

# COVID-19 Related Practices in a Remote Rural Municipality of Nepal – an Observational Study

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## ABSTRACT


**Introduction:** Health promotion, specific preventive measures, disease screening and timely isolation are the mainstay for controlling the spread of COVID-19 infection. This study is conducted in a remote place of Nepal to describe the various preventive measures practised by the community for COVID prevention and general health fitness.

**Methods:** An observational study was conducted in Guthichaur Rural Municipality (RM) of Jumla. The subjects were tested for antigens by Rapid Diagnostic Test (RDT) kit for COVID-19 infection. Subjects were evaluated with a questionnaire to assess the awareness and practices related to COVID prevention and health promotion, including Yogasan and Pranayam. Data were analyzed by descriptive (mean and standard deviation) and inferential (Chi-Square test) statistics.

**Results:** A total of 546 subjects were tested for COVID, 49 were positive by RDT (case positivity rate 9%). Among them, 218 were evaluated by questionnaire. The mean age was 40.39 years (range 5 – 81). The sex ratio was 1.9, favouring males; but females were more (58%) among COVID positive. Common complaints were headache (39.4%), fever (33.3%), dry cough (24.2%) and body ache (24.2%). There were significantly higher positive subjects who had contact with COVID-19 positive individuals within the past 14 days ( $p < 0.001$ ). Most of the subjects in both groups practised standard preventive measures. Hot water and herbal products were commonly used in the community. The awareness and practices of Yogasan and Pranayam were low in all subjects, but more COVID positive subjects were unaware than COVID negative ones.

**Conclusion:** Most individuals in the community practised general preventive measures, but their awareness and practice of Yogasan and Pranayam were poor. Women should be encouraged to the screening test. More awareness about health fitness should be given in the community, and the COVID management system needs to be improved.

**Key words:** Antigen test, COVID screening, Health promotion, Prevention, RDT, Pranayam, Yogasan.

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## INTRODUCTION

COVID-19 is the disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It mainly affects respiratory system but can spread to other systems. The disease usually causes mild to moderate respiratory illness with good recovery. But some at-risk groups – such as older people and with underlying co-morbidities – may become seriously ill, and may succumb to death usually from respiratory failure.<sup>1,2</sup>

There is no cure of the disease till now, and so the preventive measures become important. As per WHO recommendation, the protective measures an individual should follow includes physical distancing of at least 1 meter to others, wearing proper mask, washing hands frequently with soap and water or alcohol-based rub, covering nose and mouth on sneezing or coughing, and self-isolating on suspected exposure (such as returning from travel) or on development of symptoms. For the diagnosis of COVID infection, while polymerase chain reaction (PCR) is the best and most common tool used, rapid diagnostic test (RDT) gives fast result and is cheap, but is also less accurate. RDT is valuable when there is more virus circulating in a community.<sup>1</sup>

By the first week of April 2022, there were about 491 million confirmed cases of COVID globally, with mortality rate of 1.25% (equating to 6.15 million deaths). Cases number in South-East Asia was 57.25 million.<sup>1</sup> According to Ministry of Health and Population, Nepal, total confirmed cases in Nepal were 0.978 million and total deaths 11951, accounting for 1.22% mortality rate. Age-wise, most common age group to be infected were between 20 and 40. In Jumla district of Karnali province, a remote area of the country, the total infected cases so far (by 6 April 2022) were 1839 (male 1154). There are about 60 government centers nationwide for COVID testing. Karnali Academy of Health Science is one of such, which has already conducted 34516 PCR tests apart from time-to-time screening tests done in the peripheral villages in different COVID campaigns.<sup>2</sup>

A community-based study on the risk factors of the disease and the preventive practices done by the people is useful to the policymakers and health practitioners, as they get the picture by

which they can decide where to invest the limited resource for risk factor control and increase awareness of the importance of prevention methods. Various studies have shown a variable level of benefits of practising Yogasan and Pranayam, apart from regular exercise, in general health and wellbeing, which is likely to be beneficial for COVID-19 prevention as well. There have hardly been any studies to describe such practices in community level in rural village of Nepal, in context of COVID infection. Hence we conducted this study with the aim to describe the various measures practised in community for COVID prevention as well as for general health fitness including Yogasan and Pranayam in Guthichaur rural municipality of Jumla district.

## MATERIALS AND METHODS

This is a descriptive cross-sectional study done in Guthichaur Rural Municipality (RM) of Jumla district. A COVID-screening campaign was done in Guthichaur RM as a part of the COVID-management program by the RM office. The program lasted from 2078-02-10 to 2078-03-20 which included COVID antigen test in the hospital as well as in the periphery by mobile campaigns in all the 5 wards of the RM separately, health counselling, admission in COVID hospital, in-patient care in COVID isolation ward, and conducting various COVID awareness programs in the RM. Study population were all the citizens of Guthichaur RM, and sample population were all the subjects who came to the camp for COVID testing and counseling.

The people who came in COVID antigen testing camp were first evaluated for obvious health status by history and general physical examination. Testing of all the subjects could not be done due to limited number of antigen kits. Subjects' choice of getting tested was also considered while deciding to send them for antigen test. All the subjects who underwent the antigen tests and who gave verbal consent for data collection were included in this study. Those whose test were not done were counselled and asked to follow-up in COVID hospital or in next camp if there were any risk of transmission. All the procedures were done in strict aseptic environment

using personal protective equipment and sterilization techniques. All health personnels were trained certified workers in their respective fields.

**Data collection:** A mixed qualitative and quantitative data were collected using a questionnaire sheet which consisted of demographic profile, evaluation of risk of infection, and various COVID prevention practices (Annex 1). Questions were asked in local Nepali language maintaining their privacy. Their response were recorded in paper using anonymous code given to each.

**Testing for COVID:** After initial evaluation, subjects with any risk of having COVID-19 were tested with COVID antigen kit [Panbio Covid-19 Rapid Antigen Test device, by Abbott®]. Each subject to be tested was asked to sit on a stool with nose facing upwards. The procedure was explained to subject. Separate swabs were inserted in the nasopharynx and oropharynx and kept for few seconds before gently taking them out. The swab was kept in a solution a drop of which was placed in the antigen kit. The kit reading was taken after few minutes. Maximum of 10 minutes were given before labelling the test as negative. Subject was observed for complication of the test such as nasal bleeding. Subjects with negative results were counselled and sent home. In case of positive result, the subject was counselled for admission and family members were advised for COVID testing.

**Data entry and analysis:** Data collected were entered, processed and analysed in Libreoffice suite. Graphical presentation, mean and standard deviation were used as descriptive statistics, whereas Chi Square test was done for inferential statistics. P value less than 0.05 was taken as statistically significant.

## RESULTS

In Guthichaur Rural Municipality (RM) of Jumla, there are 5 wards with total of about 11,443 population. During the six-week period of COVID management by the team, total 546 subjects were tested for COVID. Out of this, 49 cases came COVID positive and 42 cases got admitted whereas seven were lost before admission. There was no mortality of any cases tested. No cases had serious

complication during the period. All the subjects that came to the service were not tested for COVID antigen due to limited number of kits, and also not all of them were interviewed for the purpose of this study because of their noncompliance. So, only 218 subjects who gave verbal consent were documented for this study. COVID test done in the RM was Antigen test; but two cases of PCR positive done in KAHS were also admitted which were not included in this study. Out of the COVID negative cases mentioned in the result, they are either not tested for COVID or the test result was negative. Out of the five wards tested, ward number 5 was the most affected region (Table 1).

Table 2 summarizes the age-sex distribution of all subjects tested. Most of the subjects that came for COVID test were male (65.13%), but most of COVID positive subjects were females (57.58%). Among the males tested, 9.86% came positive and among females, 25% were positive. Females were significantly more COVID positive than males ( $p=0.003$ ). The age ranged from 5 to 81, and for COVID positive cases, it was 9 to 75 years. COVID positive were significantly younger than the negative group.

Most of the subjects had no complaints (127 subjects total) at the time of evaluation. Most of them were COVID negative. Among the complainers, the most common complaints in COVID negative subjects were headache, fever and chest pain; whereas that in COVID positive subjects were headache, fever, dry cough, bodyache and then chest pain, in various combinations (Figure 1). The subjects having any of the symptoms were 20 times more likely to have COVID than asymptomatic ones with  $p$  value  $<0.001$  (Table 3).

Orthopaedic complaints included backache, limb and joint pains (especially in lower limb), neck pain etc. Other minor complaints were eye pain, nausea, skin itching, loss of taste and throat discomfort. (Figure 1)

Most of subjects did not get contact with COVID positive cases or travelled outside Jumla district within past 14 days, but among them who did, the frequency is significantly higher in COVID positive cases (OR 32.77,  $p<0.001$ ; Table 4).

**Table 1:** Ward distribution of tested subjects in Guthichaur RM

Ward no.	Total cases tested	COVID Positive number (percent)
1	42	0 (0%)
2	42	0 (0%)
3	54	3 (5.6%)
4	47	6 (12.8%)
5	33	25 (75.8%)

**Table 2:** Age and sex distribution of the subjects

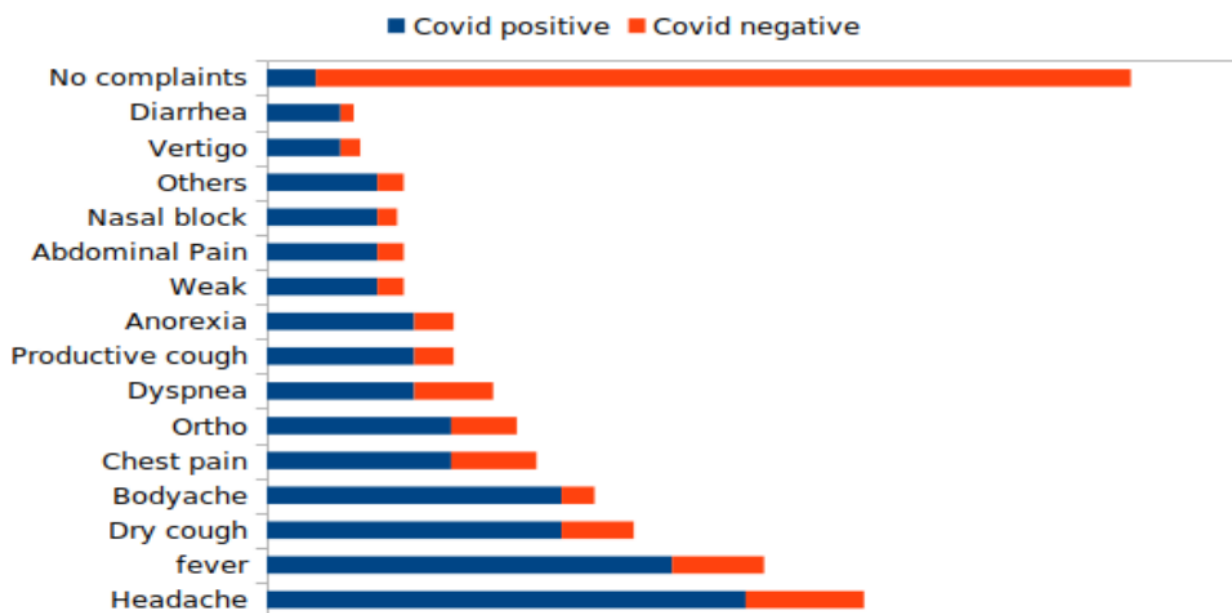
	COVID positive (n=33)	COVID negative (n=185)	Total (n=218)
Mean Age	33.7	41.59	40.39
SD of age	17.2	17.49	17.64
Age range (min – max)	9 – 75	5 – 81	5 – 81
P value for age (Student t-test)	<0.001*		
Male	14 (9.86%)	128 (90.14%)	142
Female	19 (25%)	57 (75%)	76
P value for sex (Chi Square test)	0.003*		
* Statistically significant			

**Table 3:** Frequency of symptoms in subjects

	Some Complaints n (%)	No complaints n (%)	Chi Square value	P value	OR (CI at 95%)
COVID +	30 (90.91%)	3 (9.1%)	38.65	<0.001	20.33 (5.97 – 69.25)
COVID -	61 (32.97%)	124 (67.03%)			

**Table 4:** History of contact in subjects

History of contact in past <14 days	COVID Positive (n=33)	COVID Negative (n=185)	Chi Square Value	P Value	OR (CI at 95%)
Present	28 (50.91%)	27 (49.1%)	73.27	<0.001	32.77 (11.64 – 92.3)
Absent	5 (3.07%)	158 (96.93%)			



**Figure 1:** Common complaints among subjects at the time of test.

**Table 5:** Common COVID prevention practices in subjects

Practices		Covid Positive	Covid Negative	Chi Square	P Value
Mask	Used	27 (14.67%)	157 (85.33%)	0.197	0.66
	Not used	6 (17.65%)	28 (82.35%)		
Physical distance >2 m	Maintained	23 (14.65%)	134 (85.35%)	0.104	0.75
	Not maintained	10 (16.39%)	51 (83.61%)		
Handwashing	Regular	28 (14.36%)	167 (85.64%)	0.87	0.35
	Not regular	5 (21.74%)	18 (78.26%)		
Hot water	Used	22 (18.03%)	100 (81.97%)	1.81	0.18
	Not used	11 (11.46%)	85 (88.54%)		
Herbal preparations (Jadibuti)	Used	24 (15.09%)	135 (84.91%)	0.0008	0.98
	Not used	9 (15.25%)	50 (84.75%)		

**Table 6:** Comparison of Awareness and practice of Yogasan and Pranayam in subject groups

Awareness of yogasan and pranayam	Covid Positive	Covid Negative	Chi Square	P value
Not heard	30	114	12.21	0.002*
Heard but not practised	3	71		
Practised	1	16		
* Statistically significant				

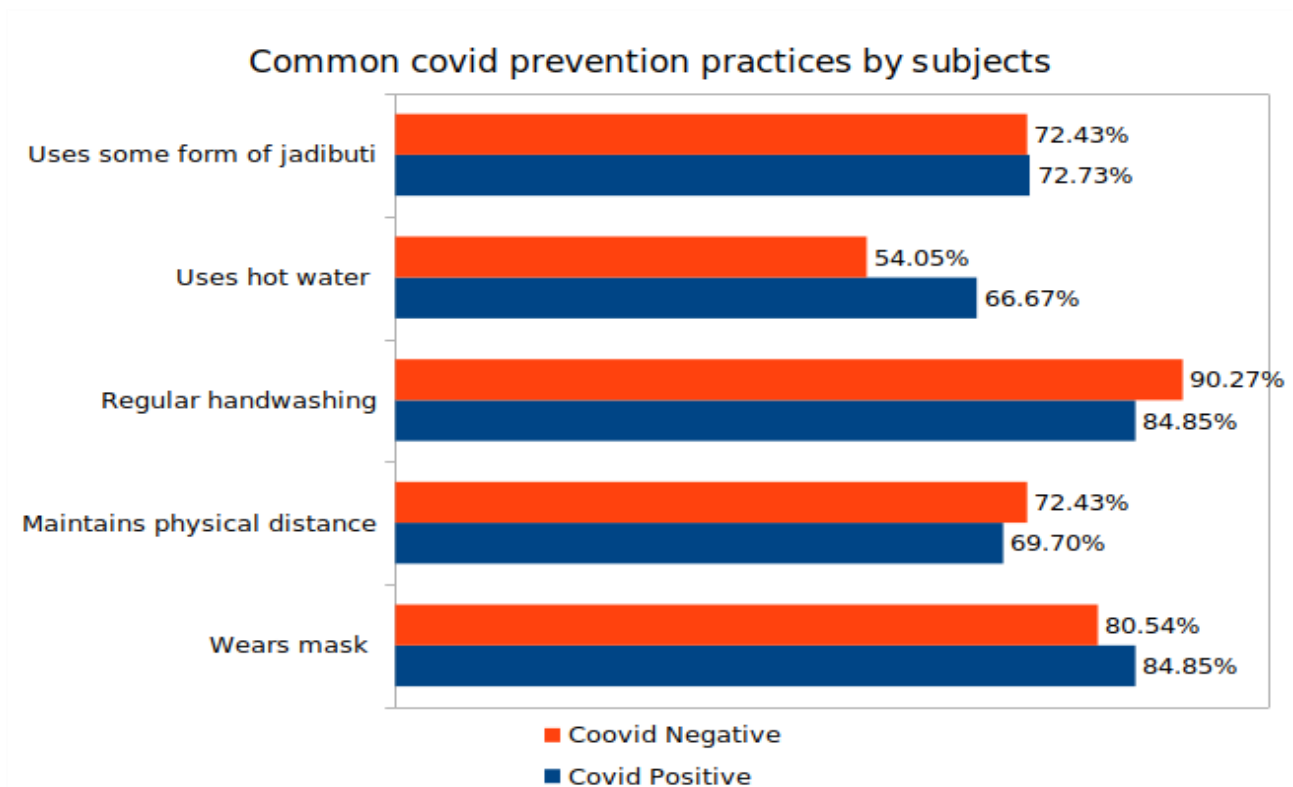


Figure 2: Common COVID prevention practices by subjects

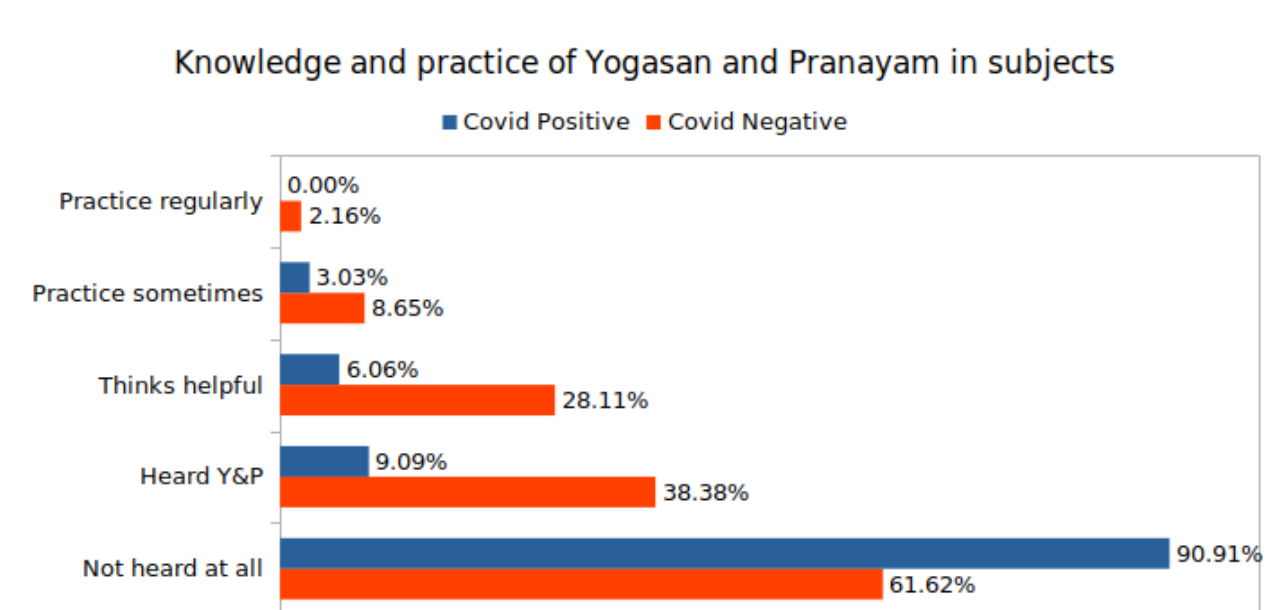


Figure 3: Knowledge about Yogasan and Pranayam (Y&P) and its practice within past six months.

We asked for common COVID related practices and found the common ones were using mask, maintaining physical distance, regular handwashing, using hot water for drinking and using some kind of herbal

medical products called *jadibuti*, which was very popular in the region. They were taken as an ingredient of tea or taken separately, mostly the roots, stem and/or leaves. According to the response of the subjects to the



questionnaire, most subjects practised regular handwashing by soap or sanitizer solution and using mask. There is slight variation in each of the practices among COVID positive and negative subjects (Figure 2), but none of their distribution in the subject groups were significant (Table 5).

We then asked them about the knowledge and practice of Yogasan and Pranayam within past six months. Most of the subjects were not aware of these practices (144 out of all 218 subjects), much less practising it; but COVID positive subjects seemed to be more unaware of these practices. Only four subjects (2.16%) of COVID negative ones were practising Yogasan and Pranayam more than two times a week in past 6 months (Figure 3). The COVID negative subjects are significantly more aware of the benefits of these practices ( $p=0.002$ , Chi square test) (Table 6).

## DISCUSSION

This study was done to evaluate the COVID-related practices in a rural community of a remote district, Jumla. The COVID management program conducted by local government of Guthichaur RM was used as an opportunity to collect data using a questionnaire and the COVID antigen test results.

For the diagnosis of COVID infection, PCR is recommended as well as most widely used tool.<sup>1</sup> However, we could not use this for our screening due to lack of facility. We chose the rapid diagnostic tool (RDT) by antigen detection which is cheaper and gives faster result, in expense of being less accurate.<sup>1</sup> Among the population of 11,443 in the RM, altogether 546 subjects were tested within six-week period and 49 COVID positive cases were identified. This means number of tests done per 1000 population is 47.71, and the case positive rate was 8.97%. Comparing this with the national figure, the number of tests done in this campaign is less than the national 162.75, and the case positivity rate is more than the national figure of 2.98%.<sup>3</sup> These figures reflect the village has higher COVID load in community and needs more frequent tests and management programs to be implemented.

All clients visiting the camp could not be documented for this study during the rush of testing process. Some people were non-compliant and some

gave incomplete data. Among the documented 218 cases, 31 were positive (14.22%). Two cases were PCR positive that was not done in the campaign. It was done in Karnali Academy of Health Sciences (KAHS) which has been doing PCR tests daily as one of the 62 Government centers for PCR testing throughout the nation. Nationwide, there has been about 5.56 million total PCR tests done (by April 2022), out of which 17.6% came positive.<sup>2</sup> Our figure in this sample population is better than average national figure. Also the distribution of the COVID positive in different wards of the RM can be correlated with their geography. Ward 5 is directly linked to Jumla market with main street, which allows them to have easy exposure to contact with COVID, and also has the maximum COVID positive individuals. Conversely, wards 1 and 2 have no COVID case and they seem to be protected from the infection by their remoteness.

Among the subjects tested, more than half (65%) were males, but only 42% of all COVID positive cases were males. According to data from Ministry of Health and Population, out of total 1839 infected cases in Jumla, there are 62.75% male.<sup>2</sup> A higher rate of male subjects coming for health service is a common finding in Nepal, probably due to the social structure. A quarter of the female subjects tested came to be COVID positive; where it was only 10% for males. This suggests females should be included more in such tests. Similarly, the younger subjects had significantly more COVID positive results than older ones, which may be because of higher exposure of the young groups by travel or other means; but it needs further exploration.

Most COVID negative subjects had no chief complaints at presentation, but among the complainers, headache and fever were the commonest ones among positive as well as negative groups. It was roughly followed in frequency by chest pain, mild dyspnoea, dry cough and orthopaedic pains in both the groups. Many subjects might have undiagnosed infections or diseases apart from COVID, for which they were counselled and advised for follow-up in next COVID camp or referred to higher center as per the severity of symptoms. Four percent of COVID positive cases had no symptoms, and 9% had non-specific ones such as abdominal pain, body-ache, skin itching, vertigo, eye pain etc. Other symptoms of COVID such as diarrhoea

and loss of taste and smell were very uncommon in our subjects. This finding is in contrast to the common and less common symptoms of COVID according to WHO. Globally, common symptoms are fever, cough, weakness, and loss of taste and smell; whereas the less common ones are sore throat, headache, bodyache, headache, diarrhoea, skin rash, and red eyes.<sup>1</sup> No subjects in our study had any serious symptoms such as moderate to severe dyspnea and loss of speech, consciousness or mobility.

The frequency of travel outside district or direct contact with COVID positive individuals within past 14 days were significantly higher in COVID positive cases than the negative ones. This endorses the established fact about the mode of transmission of COVID. Related to COVID prevention practices, most of the subjects (with either test result) followed regular handwashing, maintained physical distancing and wearing mask. Though the practices were more frequently done by COVID negatives, it was not statistically significant.

Hot water and herbal preparations (*jadibuti*) is common routine in mountainous regions like Jumla. This practice is also observed to be similar in both of our subject groups. The common herbal products were used as ingredient to a drink or taken separately. Yarsagumba (*Ophiocordyceps sinensis*) is used for boosting energy in body and as aphrodisiac. Titepati (*Artemisia vulgaris*) shoot is burned as incense to cleanse environment and also consumed for upper respiratory tract infections, such as common cold. Similarly, Jatamasi (*Nardostachys jatamansi*) is taken as memory enhancer and as brain tonic; katuko (*Picrorhiza kurroa*) as antitoxin and digestive tonic; Ghucchi chyaw (*Morchella esculenta*) for liver tonic and immunity; rugha saag (*Megacarpaea polyandra*) for common cold; dhokaya saag (*Arisaema utile*) as pain killer and to cure rheumatism; padam chaal (*Rheum australe*) for digestion; satua (*Avena sativa*) for energy production; and paanch aule (*Dactylorhiza hatagirea*) as general tonic and for wound healing. These herbal products have long been being used in local community and have been found to be effective in various ailments. We could not collect data about the duration of such practices which might affect the relation with COVID test. Various herbal products have been recommended as potentially COVID preventive factors, such as dry ginger (*Zingiber*

*officinale*), yashtimadhu (*Glycyrrhiza glabra*), and nut-grass (*Cyperus rotundus*) rhizomes; khus (*Vetiveria zizanioides*) and Indian sarsaparilla (*Hemidesmus indicus*) roots; coriander (*Coriandrum sativum*) and fennel (*Cuminum cyminum*) seeds; and cinnamon (*Cinnamomum verum*) and catechu (*Acacia catechu*) barks; giloy (*Tinospora cordifolia*), ashwagandha (*Withania somnifera*), and tulsi (*Ocimum sanctum*). Besides, their use as integration to conventional therapy is more effective in mitigating the symptoms of COVID-19, along with other benefits such as control of blood sugar, as compared to western medicine.<sup>4,5</sup> Many of these plants are available in Jumla as well. But Karnali region has many more medically important plants that are consumed by local community, whose potentials in treatment and prevention of diseases have yet to be scientifically studied. It would be a matter of interest to conduct a large scale research in these community about the use of such herbal products in various health conditions. The WHO-recommended practices for prevention of COVID transmission are physical distancing, wearing mask properly, washing hands with soap-water or alcohol-based rub, covering nose and mouth during sneezing or coughing, and isolating oneself on exposure to COVID.<sup>1</sup> Besides these, other suggestions by alternative medicine practitioners and authors include mouth rinsing, sunbathing, *jal-neti* (cleansing of nostrils by warm water).<sup>6</sup>

We also included the data about awareness and practice of Yogasan and Pranayam by the community in our study. Most of the participants (about two-thirds of all subjects) were not aware of Yogasan and Pranayam; and only four subjects practised it regularly within past six months. Our data show COVID negative subjects were significantly more aware of such practices and its benefit in health compared to COVID positive ones. A regular practice of them might be protective to the infection, but it is also likely that those who were merely aware of Yogasan and Pranayam were also aware of other health related issues, which gave them advantage in the test result. Multiple studies have shown the positive beneficial effects of exercise, Yogasan, Pranayam and meditation in multiple dimensions of health.

Yoga is a multidisciplinary system of eastern origin, practised since ancient times; but well-organized by Patanjali about 5000 years ago. Recently,



there have been surge of interest in medical research in the benefits of yoga in health and diseases. Yoga brings positive changes in physical and mental health by regulating the hypothalamic–pituitary–adrenal system, sympathetic nervous system, reducing the cortisol, and improving immunity.<sup>7,8</sup> Thus one can assume its beneficial effects in infections, but it has not been studied directly in COVID patients. Currently, there are no experimental studies that demonstrated improvement in lung functions in patients with COVID-19.<sup>8</sup> Thus we need to rely on the study findings on other pulmonary conditions and healthy subjects. Pranayam improves lung functions via multiple mechanisms. For one, it improves the sympatho-vagal balance, resulting in positive changes in cardiovagal, neuroendocrine, hemodynamic, and inflammatory system as well as in various metabolic parameters.<sup>4,6,8,9</sup> Practices such as deep breathing and breathing via alternate nostrils (nadi shodhan) have shown to affect autonomic function of body in positive way.<sup>10</sup> Some Pranayam techniques such as humming (Bhramari) increases endogenous nitric oxide level.<sup>11</sup> Nitric oxide causes vasodilation and is important in pulmonary function, reduces inflammation, is used as therapy for pulmonary hypertension, and can be helpful in management of COVID-19.<sup>12,13</sup> Yogasan and Pranayam are also shown to be helpful in management of pulmonary conditions such as high altitude hypoxia, adult respiratory distress syndrome, COPD, bronchial asthma.<sup>5,6</sup>

Meditation modulates inflammation and influences the markers of virus-specific immune response. This is important in COVID infection, as most of the deleterious effects of COVID include immunological destruction of lung parenchyma and respiratory failure. Meditation, Pranayam and various yoga practices also affect multiple domains such as autonomic, neurohumoral and mental status. It is observed that these practices increase vagal tone and thus reduces natural killer and T cell activities. A 90-minute yogic asan stretching is able to increase expression of antimicrobial peptides – beta defensin and Human beta defensin-2, both are expressed in respiratory epithelium.<sup>4,10,14,15</sup> Thus it is logical to hypothesize the beneficial effects of these practices extend in COVID infection as well. Meditation gives better mental health, reduces stress, anxiety, improves coping against mental stress, and creates a balance of

body-mind-spirit.<sup>7,16,17</sup> This becomes specially important in COVID pandemic where the whole human society has faced mental stress during lockdown. It contributes to neurosis like fear of infection to psychosis such as coronaphobia.<sup>10</sup>

A large cross-sectional study done in India using a standardized self-rated scale about COVID health assessment scale in 23760 subjects showed that the non-yoga group were more likely to have exposure to COVID-19. Yoga group had significantly more healthy food (mainly vegetarian), better quality of sleep, better physical endurance, and had less mental stress, anxiety, fear and insecurity as well as better coping for them. Authors recommend yoga practices for health care workers as well, as they get continuously exposed to infection as well as mental stress.<sup>7</sup>

We can see that various yoga practices could be simple and useful home-based practice for the prevention and post-recovery management of COVID-19. In India, Ayush ministry has already recommended practising yoga for 30 minutes to boost immunity during the pandemic.<sup>17</sup> The broad-spectrum regime of Yoga practices can become an eternal, holistic, very cost-effective & straightforward model of health and healing of the body in Pandemic like COVID-19.<sup>4,5,7,18</sup>

The COVID-19 pandemic has already had a severe effect on health systems globally, including effects in the service delivery of other diseases, thus having the potential to disrupt the health system as well as economy of poor countries like Nepal. If we could implement daily-life practices in patients, in health workers as well as in common population, the burden of the pandemic in or society could be significantly reduced.

This report is a preliminary study on the preventive practices of people in one rural municipality of a remote place of Nepal. The findings are questionnaire based, and is subject to response and recall biases. The questionnaire did not get any chance for pretesting. Generalisability of the findings is also limited. Similar study in other parts of the country needs to be done in COVID patients and in other diseases as well as in healthy subjects, which will guide the health policy makers to recommend health promotive measures for the public and health workers. Author (JPJ) experienced some difficulties during data collection as well as during management of patients in

isolation ward. While the lack of interest in the camp by public can be understood, the motivation and participation in this study of other health workers and administration were not satisfactory. The COVID-hospital provided by local government in the RM were limited even in basic facilities such as electricity, sanitary toilet, fooding for patients and ventilation in the rooms. This adversely affected the patients, health workers in the hospital, as well as community around it. Apart from screening tests, other programs could have been launched to improve public awareness and their involvement in prevention of the disease.

## CONCLUSION

In Guthichaur RM of Jumla, most of subjects practised general preventive measures, but their awareness and

practice about Yogasan and Pranayam were poor. Community needs to be made aware about the health promotive effects of yogasan and pranayam. Females need to be encouraged more to get tested. Local government should invest more in strengthening the healthcare system.

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