Homoeopathy systems of medicine. This may point out that more reliance to these healthcare systems than self-employed individuals.

## **Conclusion**

This study showed the utilisation patterns of different types of AYUSH systems of medicine in the North-Eastern region of India. By applying a multinomial logistic regression framework, the findings exhibit that utilisation of different types of AYUSH systems of medicine has heterogeneity in nature across socioeconomic and demographic characteristics in the North-Eastern region. Utilisation of Ayurveda took the highest position within this system. In the policy-oriented framework, concerned authorities should take some initiative to develop a greater

number of Homoeopathy, Naturopathy, Unani, Siddha centres in this region and recruit more trained Homoeopathy, Naturopathy, Unani, Siddha practitioners in these centres through incentives and proper career pathways. Middle-aged adults were more utilised in Ayurveda. In difference, other age groups were not used as much as Homoeopathy and Naturopathy type systems. It may happen because of a lack of awareness and availability of these systems. Those who are rural residents are utilising more Ayurveda and Naturopathy AYUSH systems. The concerned authority may take some policy measures on this in urban area. In education perspectives, those who are higher educated utilise low, all kinds of AYUSH systems. The concerned authority may provide some health literacy and awareness programmes with Accredited Social Health Activists (ASHA) workers to enhance these types of healthcare utilisation among higher educated strata. Those who are in scheduled class group are utilised less Ayurveda, Homoeopathy and Naturopathy systems. From a policy-oriented point of view, concerned authorities may initiate some community-based health insurance policy for better utilisation of AYUSH systems. Those who are in self-employed group utilise less Ayurveda, Homoeopathy healthcare services than salaried/regular wage earners. The concerned authority may take some action on it. In conclusion, AYUSH systems take an important role in India's healthcare system. Utilisation of AYUSH in North-East India is structured by the socioeconomic factors and demographic contexts. Mentioned policy framework, aimed at strengthening AYUSH utilisation in North-East India on empirical evidence.

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