Global Journal of Medicine & Public Health

Assessment of Home Isolation Measures and Factors Associated with Adherence Among Patients During the Pandemic in Nepal: A Cross-Sectional Study

Lisasha Poudel[1], Bikram Adhiakri[1], Deekshya Neupane[1], Pranita Maharjan[1], Tek Bahadur Thapa[1], Pramita Shrestha[1], Rashmi Maharjan[1], Brish Bahadur Shahi[2],Bakhat Bhandari[3], Rajeev Shrestha[1,4], Nishan Katuwal[1], Biraj Man Karmacharya[5], Archana Shrestha[5,6,7,8]*

ABSTRACT

Introduction

Housing status and behavioral practices of COVID-19 positives during home isolation are crucial to breaking the transmission chain and rapidly managing cases during emergencies. This study aimed to assess the home isolation status of COVID-19 patients in Nepal and determine factors associated with adherence to home isolation measures.

Methods

A telephone-based cross-sectional study was conducted from January to May 2021 to assess the home isolation status among 362 home-isolated COVID-19 patients in Karnali Province. Patients were interviewed to collect socio-demographic characteristics, COVID-19 symptoms, comorbid conditions, and household and behavioral characteristics. Univariate and multivariate logistic regression analyses were done to determine the association of the use of masks, social distance, and outside visits during home isolation with socio-demographic and household characteristics. We reported adjusted odds ratios(aOR) with 95% confidence intervals.

Results:

Of the total, 15% did not have ventilation in their isolation rooms, and only about 30% used separate toilets during isolation. More than half of the respondents staying at home in isolation were asymptomatic. About 29% of respondents did not maintain a two-meter distance from their family members. About 76% always wore a mask in front of their family members and 68% never went outside the house during home isolation. Females were more likely to stay home during the isolation period (aOR:2.42; 95%CI:1.39-4.21). Young adults were more likely to wear masks in front of family members(aOR:0.96;95%CI:0.94-0.99). Highly educated participants were more likely to maintain distance during isolation (aOR:1.19;95% CI:1.10-1.28).

Conclusion

State and local authorities are recommended to develop specific measures to enhance the knowledge and practice of the participant groups likely to exhibit low adherence to home isolation measures.

Keywords: COVID-19; home isolation; public health measures; Nepal

GJMEDPH 2024; Vol. 13, issue 6 | OPEN ACCESS

1*Corresponding author: D Lisasha Poudel[1*], Bikram Adhiakri[1], Deekshya Neupane[1], Pranita Maharjan[1], Tek Bahadur Thapa[1], Pramita Shrestha[1], Nishan Katuwal,Rashmi Maharjan[1], [1]Research and Development Division, Dhulikhel Hospital, Kathmandu University Hospital, Dhulikhel, Nepal, Email: lisashapoudel01@gmail.com; 2. Brish Bahadur Shahi[2], Ministry of Social Development, Karnali Province, Nepal; 3. Bakhat Bhandari , Good Neighboors International, Nepal; 4. Rajeev Shrestha ,Research and Development Division, Dhulikhel Hospital, Kathmandu University Hospital, Dhulikhel, Nepal, Department of Pharmacology, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal; 5. Biraj Man Karmacharya, Department of Community Programs, Dhulikhel Hospital-Kathmandu University Hospital, Dhulikhel, Nepal, Archana Shrestha, Department of Community Programs, Dhulikhel Hospital-Kathmandu University Hospital, Dhulikhel, Nepal, Department of Public Health, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal, Center for Methods in Implementation and Prevention Science, Yale School of Public Health, New Haven, CT, USA, Institute for Implementation Science and Health, Nepal

Source of Funding

This study was conducted from a project entitled "COVID-19: Strengthening Provincial Level COVID Response in Nepal" which was funded by the Bill Gates and Melinda Gates Foundation (INV-021518)

Ethical approval

The approval for this study was taken from the Ethical Review Board (Ref no: 1137).

Consent

Consent was obtained from the participants

Conflict of Interest—none | Funding—none

INTRODUCTION

The COVID-19 pandemic, which emerged in late 2019, has caused significant global devastation, with millions of infections and deaths worldwide. Nepal, like many other countries, faced severe public health, social, and economic consequences as the virus spread (1-5). The pandemic overwhelmed healthcare systems, leading to substantial mortality and morbidity, with COVID-19 cases and related deaths rising exponentially. In Nepal, the government implemented strict containment measures, including lockdowns, quarantines, and home isolation guidelines, to curb the spread of the virus. These efforts helped mitigate transmission, but the impact of the pandemic continued to be felt throughout the country. (6) National and international studies have shown that safety measures such as physical distancing, mask-wearing, and hygiene practices significantly reduced COVID-19 cases and mortality. (7-14) In particular, home isolation for mild and asymptomatic COVID-19 patients was promoted to prevent healthcare facilities from becoming overwhelmed. The Ministry of Health and Population (MoHP) in Nepal issued detailed guidelines to support home isolation, focusing on infection control practices like mask usage, hand hygiene, and maintaining a separate living area for infected individuals (6). Evidence from other countries highlights the effectiveness of these measures in reducing transmission, yet compliance with them has been variable, often influenced by socio-demographic and household characteristics. (10-14) Socio-demographic factors such as age, education, gender, and socioeconomic status have been shown to significantly affect adherence to these safety guidelines. Studies in other regions have demonstrated that individuals from lower socio-economic backgrounds, older populations, or those with lower levels of education are less likely to follow isolation protocols, increasing the risk of community transmission. (7–11). Household characteristics, such as the availability of separate living spaces and adequate ventilation, also play a crucial role in adherence to home isolation measures (15,16). These socio-demographic and household factors are important to consider when designing effective public health strategies for future outbreaks. The cases with less guidance on maintaining home isolation can lead to disaster in terms of their health and also transmission.(17,18) This can be the primary reason for the transmission rate, resulting in community transmission and outbreak. The status of home isolation is not clearly understood in the context of Nepal.This study assessed home isolation status among COVID-19 patients in Karnali province, Nepal, and investigated associated factors with adherence to home isolation measures. The study hypothesizes that socio-demographic factors, such as age, education level, and gender, along with household characteristics, including ventilation and access to separate facilities, significantly influence adherence to protective behaviors like mask usage, social distancing, and minimizing outside visits during home isolation. While COVID-19 is no longer classified as a public health emergency and mortality rates have significantly declined globally, the findings of this study remain highly relevant to the scientific community. Understanding home isolation practices during the pandemic provides critical insights into managing infectious diseases that require isolation in resource-limited settings. The lessons learned from this research can inform strategies for future outbreaks of transmissible diseases, ensuring effective containment and mitigating community transmission risks. This study highlights the role of socio-demographic and household characteristics in influencing adherence to protective behaviors during home isolation. By identifying these factors, policymakers and health authorities can design targeted interventions to enhance compliance with isolation measures. Such insights contribute to strengthening pandemic preparedness, optimizing resource allocation, and improving community-level interventions for managing transmissible diseases.

1. Material and Methods

2.1. Study design and setting

We conducted a cross-sectional study among COVID-19 patients of Karnali Province, Nepal, from January to May 2021. The province, with a population of about 1.7 million, has one of the country's highest poverty rates and the poorest human development index.(19)

2.2. Study participants

We recruited 362 adult participants (18 years or older) who tested positive for COVID-19 via RT-PCR from January to May 2021. The list of all COVID-19 positive cases tested during this period was obtained from the Ministry of Social Development of Karnali Province. The sample size was determined based on the assumption of a 38% prevalence of safety measures adoption during isolation (20), 95% significance level, and 5% allowable error. Figure 1 shows the number of chosen participants in each district of the Karnali province. Trained research assistants contacted the patients on the 7th day after the date of testing positive

.

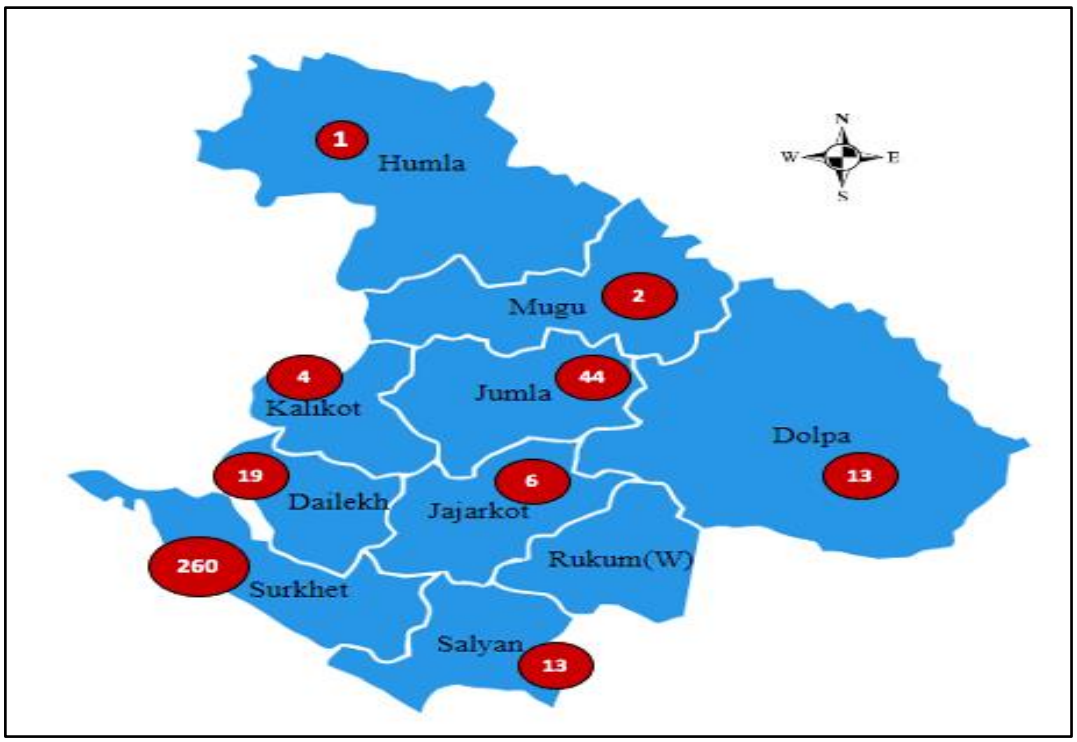

Figure 1. The number of participants in the study site (Karnali Province)

2.3. Data collection Technique and Tool

Trained research assistants conducted telephone-based interviews using a semi-structured questionnaire, and entered data into an online form on the Kobo toolbox platform. The structured questionnaire comprised the following components:

2.3.1. Socio-demographic characteristics: It included age (in years), gender (male/female/others), ethnicity (brahmin-chhetri/janjati-adivasi/others), educational status (number of formal years of education), marital status (married/not married) and types of family (nuclear/joint).

2.3.2. Comorbidity and symptoms*:* Comorbidity was described as the presence of at least one of the following conditions: hypertension, diabetes, heart disease, thyroid dysfunction, chronic lung disease, chronic kidney disease, chronic liver disease, malignancy, and immuno-compromised conditions; as per the guideline of the Ministry of health and population. Patient's symptoms were assessed based on the presence or absence of the following COVID-19 symptoms in past one week: fever, cough, sore throat, runny nose, headache, difficulty in

breathing, loss of taste, loss of smell, vomiting, diarrhea, muscular pain, abdominal pain, joint pain, chest pain, and irritability/confusion.

2.3.3. Household characteristics: It included types of houses (Kutcha/Pucca/semi-Pucca), having a separate room to stay during isolation(yes/no), having direct sunlight in the room (yes/no), having cross-ventilation (yes/no), and having a separate toilet to use during isolation (yes/no).Kutcha houses are defined as house structures with walls made of bamboo, mud, bushes, reed, straws, leaves, stones, thatch, and unburned bricks. A pucca house has roofs and walls made of burnt bricks, cement concrete, jack board, stone, or timber. A semi-pucca house structure has walls made of pucca materials like stones, oven-burnt bricks, etc., and the roof made of Kutcha materials like mud, grass, etc.

2.3.4. Home Isolation measures: *We measured the home isolation measures adherence in a Likert scale* (always/often/sometimes/never). The home isolation measures were adopted from the Nepal government guideline (6) that included: (1) always use tissue or elbow while sneezing; (2) do not share utensils (glass, cup, plates) with others; (3) use of mask in front of family members; (4)washing hands after contact with saliva, sputum and cough; (5) keep a distance of 2 meters with family members; (6) use of disinfectant to clean room; (7) daily use of thermometer; (8) go out of house during isolation and (9) regular contact with health worker.

2.4. Data analysis

Characteristics of the study participants were presented in frequency and proportion for categorical variables, and mean and standard deviation for numerical variables. Home isolation measures such as the use of a mask in front of family members, distance maintenance, and roaming outside of the house during isolation were selected further for regression analysis. For regression analysis, wearing masks and maintaining two-meter distance were further categorized into binary variables that included "Always" in one group and "Never, Often and Sometimes" in the other, while roaming outside of the house was categorized as "Never" in one group and "Sometimes, Often and Always" in the other. We utilized a univariate and multivariate logistic regression analysis to determine the association of adherence to home isolation measures (always wearing a mask, maintaining distance, and roaming outside during home isolation) with all the variables included in the socio-demographic and household characteristics after adjusting for confounding variables (gender, age, number of formal years of education, ethnicity, marital status, types of family, rented/own, types of house, separate room, ventilation in room, sunlight in room and separate toilet). Confounding variables were adjusted by including them as independent variables in the multivariate logistic regression model. The selection criteria for confounding variables were based on their potential to influence both the independent variables (socio-demographic and household characteristics) and the dependent variables (adherence to home isolation measures). These variables were identified through a review of the literature and expert consensus. Crude odds ratio (cOR) and adjusted odds ratio (aOR) with 95% confidence interval were presented. We analyzed data using R-programming software (R-version:4.0.3).

2.5. Ethical Consideration

We received ethical approval from the Ethical Review Board (ERB). The Ministry of Social Development (MoSD) in Karnali province, Nepal, provided written permission. We obtained verbal consent from the participants over the phone after providing information about the study, risks, and benefits of the participation, as well as the confidentiality and voluntary participation clause. Nepal ERB authorized verbal consent due to the isolation policy for active COVID-19 patients.This study is in line with Strengthening the reporting of cohort studies in surgery (STROCSS) Criteria. (21)

1. Results

3.1. Socio-demographic and household characteristics of participants

Table 1 presents the socio-demographic and household characteristics of the participants. The mean age was 37±13 years and 70 percent were

males. The mean year of formal education completed was 12 years. Majority of the participants were Brahmin and Chhetri (77%) and married (74%). Sixty-five percent of them were residing in their own home. Majority of the participants were staying in Pucca house (82%) and in a separate room (83%) during isolation. Majority of the participants had cross-ventilation (85%) and direct sunlight (73%) in their room. Only 30 percent of them used separate toilets during home isolation. (Table 1)

Table 1. Socio-demographic and household characteristics of participants (n=362)

Characteristics (n=362)	n (%)
Male	253(69.9)
Age (in years), Mean (SD)	36.7±12.8
Number of formal years of education, Mean (SD)	12.3±3.6
Ethnicity	
Brahmin/Chhetri	278 (76.8)
Janjati/ Adivasi	31 (8.6)
Other	53 (14.6)
Marital status	
Married	298 (74.0)
Not married	94 (26.0)
Types of Family	
Nuclear	305 (84.3)
Joint	57(15.7)
Rented or owned	
Owned	237 (65.5)
Rented	125 (34.5)
Types of Houses staying	
Pucca	297 (82.0)
Semi-Pucca	17 (4.7)
Kutcha	48 (13.3)
Have a separate room	300 (82.9)
Cross-ventilation in room	309 (85.4)
Direct Sunlight in room	266 (73.5)
Have a separate toilet	108 (29.8)

SD: standard deviation

3.2. Health related characteristics

Table 2 represents comorbidities and COVID-19 related symptoms among home isolated patients. About 42 percent experienced at least one symptom in the past week and about 11 percent reported at least one comorbidity. (Table 2)

Table 2. Health related characteristics (n = 362)

Health characteristics	n(%)
Comorbidity	40 (11.0)
COVID-19 Symptoms	150 (41.4)

Comorbidities: *hypertension, diabetes, heart diseases, thyroid dysfunction, chronic lung disease, chronic renal disease, chronic liver disease, malignancy, pregnancy, post-partum , and immuno-compromised conditions*
COVID-19 symptoms: *fever, cough, sore throat, runny nose, headache, difficulty in breathing, loss of taste, loss of smell, vomiting, diarrhea, muscular pain, abdominal pain, joint pain, chest pain, and irritability/confusion*

3.3. Adherence to home isolation measures

Table 3 shows the frequency of reported use of public health measures stated in the home isolation guideline. Sixty-nine percent reported always using a tissue or elbow while sneezing. Approximately 95 percent of home-isolated patients consistently used their own utensils (glass, cup, plates). Around 76 percent always wore masks in front of family members. Majority (83%) of the participants always cleaned their hands after coming into contact with saliva, and 71 percent always kept a two-meter distance from their family members during isolation. More than half of the participants admitted to not using disinfectant or a thermometer daily. Approximately 31% of the participants roamed outside during isolation. (Table 3)

Table 3. Use of the home isolation measures by home-isolated COVID-19 patients in Karnali province, Nepal (n=362)

Characteristics	Never n(%)	Sometimes n(%)	Often n(%)	Always n(%)
Use of tissue or elbow while sneezing	2 (0.6)	10 (2.8)	100 (27.6)	250 (69.1)
Use of utensils (glass, cup, plates) by others	344 (95.0)	8 (2.2)	4 (1.1)	6 (1.7)
Use of mask in front of family members	4 (1.1)	10 (2.8)	74 (20.4)	274 (75.7)
Wash hands after contact with saliva, sputum, cough	3 (0.6)	4 (1.1)	54 (14.9)	301 (83.1)
Keep distance of 2 meters with family members	13 (3.6)	15 (4.1)	75 (20.7)	259 (71.5)
Use of disinfectant to clean room	163 (45.0)	90 (24.9)	83 (22.9)	26 (7.2)
Use of thermometer daily	128 (35.4)	175 (48.3)	34 (9.4)	25 (6.9)
Go out of house during isolation	248 (68.5)	96 (26.5)	15 (4.1)	3 (0.8)
Regular contact with health worker	153 (42.3)	142 (39.2)	39 (10.8)	28 (7.7)

n: *frequency %: percentage*

3.4. Association between home isolation measures and socio- demographic characteristics of patients in Karnali Province, Nepal

Table 4 presents the association between home isolation measures and sociodemographic status. In multivariate regression, among sociodemographic variables, age and educational status were significantly associated with always wearing a mask in front of family members during home isolation after adjusting for other socio-demographic variables. The odds of wearing a mask during isolation were four percent lower with each year's higher age group (aOR:0.96; 95% CI:0.94-0.99; p=0.004). The odds of wearing a mask were 13 percent higher with each year`s higher education (aOR:1.13; 95% CI:1.05-1.23, p=0.002).The number of years of formal education was significantly associated with always maintaining distance during isolation after adjusting for other socio-demographic variables. The odds of maintaining distance during isolation were 19 percent higher with each year's higher education (aOR:1.19; 95% CI:1.10-1.28; p=<0.001).Age and gender were also significantly associated with roaming outside during home isolation after adjusting for other socio-demographic variables. The odds of roaming outside the house during isolation were four percent lower with each year's higher age group (aOR:0.96; 95% CI:0.94-0.99; p=0.003). Similarly, the odds of roaming outside during isolation were twice higher among males than females (aOR:2.42; 95% CI:1.39-4.21; p=0.002). (Table 4)

Table 4. Association between home isolation measures with socio- demographic of home isolated patients in Karnali Province, Nepal

Variables	Wearing Mask (n=362)		Maintaining 2 meters distance (n=362)		Roaming outside (n=362)	
	cOR (95%CI)	aOR (95%CI)	cOR (95%CI)	aOR (95%CI)	cOR (95%CI)	aOR (95%CI)
Gender (Last)						
Female	1	1	1	1	1	1
Male	1.19 (0.71-1.99)	0.91(0.50-1.64)	0.94 (0.57-1.54)	0.66(0.37-1.17)	2.26(1.33-3.85)*	2.42(1.39-4.21)*
Age(in years)	0.95 (0.94-0.97)**	0.96 (0.94-0.99)*	0.97 (0.95-0.99)**	0.99(0.96-1.01)	0.98(0.96-0.99)*	0.96 (0.94-0..99)*
Number of formal years of education	1.18(1.12-1.29)**	1.13(1.05-1.23)*	1.20 (1.12-1.28)**	1.19 (1.10-1.28)**	1.03 (0.96-1.09)	0.96(0.89-1.03)
Ethnicity						
Brahmin/Chettri	1	1	1	1	1	1

Janjati	1.28 (0.51-3.30)	1.56(0.57-4.26)	0.76 (0.34-1.69)	0.82 (0.35-1.93)	1.39(0.64-2.98)	1.44(0.65-3.19)
Others	0.72 (0.38-1.38)	0.82(0.40-1.68)	0.65 (0.35-1.21)	0.76(0.38-1.49)	0.87(0.45-1.66)	0.78(0.40-1.52)
Marital status						
Married	1	1	1	1	1	1
Unmarried	1.01(0.58-1.75)	1.71(0.87-3.37)	1.09(0.65-1.83)	1.47(0.79-2.73)	0.97(0.59-1.61)	1.46(0.80-2.69)
Type of Family						
Nuclear	1	1	1	1	1	1
Joint	0.53(0.29-0.97)*	0.64(0.33-1.27)	0.76(0.41-1.39)	0.90(0.46-1.76)	1.00(0.55-1.85)	1.11(0.59-2.09)

Results from Multivariate logistic regression including all of the variables: : gender, age, number of formal years of education, ethnicity, marital status,types of family
cOR: crude Odds Ratio, aOR: adjusted odds ratio, CI: confidence interval
***p <0.001, *p <0.05*

3.5. Association between home isolation measures and household characteristics of home isolated patients in Karnali Province, Nepal

Table 5 presents the association between home isolation measures and household characteristics. Type of house and having a separate room were significantly associated with always wearing a mask in front of family members after adjusting for other socio-demographic variables. The odds of always wearing a mask during home isolation were 77 percent lower among patients staying at Kutcha house (aOR:0.23; 95% CI:0.11-0.49; p value<0.001) after adjusting other variables. The odds of wearing a mask during home isolation were 2.7 times higher among patients staying in separate rooms (aOR:2.73; 95% CI:1.34-5.54; p=0.004).Having a separate room was significantly associated with always maintaining distance during isolation after adjusting for other socio-demographic variables. The odds of always maintaining distance during isolation were 10.9 times higher among those who stayed in separate rooms (aOR:10.97; 95% CI:5.41-22.21;p<0.001).Types of houses and rented/owned were significantly associated with roaming outside during isolation after adjusting for other socio-demographic variables. The odds of roaming outside during isolation were four times higher among those who had their own house (aOR:4.04; 95% CI: 2.18-7.47; p<0.001). The odds of roaming outside were also 4.3 times higher among those staying at Kutcha house (aOR:4.31; 95% CI:2.05-9.09; p<0.001). (Table 5)

Table 5. Association between home isolation measures with household characteristics of home isolated patients in Karnali Province, Nepal

Variables	Wearing Mask		Maintaining Social Distance		Roaming Outside	
	cOR (95%CI)	aOR (95%CI)	cOR (95%CI)	aOR (95%CI)	cOR (95%CI)	aOR (95%CI)
Rented or owned (last)						
Rented	1	1	1	1	1	1
Owned	0.47(0.27-0.82)*	0.60(0.30-1.18)	0.97(0.60-1.57)	0.79(0.41-1.53)	2.76(1.64-4.66)**	4.04(2.18-7.47)**
Type of house (last)						
Pucca	1		1	1	1	1
Semi- Pucca	0.34(0.12-0.93)*	0.49(0.15-1.58)	0.50(0.18-1.36)	0.52(0.16-1.70)	0.82(0.26-2.59)	0.61(0.17-2.17)
Kutcha	0.24(0.13-0.45)*	0.23(0.11-0.49)**	0.53(0.28-1.01)	0.78(0.35-1.73)	4.07(2.16-7.66)**	4.31 (2.05-9.09)**
Separate room						
No	1	1	1	1	1	1
Yes	2.13(1.19-3.82)*	2.73 (1.34-5.54)*	8.23(4.51-15.02)**	10.97(5.41-22.21)**	2.15(1.09-4.21)*	1.44(0.67-3.10)
Ventilation in room						
No	1	1	1	1	1	1
Yes	1.58(0.84-2.99)	1.21(0.56-2.63)	1.82(0.99-3.33)	1.26(0.57-2.77)	1.19(0.63-2.27)	1.04(0.48-2.24)
Sunlight in room						
No	1	1	1	1	1	1

Yes	1.41 (0.84-2.39)	1.39(0.73-2.65)	1.67(1.01-2.75)*	1.30(0.69-2.43)	1.43(0.85-2.41)	1.41(0.75-2.64)
Separate toilet						
No	1	1	1	1	1	1
Yes	1.37(0.79-2.37)	1.27(0.67-2.41)	1.70(0.10-2.90)	1.25 (0.66-2.38)	1.20(0.74-1.93)	1.11(0.63-1.94)

Results from Multivariate logistic regression including all of the variables: gender, age, number of formal years of education, ethnicity, marital status,types of family, rented/own, types of house, separate room, ventilation in room, sunlight in room, separate toilet
cOR: crude Odds Ratio, aOR: adjusted odds ratio, CI: confidence interval
***p <0.001, *p <0.05*

2. DISCUSSION

Our study focused on assessing the home isolation practices and identifying factors associated with adherence to isolation measures during the COVID-19 pandemic in Western Nepal in 2021. We hypothesized that socio-demographic characteristics, including age, education level, and gender, along with household features such as ventilation and access to separate facilities, significantly influence compliance with protective behaviors like mask usage, social distancing, and limiting outside visits during home isolation.Our findings showed that over half of the participants resided in a well-structured building (Pucca House) while 13 percent stayed in Kutcha House. Most participants stayed in a separate room with ventilation and direct sunlight, and one-third used separate toilets during their home isolation period. We found that age, educational status, gender, types of house, and use of separate rooms were significantly associated with adherence to home isolation measures.

This study found that around 15% of the patients did not have proper ventilation in their rooms, and 30% used separate toilets in isolation. However, another research conducted by the Nepal Health Research Council (NHRC) among COVID-19 home-isolated patients found that around 94% stayed in a well-ventilated room, and 74% used separate toilets.(22) The difference in findings could be due to the difference in study areas. The NHRC study was conducted in all seven provinces of Nepal, whereas this study was conducted in Karnali Province, known for its low human development index and high poverty rate.(23) Around 36% of the population in Karnali Province doesn't have access to safe drinking water, and only 50% of households have adequate toilet facilities.(24) This study found that approximately 45% of patients never used disinfectants. However, disinfectants are one of the most effective preventive approaches for reducing transmission within families. A cohort study conducted in China found that disinfection was 77% effective in preventing the spread of the disease within families.(12)

Our study revealed good hand-washing practices among home-isolated patients in Karnali province, thus confirming previous research done in Karnali.(25) To slow down the transmission rate of COVID-19, the Nepalese government had urged the public to adopt SMS (Social distancing, mask, and sanitizer) measures more prominently after the lockdown, especially through audiovisual aids and radio jingles. Individuals in Karnali province are most likely to listen to the radio during the pandemic. (25) In our study, about 76 percent of the isolated patients always wore masks in front of their family

members. Use of masks is vital for people of all ages since one of the most underappreciated benefits of masks is source control. Face mask usage by the primary patient and family contacts before the primary case developing symptoms can reduce the transmission by 79 percent.(12) It is critical to use a universal face mask in public settings and in the home when family members are at risk of infection.

Always wearing a mask in front of family members during isolation was positively and significantly associated with younger age, higher education, living in a Pucca house, and staying in a separate room. A study conducted in the United States revealed that older persons tend to use masks more often than middle-aged and young people, indicating that older people are at a higher risk of experiencing serious COVID-19 cases.(26) However, in contrast to these studies, our study revealed that wearing masks was more prevalent among younger populations. This discrepancy may be due to differences in study populations. In our study, we specifically selected patients infected with COVID-19, while other studies targeted the general population.Not surprisingly, higher-educated people were more likely to wear masks during isolation. High compliance with good behavioral practices was found in highly educated participants, similar to the findings from previous global studies (27–31). This may be related to a lack of technology and education since better-educated individuals obtained information from a wider range of sources than less-educated ones.

Those staying in a kutcha house were less likely to wear masks in front of their family members. People living in Kutcha houses indicate low socio-economic status. The study conducted in China revealed a higher rate of wearing masks among people of high socio-economic status.(32) This might be due to access to facilities and adequate information regarding home isolation measures among high socio-economic status people.

Close contact is considered to be a risk factor for transmission. The risk of household transmission was 18 times higher with frequent daily close contact with the primary case in China.(12) The COVID-19 pandemic has introduced extraordinary "social distance" tactics critical to restricting the virus's transmission. In addition to quarantine and isolation protocols for persons exposed to or infected with COVID-19, social distance among the general public has been used to limit COVID-19 transmission. (33) Our study findings revealed that about 29% of respondents did not always maintain a two-meter distance from their family members during isolation. Always maintaining distance was associated with higher education and staying in separate rooms. In Karnali province, the availability of limited wood and non-risk-responsive designs influence housing construction.(23) Most of the Karnali provinces residing in Karnali live in houses with outer walls made of mud-bonded bricks or stone houses with limited rooms (23), thus hindering them from maintaining distance during home isolation.

In the study, approximately one-third of the participants roamed outside during isolation. Roaming outside during home isolation was associated with male gender, older age, owning a house, and staying in a kutcha house. Males were more likely to roam outside during home isolation periods. Females showed better behavioral practices than males in the study. Furthermore, a study on COVID-19-related health behaviors in Germany revealed an association between better hand hygiene adherence rates among women.(31) Panel evidence from eight countries revealed that women are more likely to see the pandemic as a significant health issue and to accept and follow the restrictions.(34) Young adults were likely to roam outside during isolation. They did, however, claim that they went outside for a morning stroll or for refreshment, maintaining social distance. Patients who live in their own homes have more freedom to maintain isolation guidelines than those who live in rented homes. Those who lived in rental homes were less inclined to leave the house during their home isolation.

To the best of our knowledge, this is the first study to determine the associative factors of home isolation measures in Nepal. The study not only highlights the socio-demographic, household, and behavioral determinants of protective measures

during the COVID-19 pandemic but also offers valuable insights applicable to future infectious disease outbreaks. The findings underscore the critical role of housing conditions, individual behaviors, and access to resources in determining the effectiveness of home isolation measures. While the study provides essential information for strengthening pandemic preparedness and response strategies, it has certain limitations. First, the directionality of the association cannot be determined due to the study's cross-sectional nature. Second, the patients' sociodemographic, household, and behavioral variables were all self-reported and may have been susceptible to social desirability bias.

CONCLUSIONS

Our study findings highlight significant gaps in adherence to home isolation measures among COVID-19 patients in Karnali Province, Nepal, particularly regarding ventilation, access to separate toilets, and behavioral practices like maintaining social distance. A notable proportion of individuals did not strictly follow recommended protective measures, including consistent mask use and maintaining physical distance from family members. Sociodemographic factors, including education level, age, and gender, were strongly associated with adherence to these practices. Highly educated individuals demonstrated better compliance with social distancing, while young adults were more likely to wear masks in family settings. Additionally, females were significantly more likely to stay confined at home during the isolation period, underscoring the influence of gender roles on behavior during public health emergencies.

FUTURE PERSPECTIVE

To address these gaps, targeted awareness-raising interventions are needed to improve knowledge and adherence to home isolation measures, particularly among low-educated and low-socioeconomic groups. Leveraging mass media as a communication tool can enhance the reach of these interventions. Local and state authorities should focus on developing specific measures to improve community education about home isolation practices. Future education and awareness initiatives should integrate preventive strategies, such as promoting proper coughing and sneezing etiquette, and therapeutic measures that support patient recovery. These strategies can help mitigate the spread of infectious diseases in resource-limited settings. Lessons learned from this study can inform preparedness and response strategies for future public health emergencies, enhancing the ability to manage transmissible diseases that require home isolation.

REFERENCES

1. Ministry of Health and Population. Responding to COVID-19 Health sector preparedness, response and lessons learnt. 2021.
2. Shrestha N, Mishra SR, Ghimire S, Gyawali B, Marahatta SB, Maskey S, Baral S, Shrestha N, Yadav R, Adhikari B. Health system preparedness in tackling the COVID-19 in Nepal: a qualitative study among frontline healthcare workers and policymakers. 2020.
3. World Food Programme. The Impact of COVID-19 on Households in Nepal: Fifth round of mVAM Household Livelihoods, Food Security and Vulnerability Survey 2021 (October 2021) - Nepal. ReliefWeb. 2021.
4. Singh DR, Sunuwar DR, Shah SK, Karki K, Sah LK, Adhikari B, Sah RK. Impact of COVID-19 on health services utilization in Province-2 of Nepal: a qualitative study among community members and stakeholders. BMC health services research. 2021 Dec;21(1):1-4.
5. Sharma K, Banstola A, Parajuli RR. Assessment of COVID-19 pandemic in Nepal: A lockdown scenario analysis. Frontiers in Public Health. 2021 Apr 8;9:599280.
6. Ministry of Health and Population. COVID-19 Cases Isolation Management Guidelines. 2020
7. World Health Organization. Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed. 2021 Jul 21.
8. Wang Z, Ma W, Zheng X, Wu G, Zhang R. Household transmission of SARS-CoV-2. J Infect. 2020 Jul 1;81(1):179–82.
9. Madewell ZJ, Yang Y, Longini IM Jr, Halloran ME, Dean NE. Household Transmission of SARS-CoV-2: A Systematic Review and Meta-analysis. JAMA Netw Open. 2020 Dec 1;3(12):e2031756.
10. Denford S, Morton K, Horwood J, de Garang R, Yardley L. Preventing within household transmission of Covid-19: is the provision of accommodation to support self-isolation feasible and acceptable? BMC Public Health. 2021 Sep 8;21(1):1641.
11. Pan A, Liu L, Wang C, Guo H, Hao X, Wang Q, et al. Association of Public Health Interventions With the Epidemiology of the COVID-19 Outbreak in Wuhan, China. JAMA. 2020 May 19;323(19):1915–23.
12. Wang Y, Tian H, Zhang L, Zhang M, Guo D, Wu W, et al. Reduction of secondary transmission of SARS-CoV-2 in households by face mask use, disinfection and social distancing: a cohort study in Beijing, China. BMJ Glob Health. 2020 May;5(5).
13. Atchison CJ, Bowman L, Vrinten C, Redd R, Pristerà P, Eaton JW, et al. Perceptions and behavioural responses of the general public during the COVID-19 pandemic: A cross-sectional survey of UK Adults. bioRxiv. medRxiv; 2020.
14. Bodas M, Peleg K. Self-Isolation Compliance In The COVID-19 Era Influenced By Compensation: Findings From A Recent Survey In Israel. Health Aff . 2020 Jun;39(6):936–41.
15. World Health Organization. Coronavirus disease (COVID-19): Home care for families and caregivers. 2021
16. Center for Disease Control and Prevention. COVID-19 and Your Health. 2021
17. World Health Organization. COVID-19 NEPAL: PREPAREDNESS AND RESPONSE PLAN (NPRP). 2020 Apr.
18. United Nations. Home care and isolation of mild to moderate cases. COVID-19 Response.
19. Dhungel S. Provincial Comparison of Development Status in Nepal: An Analysis of Human Development Trend for 1996 to 2026. J Mgt Devt Stud. 2018 Nov 22;28:53–68.
20. Fuchs JD, Carter HC, Evans J, Graham-Squire D, Imbert E, Bloome J, et al. Assessment of a Hotel-Based COVID-19 Isolation and Quarantine Strategy for Persons Experiencing Homelessness. JAMA Netw Open. 2021 Mar 1;4(3):e210490.
21. Mathew G and Agha R, for the STROCSS Group. STROCSS 2021: Strengthening the Reporting of cohort, cross-sectional and case-control studies in Surgery. International Journal of Surgery 2021; 96:106165.
22. Dhimal M, Pandey A, Silwal S, Parajuli K, Dhakal N, Neupane T, Gyanwali P. Assessment of Health Status of Home Isolated COVID-19 Patients in Nepal. Nepal Health Research Council, 2020.
23. Karnali Province Planning Commission Nepal Province Planning Baseline and Strategic Options for Karnali Province. 2020. Nov.
24. Province Planning Commission, Province Government, Karnali. Sustainable Development Goals Baseline Report of Karnali Province. 2019. Dec.
25. UNICEF. Child & Family Tracker Public Health and Social Measures. 2021. Jun.
26. Haischer MH, Beilfuss R, Hart MR, Opielinski L, Wrucke D, Zirgaitis G, Uhrich TD, Hunter SK. Who is wearing a mask? Gender-, age-, and location-related differences during the COVID-19 pandemic. PloS one. 2020 Oct 15;15(10):e0240785.
27. Haftom M, Petrucka P, Gemechu K, Mamo H, Tsegay T, Amare E, et al. Knowledge, Attitudes, and Practices Towards COVID-19 Pandemic Among Quarantined Adults in Tigrai Region, Ethiopia. Infect Drug Resist. 2020 Oct 20;13:3727–37.
28. Röösli M, Cissé G. Towards health for future. Int J Public Health. 2020 Jan;65(1):1-2.
29. Elgendy MO, Abd Elmawla MN, Abdel Hamied AM, El Gendy SO, Abdelrahim MEA. COVID-19 patients and contacted person awareness about home quarantine instructions. Int J Clin Pract. 2021 Apr;75(4):e13810.
30. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. Int J Biol Sci. 2020 Mar 15;16(10):1745–52.
31. Rattay P, Michalski N, Domanska OM, Kaltwasser A, De Bock F, Wieler LH, et al. Differences in risk perception, knowledge and protective behaviour regarding COVID-19

by education level among women and men in Germany. Results from the COVID-19 Snapshot Monitoring (COSMO) study. PLoS One. 2021 May 12;16(5):e0251694.

32. Zhang L, Zhu S, Yao H, Li M, Si G, Tan X. Study on Factors of People's Wearing Masks Based on Two Online Surveys: Cross-Sectional Evidence from China. International Journal of Environmental Research and Public Health. 2021 Mar 26;18(7):3447.

33. Hwang TJ, Rabheru K, Peisah C, Reichman W, Ikeda M. Loneliness and social isolation during the COVID-19 pandemic. International psychogeriatrics. 2020 Oct;32(10):1217-20.

34. Galasso V, Pons V, Profeta P, Becher M, Brouard S, Foucault M. Gender differences in COVID-19 attitudes and behavior: Panel evidence from eight countries. Proc Natl Acad Sci U S A. 2020 Nov 3;117(44):27285–91.