

## Cultural Affinity and Preferences for Traditional Medicine and Its Providers over Modern Healthcare Services in Nagaland, India

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**Abstract:** In an era where both modern healthcare and traditional medicines co-existed, it is inevitable to examine the collective preference, cultural affinity, and sustainability of indigenous traditional medicine as supplementary healthcare under Universal health coverage (UHC) to meet Sustainable Development Goal 3. The study is based on primary data collected from 540 households in Dimapur district, Nagaland, and analysed using univariate, bivariate and generalised ordered logit model. Results indicate that one important reason cited for preferring indigenous traditional medicine is its popularity and affinity with the community. Nearly one-third of respondents had recourses from modern private healthcare to traditional medicine. Among indigenous medicine users, about half used it as first preference. Multivariate analysis indicates that duration of sickness, suffering from other conditions/disability and cultural affinity as strong predictors for availing traditional medicine as first preference. Higher education and older age groups are more likely to prefer indigenous traditional medicine as their second preference. Studies also show that in areas predominated by indigenous communities, particularly in developing countries, traditional medicine continues to make significant impact in healthcare. National and state health policy must recognise and engage traditional healthcare providers to minimise inequality and gap, resources deficit for Universal health coverage, which is also crucial for its sustainability.

**Keywords:** Cultural affinity, Indigenous traditional medicine, Preferences, Recourse, Universal health coverage.

### Introduction

Ethno-botany deals with medicines derived from plants and their usage for the treatment of various diseases and ailments, which is based on indigenous knowledge and folklore. Since time immemorial, dating from around 2500 BCE in Mesopotamia and before 5000 years in India (Adhikari and Paul, 2018), traditional medicine has been practised, and it is a form of structured method of healing various diseases by using various herbs and through this method other forms of medicine have been developed. Traditional medicine largely relies on medicinal plants for drugs and the concoctions used by mixing various medicinal plants. These different forms and practices of traditional medicines have been collectively referred to as 'traditional and complementary medicines' (T&CM). As T&CM been observed and widely used in many countries, its relevance in healthcare further enhanced by the universal health coverage (UHC) policy. By the second half of the twentieth century, across the world, the use of T&CM has been estimated to be very high, despite some studies disputing such claim. Studies in developing nations, particularly in Asia and Africa, observed that between 70% - 90% of the developing countries use traditional medicine,

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which includes herbal medicines for health care (Robinson and Zhang, 2011). A study pointed out that such estimated proportion of users was way too high, but the fact remains that there has been an increase in its use in many countries, even for treatment of non-communicable diseases (Oyebode *et al.*, 2016). A very recent report of the WHO noted that "88% Member States have acknowledged their use of T&CM. These are the countries that have, for example, formally developed policies, laws, regulations, programmes and offices for T&CM, and the actual number of countries using T&CM is likely to be even higher". It further stated that "By 2018, a total of 98 countries [25 countries in 1999], more than 50% of the 194 Member States, had a national policy on T&CM" (WHO, 2019). Studies show that demand for traditional medicine is prevalent both in developing and developed countries and it has been growing exponentially where the market for herbal medicine was estimated to have reached \$83 billion in 2008 (Robinson and Zhang, 2011; Rivera *et al.*, 2013), and is expected to grow exponentially up to \$5 trillion by 2050 (Aneesh *et al.*, 2009).

### ***Tradition of medicinal plants in Nagaland: knowledge and usage***

Nagaland has 11 districts and a population of 19,80,602 according to Census 2011. The state is endowed with a variety of natural vegetation including various medicinal plants (found only in the state), as it lies within temperate humid climate (as classified by Thornwaite in 1948), in the 'very heavy rainfall zone' of the 'North Eastern Range' (along with Manipur, Meghalaya, Mizoram, and Tripura). This zone has an altitude ranging from 300-1500 meters above mean sea level.

The Nagas since time immemorial, have known the use of medicinal herbs for various purposes either for consumption or healthcare purposes, and certain areas were also identified with specific flowers or plants with medicinal value. For instance, Khonoma village (Kohima district) has been known for the availability of such invaluable medicinal plants as *Panax quinquefolium*, *Paris Polyphylla*, and *Potentilla fulgens* and these plants were used by the indigenous people for curing various diseases such as cancer, diabetes, stomachache and toothache (Chase and Singh, 2013). Besides, in Nagaland, the orchid flower has been cultivated by many households in their gardens for beautification, and as many as 15 species of orchid used for medicinal purposes. The orchids have been used for the treatment of diseases such as rheumatism, cholera, nervous disorder, tuberculosis, etc., and also as antibacterial agent and antidotes to snake and insect bites (Deb *et al.*, 2009).

Different tribes used the local herbs concoctions for the treatment of different diseases in their ways. Studies have observed that the Angami, Sumi, Lotha and Zeliang tribes used *ananas comosus* (Linnaeus) Merrill, *Averrhoa carambola* Linnaeus, *Saccharum officinarum* Linnaeus and *Syzygium cumini* (Linnaeus) Skeels for the treatment of jaundice disease (Singh *et al.*, 2015), and among the local healers of Ao, Sema, Angami and Lotha tribes use plants like *Erythrina stricta* R., *Embllica Officinalis* G, *Litsea citrate* BI, *Bauhinia variegata* L., *Acacia pinnata* L. Willd, *Alstonia scholaris* L. Br., *Carica papaya* L. etc. for treatment of various diseases (Bhuyan, Meyiwapangla and Laskar, 2014). Similarly, the Chakhesang tribe in Phek district used leaf extract of *Oxalis corniculata* against seven major diseases (Bharali *et al.*, 2017) and the Mao tribe used *Crassocephalum crepidiodes* and *Hibiscus subdariffa* for treating cuts and wounds and the tonic as an appetiser, to treat fever and headache the fruit of *Rhus semialata* is used (Lokho, 2012), and the root and stem of *Alnus nepalensis* considered a potent for treating diarrhoea, dysentery and

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stomach related problems (Jamir, Lanusunep and Pongener, 2012). The Zeliang tribe also identified about 35 species which were consumed regularly as food items belonging to 26 different families of Angiosperms (a flowering, fruit-bearing plant or tree). The most commonly used species are *Asteraceae*, *Lamiaceae*, *Liliaceae* and *Zingiberaceae*. Almost all the species were used for daily consumption and treatment of various diseases or conditions like indigestion, dysentery, diarrhoea, morning sickness, tonsils, cough, cold, nausea, abnormal menstrual cycle, kidney stones, hepatopathy, paralysis, mosquito repellent, tonic, etc. (Singh, Gajurel and Rethy, 2015). Thus, in Nagaland, the state government has identified 650 indigenous medicinal plants that could be cultivated and processed (SMES, 2015)

### ***Decision-making and preference for healthcare***

Many countries or regions have developed their ways of healing (and treatment) using indigenous traditional medicine which is firmly rooted in culture and history. In an era where both modern and traditional health care co-exists, understanding the demand for particular health care becomes important and the demand for a particular health care services can be understood better, say by measuring the number of visits to such health facility. The demand for particular healthcare also depends on the trust and value attached to that healthcare service, convenience, price of alternative healthcare services, household income and preference.

Health economists have often analysed the demand for health care in several ways. One way is to treat health as one of the several commodities over which individuals have well-defined preferences and investigate the determinants of health. Another way is analysing health care choices as an inter-temporal model of consumption decisions and treating health as a stock variable within a human capital framework. A model in which individuals consume healthcare not because they value health *per se*, but because it improves their stock of health, which is used as a productive resource (Grossman, 1972). A study extended Grossman's model to account for the disutility that illness may impose on individuals and thus examined the differences in demand for preventive and curative care and the dynamics of demand over the life cycle (Cropper, 1977). Patient's decision-making on healthcare is complex and important as the patients make conscious and rational choices given the availability of healthcare facilities. Among the three elementary components in decision making, exploring phase is crucial, and the decision an individual made is more of an emotional rather than rational (Wolfs *et al.*, 2012), Individual preference for any particular healthcare depends on the health condition as well as the experience they got from the previous treatment (Gerard and Lattimer, 2004). Health economists assume that individual prefers a particular health programme depending on the satisfaction (utility) or less dissatisfaction (disutility) from it.

An individual or household demand for healthcare may depend basically on their income, as the richer households afford better healthcare facilities. A study pointed out that price elasticity was income sensitive, indicating that the poor are more price sensitive (Gupta & Dasgupta, 2002). More than 75 per cent of the population preferred to go to non-degree allopathic practitioners and also traditional healers for the first contact because of lower fees, made house calls to patients who are all-in-one 'quick service' (Gautham *et al.*, 2011). Thus, the cost of user fee not only decreased utilisation of health services but also reinforced health and gender inequality (Johnson *et al.*, 2012). However, despite the prominent role of income, there are also other factors found influencing preference and demand for healthcare.

Some studies consider ethnic or cultural affinity as equally important. Although household income determines demanding the type of healthcare, yet there are other factors such as tribal culture, which contributes in demanding for the type of healthcare as more than one-third of the respondents took traditional healers as recourse (Vijayakumar *et al.*, 2009). Thus, consumer's decision-making in healthcare depends on many factors given a range of choices. Traditional economic theory often assumes that the consumer rationally makes the decision, given a range of choices and information. At the same time, behavioural economists and psychologists acknowledge that consumer often do not act rationally as in habits and often other tendencies underlie the decision-making (Rice, 2013).

Given various health services that differ in terms of process and outcome attributes (such as efficacy, administration and risk of adverse events), individuals tend to choose the best alternative that provides the highest utility. The choice decision for alternative healthcare reveals the underlying utility or value they associate with healthcare. Therefore, keeping in view the usage of traditional medicine and how the culture can affect the choice of healthcare based on their utility, this study intends to understand the determinants of ordered preferences for using traditional medicine and its providers, as alternative healthcare in which both modern allopathic and traditional medicine co-existed.

Concepts and definitions used in the study:

*"Traditional medicine is the sum total of knowledge, skill, and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness" (WHO, 2013).*

*"Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products that contain, as active ingredients, parts of plants, other plant materials or combinations thereof. In some countries, herbal medicines may contain, by tradition, natural organic or inorganic active ingredients that are not of plant origin (e.g. animal and mineral materials)" (WHO, 2019).*

*"Indigenous traditional medicine" defined as the sum total of knowledge and practices, whether explicable or not, used in diagnosing, preventing or eliminating physical, mental and social diseases. This knowledge or practice may rely exclusively on past experience and observation handed down orally or in writing from generation to generation" (WHO, 2019).*

## **Data and methods**

The study is based on primary data collected from Dimapur district, in the state of Nagaland, Northeast India during March-July 2014. Of the 11 districts in Nagaland, Dimapur has been selected purposively as it is the most populous district, with a share of about 19% of the total population, and a decadal growth rate of 23.2% (the highest in Nagaland). The district has an area of 927 km<sup>2</sup>, with the highest density of population of 410 per km<sup>2</sup> (Census 2011). The traditional healers are locally called as '*kaviraj*', and these health providers are very well-known and even consulted for treatment of acute and chronic illnesses. The district is also one of the most urbanised and the headquarter Dimapur is inhabited by diverse tribes from different villages and towns across Nagaland. Most of the people had come and settled mainly for business, education and job opportunities. Despite being known as the commercial hub for Nagaland, yet it is also known for the use of traditional medicines/providers in the state. A stratified random sampling technique has

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been applied to select the households. As the study is based on four tribes such as Ao, Sema, Angami and Lotha, in Dimapur district, the population was subdivided into strata of these four tribes after which randomly 10 villages were selected from the strata. The selection of households from the selected villages was done according to population proportionate to size (PPS) method. One important issue in any scientific study is deriving appropriate sample size, and in this case, also, we ensured sufficient coverage and validity of the issues proposed, by doing mapping and listing of households in the study area (the sampling frame). Information on the utilisation of traditional medicine or healers by households both for minor and major ailments at the district level is taken from the concurrent evaluation of NRHM (CE-NRHM) conducted in 2009 (IIPS, 2011). The results of CE-NRHM survey on the prevalence of use of traditional health care providers (all medicines/other than Allopathy) by households has been taken as the basis for determining sample size. According to CE-NRHM, households using traditional medicine (all medicines other than Allopathy) for both major and minor ailments were 30.8% (IIPS, 2011). To determine the sample size following formula has been used (Cochran, 1977; Daniel, 2012).

$$n = \frac{z^2 pq}{e^2}$$

The formula is further modified and extended to include the likely design effect (Deff) and non-response (R), as below:

$$n = \frac{z^2 * pq * (1 + R) * Deff}{e^2}$$

Once a targeted sample size has been determined either by "rules of thumb" or statistical formulae, further adjustments are made. Where relevant, adjustments should be made for both non-response and design effect. The sample size should be adjusted for anticipated non-response (Daniel, 2012). For the adjustment of the design effect on the sample size, the calculated sample size can be multiplied by the design effect to obtain the adjusted sample size (Lohr, 2010). Therefore, with the inclusion of design effect (1.5) and non-response rate (10%), the final sample size derived is  $n = 540.4$ . The study finally selected 540 households, after doing a systematic mapping and listing exercise in the study area. These 540 households consisting of 382 eligible respondents, i.e., households with at least one member treated or used traditional medicine. In case a household has more than one eligible respondent, the person who had the most recent (last) treatment was considered. Information on health care services of both modern and traditional providers was collected in such that who had availed of health care in the last 15 days for communicable diseases and in the last 30 days for non-communicable diseases.

For data collection, a structured interview schedule was used, and information collected from any household member who had fallen sick and took treatment. The questions asked include the experience of illnesses, health-seeking behaviours, perception towards the sickness/illness, the decision on health care utilisation, financing of health care services, satisfaction on health care services, attitude towards traditional practitioner and self-assessment of use of traditional provider/medicine and also own health status, etc. The classification of diseases was done based on the NSSO survey that used the classification based on ICD-9 (Engelgau *et al.*, 2012). Apart from this classification done by the earlier research studies, another category was grouped as 'others' during the time of data collection.

### ***Variables used in the analysis***

#### *Dependent variable*

- Preferences for indigenous traditional medicine were categorised as - First preference, second preference or higher, and No preference for indigenous traditional medicine/providers.

#### *Independent variables*

Age: <15, 15-25, 26-39, 40-59 and 60+

Sex: Male, Female

Education: No formal education, middle school, high school, secondary and above

Duration of sickness: less than 3 months, one-three years, more than 3 years

The severity of disease: Mild, Severe and very severe

*(This variable is based on the respondent's self-assessment of the severity of disease)*

Type of disease: Communicable, Non-communicable, other condition/disability and others

Cultural affinity: High, Medium, Low

Wealth index: Poor, Middle, Rich

*(The wealth index variable was created using Principal Component Analysis)*

Tribe: Ao, Angami, Sema and Lotha.

Regarding utilisation of traditional medicine/provider, a cultural affinity index has been constructed and used as a proxy for beliefs and attitudes, as similarly done by Sato and Costa-i-Font (2012). It is constructed based on the level of agreement of TM/P and its efficacy. A five-point Likert scale (from '1' to '5') has been used, ranging from strongly agree, agree, neutral, disagree, strongly disagree, based on nine questions. The statements include: (1) Traditional provider (TP) gives good service; (2) TP knows good knowledge about topics the doctors do not know about; (3) Have trust on TP/M; (4) Some of the diseases can be cured only by TP; (5) Traditional medicine (TM) are safer than allopathic medicine; (6) TM can be used at home without needing to go to TP; (7) TP/M provides increased sense of control and participation on the management of the disease; (8) TM has been used widely used by my tribe as well as accepted, and (9) TP/M are well accepted in the state. Factor analysis was applied to derive the cultural affinity index, and Cronbach alpha used to test the consistency of the variables.

### ***Methods applied***

Univariate, bivariate, and Generalized ordered logit model were applied in analysing the data.

*Univariate analysis:* Used to understand the frequencies of decision in choosing indigenous traditional medicine, the reason for choosing indigenous traditional medicine, recourses and preferences for indigenous traditional medicine

*Bivariate analysis:* Used to understand and capture the distribution of preference for indigenous traditional medicine by background characteristics.

*Generalised ordered logit model:* To analyse the use of indigenous traditional medicine by background characteristics, the study used generalised ordered logit model (gologit2) model which is one of the appropriate tools for analysing the association between ordinal dependent and independent variables. The gologit2 is the backward compatible with Vincent Fu's original gologit.

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There are some special cases of gologit2 model, which can be used under certain conditions. The parallel line model estimated by ologit (Ordered Logistic regression) is also a special case of the gologit2 model. The Brant and Omodel test is used to check for the violation of the parallel line assumption. In this study, the assumption of the parallel line model is violated, which was tested using both the tests, i.e. Omodel and Brant; therefore gologit2 model is used. "A major strength of gologit2 is that it can also fit three special cases of the generalised model: the proportional odds/parallel-lines model, the partial proportional odds model, and the logistic regression model. Hence, gologit2 can fit models that are less restrictive than the parallel-lines models fitted by ologit (whose assumptions are often violated) but more parsimonious and interpretable than those fitted by a non-ordinal method, such as multinomial logistic regression (i.e. mlogit). A key enhancement of gologit2 is that it allows some of the  $\beta$  coefficients to be same for all values of  $j$ , while others can differ, i.e. it can estimate partial proportional odds model. In the following expression, the  $\beta$ 's for  $X_1$  and  $X_2$  are the same for all values of  $j$ , but the  $\beta$ 's for  $X_3$  is free to differ" (Williams. R. 2006)

$$P(Y_i > j) = \frac{\exp(\alpha_j X_{1i} \beta_1 + X_{2i} \beta_2 + X_{3i} \beta_{3j})}{1 + \{\exp(\alpha_j + X_{1i} \beta_1 + X_{2i} \beta_2 + X_{3i} \beta_{3j})\}}, j = 1, 2, \dots, M - 1$$

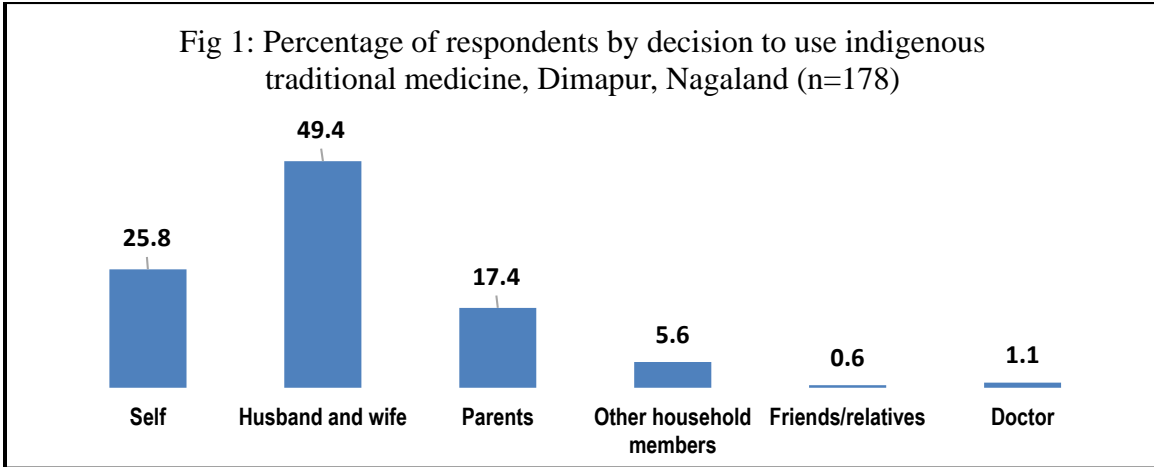
The data entry was done using *CSPPro 6.1*, and data analyses were done in *STATA 13*.

### Results

Close to three-fourths of the study households (71 per cent) reported using a healthcare service to treat a member of the household for any illness (both acute and chronic diseases) prior to the interview and survey. About 47 per cent of the households used traditional medicine/providers, and among this, half of the households (89 households) used traditional medicine as their first preference. In all, more than one-third of the households (34.3 per cent) surveyed had recourse the health care for treatment. The analysis is based on 382 households (71 percent) who had used a healthcare service both the traditional and modern health care but particularly focusing on the 178 households who used indigenous traditional medicine on issues related to the decision-making, preference ordering of the health care and reasons for their preference for healthcare.

#### *Using traditional medicine/providers: decision-makers*

The findings indicate that in the study population, there are at least five categories of decision-makers in respect of the choice or preference for healthcare (Fig.1). However, the dominant decision takers in a household to use indigenous traditional medicine is jointly made by both husband and wife (49 percent), followed by self (individual) (26 percent). It is also found that not only are the other members or friends/relatives involved in decision making, but even medical doctors also recommend or refer people to avail traditional indigenous providers for the treatment of illnesses.



**Exploring community attitudes toward indigenous traditional medicine/providers: affinity**

To understand better the attitudes and affinity people may have for traditional medicine in the study area, a cultural affinity index (local sentiments) has been constructed based on nine statements from community perspective covering various dimensions related to traditional medicine by applying factor analysis, Likert scaling, and testing consistency of variables (Cronbach alpha). The results of factor loadings for nine indices of cultural affinity index (as a proxy for the attitude towards the traditional practitioners) and the overall strength (*alpha*) value are presented in Table 1. The factor loadings values indicate the highest for 'trust on traditional practitioner' (0.86), followed by 'traditional practitioner have good knowledge about disease' (0.83), 'disease cured by TP/M' and 'TP/M gives good service' (both with 0.79), and 'TM can be used at home' (0.63). Overall, the Cronbach's alpha shows a value of 0.88, which is quite high and reflects the consistency of the selected variables to construct the index for culture.

Table 1: Results of factor loadings and Cronbach's alpha for indices of cultural affinity (attitudes) towards traditional providers in the sampled area, Dimapur, Nagaland (n=382)

Variable	Value
TP/M gives good service	0.790
TP/M have good knowledge about disease	0.829
Trust on TP/M	0.862
Disease cured by TP/M	0.792
Safer to use TP/M	0.574
TM can be used at home	0.627
TP/M are good management of disease	0.616
TP/M are used widely by own tribe	0.460
TP/M are used widely within Nagaland	0.424
<b>Cronbach's alpha</b>	<b>0.876</b>

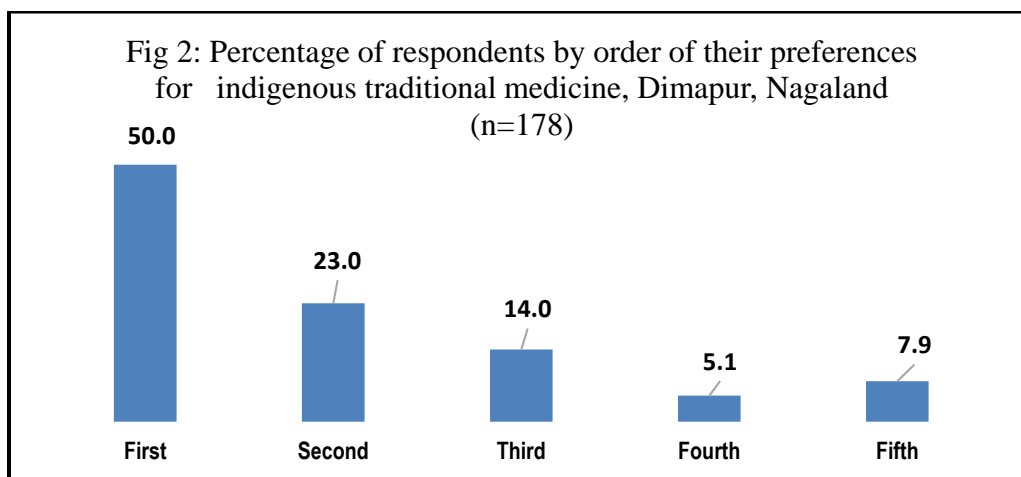
**Preference for indigenous traditional medicine: ordering, factors, differentials**

From the information collected, it is also possible to quantify the order (ranking) of their preferences, once a decision has been taken on using traditional medicine for the treatment of diseases. Figure 2. presents the distribution of the order of preferences for indigenous traditional medicine, and evident that half of them chose indigenous traditional medicine as their first preference for treatment. Another 23 percent responded that it was their second preference, followed by 14 percent as their third preference. Interestingly, the proportion that placed traditional



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medicine as their fifth choice (8%) is much higher than those who considered it as their fourth preference (5%). The analysis unveils the dynamism involved in households' decision-making for the right kind of healthcare, as respondents can also change their healthcare preference many times during treatment. Thus, the favouring of indigenous traditional medicine over modern healthcare will depend on many factors, including the role of satisfaction of traditional practitioners in delivering healthcare services.



Ordering of preferences for traditional medicine varies widely across the socio-economic and other characteristics of the people in the study area. As shown in Table 2, the differential is observed prominently across age, sex, education, duration of sickness, severity or type of illness/disease, tribe, etc. Overall, the use of traditional medicine for the treatment of any illness or disease is about 47 percent of the study households. The household population most likely to consider traditional medicine as their first preference are those in the age group 26-39 years (28 percent), while the larger proportion (35 percent) of older age group (60+) prefer it as their second or third choice. In contrast, most (71 percent) of the younger age group (<15 years) did not prefer traditional medicine at all. Compared to men, female shows marginally higher first preference for traditional medicine.

Similarly, those with higher education show lesser demand for traditional medicine as 59 percent of secondary and higher education never availed indigenous traditional medicine, while about 19 percent of those with no formal schooling use it as a first preference but as their second preference (30 percent). The other group of people likely to opt for traditional medicine as their first preference are with shorter duration (less than 3 months) and with mild or severe sickness (26-28 percent) but more likely as second+ preference, so is with the seriousness of the illness. Interestingly, a higher proportion of those suffering from non-communicable diseases (60 percent) would first prefer traditional medicine, but the situation is different in case of those with communicable diseases, as about two-thirds preferred allopathic medicine. Even in the case of other conditions (disability, etc.), about 91 percent would avail only allopathic medicine. People with a cultural affinity towards the indigenous traditional medicine plays a huge role in availing this type of healthcare, as it is evident that about 70 percent of the respondent had to use indigenous traditional medicine either as a first and second or more preference. But those whose cultural affinity towards indigenous traditional medicine is low, only about 28 percent had availed them. Again, placing indigenous traditional medicine as a second+ preference is highest among the

poorer households, but as a first preference found higher among those belonging to middle wealth index. Among the ethnic communities, Ao and Angami tribes show higher preference and utilisation of indigenous traditional medicine as a first preference (24 and 33 percent respectively) than other tribes and lowest among Lotha tribe (16 percent).

Table 2: Percentage showing preference ordering by selected background characteristics of respondents, Dimapur, Nagaland

Characteristics	First preference	Second + preference	No preference	n
<b>Age</b>				
<15	18.0	11.5	70.5	61
15-25	30.2	16.3	53.5	43
26-39	27.6	25.3	47.1	87
40-59	25.0	24.2	50.8	128
60+	14.3	34.9	50.8	63
<b>Sex</b>				
Male	22.7	25.0	52.3	176
Female	23.8	21.8	54.4	206
<b>Education</b>				
No formal education	19.2	29.8	51.1	47
Middle school	23.0	21.3	55.7	122
High School	27.5	23.2	49.3	138
Secondary and above	18.7	22.7	58.7	75
<b>Duration of sickness</b>				
Less than 3 months	27.8	12.8	59.4	180
One- three years	19.1	22.1	58.8	68
More than 3 years	19.4	38.1	42.5	134
<b>Severity of disease</b>				
Mild	26.7	22.6	50.7	146
Severe	25.6	19.2	55.1	156
Very severe	12.5	32.5	55.0	80
<b>Type of disease</b>				
Communicable	23.8	17.5	58.7	126
Non-communicable	28.4	31.3	40.3	134
Other condition/disability#	4.4	4.4	91.3	46
Others##	25.0	30.3	44.7	76
<b>Cultural affinity</b>				
High	40.3	30.2	29.5	129
Medium	19.1	21.4	59.5	126
Low	10.2	18.1	71.7	127
<b>Wealth index</b>				
Poor	20.0	27.0	53.0	115
Middle	27.4	19.4	53.2	124
Rich	22.4	23.8	53.9	143
<b>Tribe</b>				
Ao	23.8	33.7	42.6	101
Angami	33.0	22.7	44.3	97
Sema	19.8	18.7	61.5	91
Lotha	16.1	17.2	66.7	93
<b>Total</b>	<b>23.2</b>	<b>23.2</b>	<b>53.4</b>	<b>382</b>

Note: # Eye ailments (cataract, glaucoma, conjunctivitis), diseases of the mouth, teeth and gum, other undiagnosed ailments; ## intestinal, piles, appendix, liver, ureteral obstruction, sinus, spinal arteriovenous malformation (AVM), swelling of legs, nerve, food poisoning, chest problem, sterilisation, lung infection, ringworm, sprain of legs, infertility, breathing problem, weakness, stomach problem

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Preferential for traditional medicine as better healthcare by the people is also examined within their sub-groups to realise the effect as well as association using the Generalised ordered logit model (gologit2). Here, the dependent variable considered is the preference ordering of the healthcare, i.e., First preference, Second+ preference, and Not using indigenous traditional medicine (Table 3). For analysis purpose, the last category, i.e. not using indigenous traditional medicine is taken as the reference category. From the analysis, it is evident that age is an important factor - higher the age of the respondents, more likely to use indigenous traditional medicine as the second+ preference. Similarly, higher education also indicates more likely to use indigenous traditional medicine as the second+ preference, as they prefer modern medicine as the first preference. Also observed is the duration of sickness as a strong predictor for preference ordering of indigenous traditional medicine - like the duration of sickness increases, they are more likely to use indigenous traditional medicine as a first preference. Respondents who have a low cultural affinity towards the traditional practitioners are less likely to use indigenous traditional medicine compared to those who showed higher affinity. Again, among those who suffer from other condition/disability (other than acute or chronic) are less likely to use traditional indigenous medicine and among those households belonging to middle wealth index, they are more likely to use indigenous traditional medicine as a first preference. (Table 3).

### ***Users' first preference of indigenous traditional medicine: reasons***

All the households that reported using indigenous traditional medicine as their first preference for treatment of any member, additional information sought were the main reason(s) for so-preferring that healthcare as the first option. As presented in Figure 3, at least five (5) key reasons for the first option were given, ranging from distance to facility, popularity, economic, trust, etc. Among these reasons, the most mentioned reason is that the healthcare is 'very popular', by nearly two-fifths of the respondents (39.3 percent), followed by 'trust' (25 percent) and 'knows somebody who got cured' (23 percent). It is important to recognise the top three reasons specified that influenced their use of the healthcare as first option/preference; none relates to economic factors. The fact that most people chose indigenous traditional medicines over its modern counterpart for reasons other than economic is very expressive and significant. Therefore, satisfaction (utility) derived by the people from healthcare need not be necessarily 'economic' factors, but rather elements associated to psychological or cultural (affinity) aspects (as 'popularity' 'trust' or 'knows someone got cured').

### ***Changing the use of healthcare providers: recourse***

Another dimension that emerges related to the use of healthcare, particularly as recourse to indigenous traditional medicine, by people in the study area is the changing of providers for the treatment of the same illness. Despite a decision been taken to avail particular healthcare for treatment, during the illness episode people also change or shift to other healthcare for the treatment of the same illness. As shown in Fig. 4, there could be a combination of nine such shifting (five related to traditional provider) reported during treatment involving the three types of healthcare providers, i.e., traditional, public, and private providers. It is evident that the recourses in provider are indicated even among those who had first availed of modern healthcare. The highest proportion of change of healthcare provider reported is from private to private healthcare, and from private to indigenous traditional medicine (28 percent respectively). Although much smaller in proportion, even there is a change of provider from public healthcare to indigenous traditional

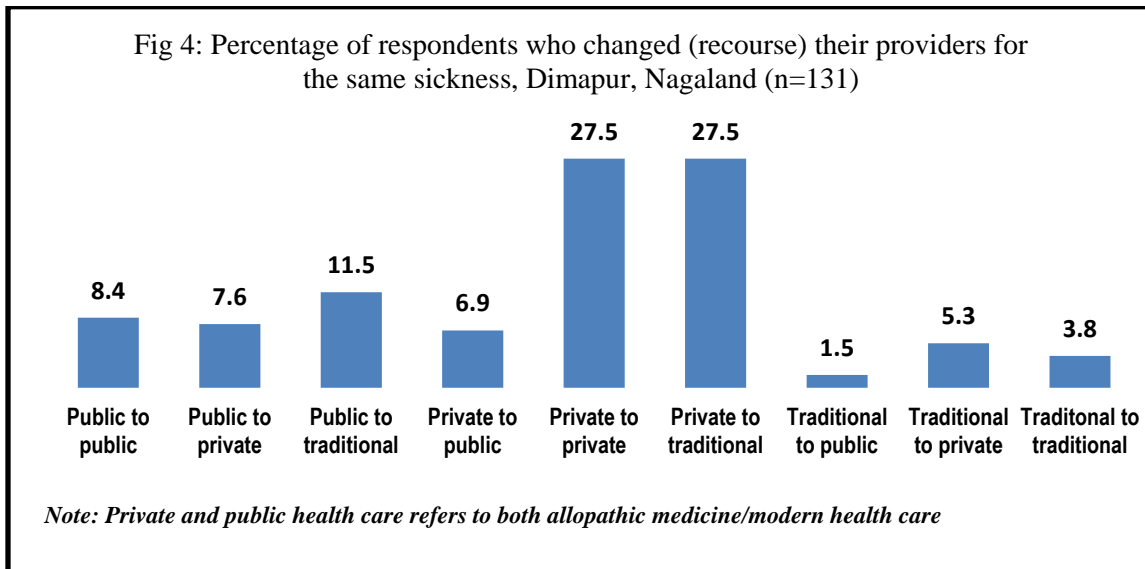
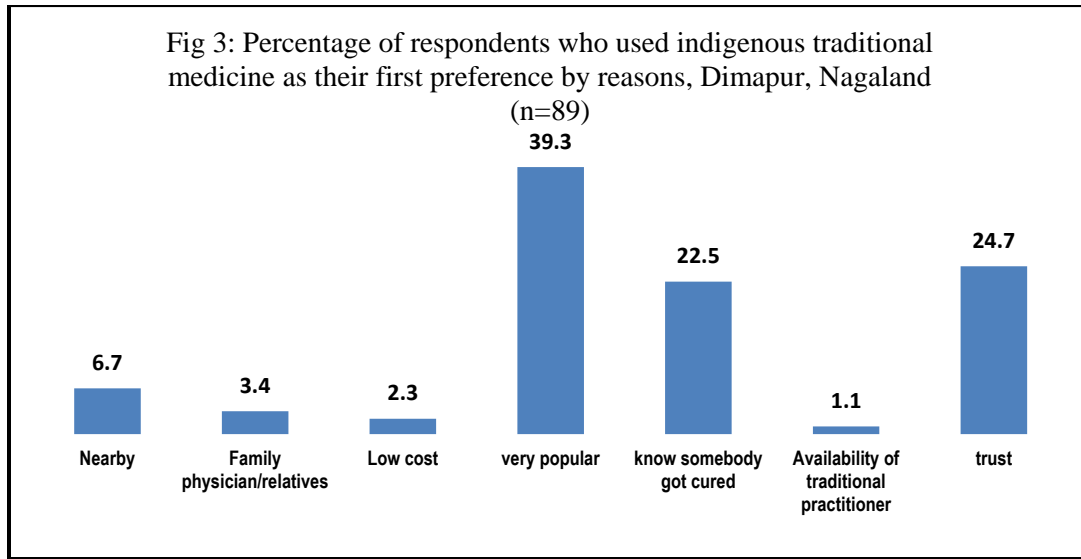
medicine (12 percent), and between one provider of indigenous traditional medicine to another indigenous traditional medicine.

Table 3: Results of generalised ordered logit model indicating preference ordering for traditional medicine by respondents, Dimapur, Nagaland

Characteristics	First preference		Second + preference	
	Coef.	P> z	Coef.	P> z
<b>Age</b>				
<15®				
15-25	-0.872	0.204	-1.677	0.005
26-39	-0.502	0.416	-1.466	0.004
40-59	-0.686	0.239	-0.910	0.062
60+	-0.080	0.905	-0.259	0.625
<b>Sex</b>				
Male®				
Female	-0.130	0.675	0.215	0.405
<b>Education</b>				
No formal education®				
Middle school	-0.573	0.307	1.149	0.009
High School	-0.833	0.179	1.207	0.013
Secondary and above	-0.608	0.388	1.791	0.001
<b>Duration of sickness</b>				
Less than 3 months®				
One- three years	1.172	0.012	0.266	0.481
More than 3 years	1.319	0.001	-0.493	0.137
<b>Severity of disease</b>				
Mild®				
Severe	-0.179	0.596	0.404	0.174
Very severe	0.724	0.123	0.224	0.528
<b>Type of disease</b>				
Communicable®				
Non-communicable	0.063	0.865	-0.469	0.138
Other condition/ disability#	0.100	0.914	2.239	0.000
Others##	0.360	0.382	-0.159	0.648
<b>Cultural affinity</b>				
High®				
Medium	1.552	0.000	1.247	0.000
Low	2.242	0.000	1.856	0.000
<b>Wealth index</b>				
Poor®				
Middle	-0.916	0.018	0.008	0.980
Rich	-0.163	0.667	0.182	0.566
<b>Tribe</b>				
Ao®				
Angami	-0.149	0.702	-0.154	0.673
Sema	-0.223	0.611	0.592	0.104
Lotha	-0.134	0.779	0.458	0.216

Note: ® Reference category; # Eye ailments (cataract, glaucoma, conjunctivitis), diseases of the mouth, teeth and gum, other undiagnosed ailments; ## intestinal, piles, appendix, liver, ureteral obstruction, sinus, spinal arteriovenous malformation (AVM), swelling of legs, nerve, food poisoning, chest problem, sterilisation, lung infection, ringworm, sprain of legs, infertility, breathing problem, weakness, stomach problem

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**Discussion**

The sustainable development goal 3 is to ensure healthy lives and promote well-being for all at all ages. It also stresses on the access to affordable and essential medicines to all. This goal could remain a distant dream even beyond the 2030 deadline for SDGs, as in many developing countries and its rural areas healthcare is yet to be accessible and affordable. In order to overcome such inequality and ensure good health and affordable medicine under Universal health coverage (UHC), traditional medicine fits the gap with proper policy, along with modern medicine. Globally 80% of the population relies on traditional medicine both directly or indirectly for health care (UNDP, 2016). World Health Organization (WHO) also stresses on the importance of indigenous traditional medicine and emphasises on universal health coverage by integrating T&CM services into health care service delivery and self-health care (WHO, 2019). The most disadvantage group in the society is the poor households, found both in urban and rural areas. The Indian Government

also set up AYUSH department as it understands the high usage of indigenous traditional medicine in the country. After the realisation of the importance of indigenous traditional medicine, an effort has been taken by integrating traditional healers in the National Rural Health Mission (NRHM). There are also four national institutes which undertake research for T&CM such as, The Central Council for Research in Ayurveda and Siddha, The Central Council for Research in Unani Medicine, The Central Council for Research in Yoga and Naturopathy, and The Central Council for Research in Homeopathy (WHO, 2019).

This present study also illustrates the preference ordering and affinity of the people with indigenous traditional medicine for the treatment of various diseases, with nearly one-third of the respondents relying (first preference) on indigenous traditional medicine. The study also highlights the fact that, despite the presence of modern healthcare, people would still prefer (and recourse to) the indigenous traditional medicine because of its popularity, satisfaction (utility), trust (faith) and affordability in the long run, even for non-communicable diseases. A study in Northern Tanzania found that the most common reason for using traditional medicine is for non-communicable diseases (Stanifer *et al.*, 2015) and nearly one-third of respondents had improved their health after using traditional medicine (Ao, 2020). The preference for traditional health care is evident not only due to the cultural attachment but also due to the low and flexible payment system (Lemma & Rao, 2013), as reflected in this study too that cultural affinity plays a vital role (higher usage). Commonly, there is a tendency to associate modern medicines as pro-rich, and traditional medicines are pro-poor and hence more affordable, accessible and acceptable to the communities in which it operates (Sato, 2012b).

Similarly, our study also found that first-order preference for indigenous traditional medicine is most likely among poorer households compared with those in higher wealth index. However, there are also recourses of healthcare in which almost one-third of the respondents had shifted from modern private healthcare to traditional medicine/healthcare. In Nagaland, the popularity of traditional healers or indigenous traditional medicine is quite evident, and the traditional practitioners use local herbs and plants to treat and cure many difficult diseases (Deb *et al.*, 2009). As some other noted, the preference to use traditional medicine maybe because of the cultural, livelihood or economic roles (Hamilton, 2004), as also reflected by this study.

## Conclusion

Nagaland is rich in biodiversity, and many medicinal plants are available and used by local folk traditional healers for curing different diseases. There is a concern for the sustainability of these Medicinal and Aromatic Plants (MAP) found in the wild forest. Efforts are needed from the stakeholders, particularly the state, nurture and promote the cultivation of medicinal herbs and plants as they are becoming endangered for their medicinal value. The Government need to boost this sector and encourage the use of indigenous traditional medicine to ensure accessibility and reduce the household expenditures on healthcare for people to lead a healthy life.

Like in most developing countries, in India too, many of its states have poor healthcare facility/ infrastructure. Thus, proper validation, efficacy and popularity of traditional medicine must be promoted alongside improving modern healthcare infrastructure to achieve on time the SDG 3, such as target 3.b, which focuses future pharmaceutical research on plant-based medicines

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and provide efficacy with value to cure different diseases. As is observed, there is a huge demand or preference for indigenous traditional medicine, and this sector is capable of filling the huge gaps in healthcare, which can be gainful in our quest to achieve UHC, particularly in areas where people had established close affinity with such healthcare system.

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