

Factors Influencing Facemask and Hand Sanitizer use During the COVID-19 Pandemic in Odisha

Prasanta Patri¹, Dr. Shiba Shankar Pattayat², SK Niyaj Mohammed³, Dr. Rajesh Barik^{4*}

Abstract

This study endeavours to find out the various factors that determine the usage of facemasks and hand sanitizer among the rural people of Odisha (India) during the COVID-19 pandemic time. The study is based on a primary survey. In total, the study has collected 360 individual samples from three districts of Odisha. Additionally, the study applies a logistic regression model to empirically measure the impact of various socio-economic factors on the usage of facemasks and hand sanitizer. The major findings of the study depict that both behavioural and socio-economic factors are impacting the usage of facemasks and hand sanitizer among the people of rural Odisha. Some behavioural factors, such as “thinking of not being required,” “no COVID patients in our areas”, and “feeling suffocation,” are highly restricting rural people from using facemasks. Similarly, some socio-economic factors like “being a male member, young age group, being unmarried, education level, joint family, having children under 5, pucca house, working in private or government organisations, and high income” are positively influencing the usage of facemasks and hand sanitizer among the rural people of Odisha.

Keywords: Facemask, hand sanitizer, COVID-19, logistic regression model, rural

Odisha

¹ Assistant Professor, School of Social, Financial and Human Science, Kalinga Institute of Industrial Technology (KIIT) Bhubaneswar, India.

² Assistant Professor, Department of Economics, CHRIST (Deemed to University), Yeshwanthpur, Bangalore

³ Research Scholar, Shiv Nadar University

^{4*} **Corresponding Author:** Assistant Professor, Department of Economics and Finance, BITS Pilani K K Birla Goa Campus, Email: rajeshbarik195@gmail.com

The sudden escalation of the COVID-19 pandemic has shaken up the entire health system in India. While looking at the trend of COVID cases in India, it can be seen that between March (2020) and mid-October (2020), the cases of the Corona virus were increasing rapidly in India. However, India shows a slight decline in cases from mid-October (2020) onwards (Bedi et al., 2021). But again, recently, India has witnessed an unexpected rise in COVID cases. From March 2021 onwards, India has witnessed a severe rise in COVID cases. The second wave of the COVID-19 surge has aggressively attacked rural India as well. Unlike the first wave, rural India is witnessing a high death rate in the second phase of the Corona spread. This second wave of the COVID surge has become more harmful than the first wave. A large number of people are getting infected every day. Correspondingly, the death rate is also very high as compared to the first wave. As of May 25, 2021, India has seen a total death rate of 3.04 lakhs, with daily death reporting of more than 4000 people. Every day, all news channels, print media, and social media show the excruciating stories of COVID-19 patients. Corona patients are dying like flies due to the shortage of hospital beds, ventilators, oxygen concentrators, ambulances, and sometimes the shortage of doctors and paramedics in the hospital. The death rate has increased in such a way that crematoriums or burials are going out of space.

On the other hand, since the escalation of the virus in December 2019, every government and health organisation has been continuously advising people to wear facemasks, maintain social distancing, and sanitise their hands every 15 to 20 minutes to prevent transmission of the virus. Moreover, while explaining the reasons for the sudden outbreak of this second wave in India, health experts have explained that there are few behavioural, socio-economic, and policy factors that are responsible. From the people's side, lack of social distancing in public places, not wearing a facemask, and no proper hand sanitization have caused COVID-19 cases to rise in India. Similarly, from the government

side, the lack of proactive policy measures, low vaccination rate, poor political interest, and lack of preparation have caused a high death rate of COVID patients (Press Trust of India, 2020; Priyamvatha, 2021; The Lancet, 2021).

Since the early identification of the virus in India, both the central government and various state governments and health experts have been constantly directing people to wear a facemask, use hand sanitizer, and maintain proper social distancing. These practices are some of the necessary methods to control the spread of this virus. According to the health specialist's opinion, this virus is characterised by acute respiratory disorder, pneumonia, dry cough, fever, and body pain, with a high mortality rate, particularly among children, elderly people, and people suffering from other fatal diseases (Lai et al., 2020). Human beings are recognised as the main transmitters of this virus. When a contagious person coughs or sneezes, droplets containing infectious particles (bacteria and viruses) are released (Mahmood et al., 2020), and it can be easily transmitted to a healthy person. Hence, it is always advised to people to use a regular facemask, hand sanitizer, and maintain social distance to control the transmission of the virus.

However, since the eruption of this virus, it has been observed that Indian people have been highly neglecting the practices of using a facemask, hand sanitizer, and social distancing among themselves (Press Trust of India, 2020; The Lancet, 2021). Though people from urban areas and educated youth are somehow using facemasks or hand sanitizer, people from village areas are totally neglecting these practices (The Lancet, 2021). There are a few behavioural and socio-economic reasons that may restrict rural people from using a facemask or hand sanitizer during this COVID-19 pandemic time. Some of the behavioural factors, like feeling uneasy, individual negligence, and the false notion of being a strong immune man or woman, may be impacting the use of facemasks and hand sanitizer. Correspondingly, some of the social and economic factors, such as lack of health literacy or awareness, less income,

unavailability of facemasks and hand sanitizers, unavailability of water, the number of rooms available in a house, members of a family, educational status, etc., can equally determine the usability of facemasks and hand sanitizers among rural people. However, while going through our literature expedition, it was observed that no serious studies have been conducted in the Indian context to understand the various socio-economic determinants of using facemasks and hand sanitizer in either rural or urban areas. Realising the dearth of studies in this regard, this study here attempts to examine the various behavioural and socio-economic factors that determine the usability of facemasks and hand sanitizers among the people of rural Odisha (India).

The rest of the paper is organised into the following sections: Section two of this paper provides a brief literature review related to this topic. Section three of this paper discusses the data collection technique and the econometric method used in this study. Section four of this paper discusses the empirical results. Finally, Section 5 of this paper delivers a concluding remark with some valuable policy suggestions.

Brief Review of Literature

Health experts across the globe have well-mentioned the importance of using a facemask and hand sanitizer during the COVID-19 pandemic. The virus can spread rapidly through human-to-human contact. It is known that the transmission of the virus creates a respiratory disease caused by the SARS-CoV-2 virus. Hence, coming into close contact with an infected person can hamper a healthy individual (Chua et al., 2020; Sikakulya et al., 2021). Similarly, recent studies have confirmed that COVID-19 can spread through the air as well (Greenhalgh et al., 2021; Morawska & Milton, 2020). The best nonpharmaceutical interventions against this disease are wearing a facemask, using hand sanitizer more frequently, and maintaining safe social distance. Wherever social distancing is not possible,

using personal protective equipment (PPE) is the alternative mode of self-protection. Using a facemask is, arguably, the most important way to protect oneself from a virus infection. The use of a facemask creates a physical barrier between infected individuals and healthy people (Chua et al., 2020; Desai & Aronoff, 2020; Lin et al., 2020; Sikakulya et al., 2021; Wang et al., 2020; WHO, 2020). Similarly, scientific communities have confirmed that the use of hand sanitizer or hand washing with soap can inactivate the virus. Washing hands with soap and water for at least 20 seconds can prevent virus transmission. However, due to the scarcity of water at all times, washing hands regularly is not always practical, especially for frontline health care workers. Hence, in that case, the use of hand sanitizer containing 60 percent alcohol would be the best method to combat the virus (Lin et al., 2020; Mahmood et al., 2020).

Throughout the literature journey, we realised that there are a handful of studies that have discussed the significance of using facemasks and hand sanitizer during the prevalence of the COVID-19 pandemic. However, little research has been conducted to investigate the factors that influence the use of facemasks and hand sanitizer by the general public. As various behavioural and socio-economic factors can affect the accessibility and usability of facemasks and hand sanitiser, hence a study in this regard is required. So that proper policy measures can be undertaken by the government and factors that create constraints in the usage of facemasks and hand sanitizer can be eradicated. The eradication of such constraints may protect people from virus transmission and save their lives.

Methods

Sampling Size and Data Collection Procedure

This study is based on primary data. A total of 360 samples have been collected from three districts of Odisha. These districts are Balasore, Bhadrak, and Jajpur (see Table 1).

Because of heavy travel restrictions caused by the COVID-19 pandemic, it was not possible for the researchers to travel to far-distance districts of Odisha. Because of easy accessibility and convenient travel facilities, the researchers endeavoured to collect data from the nearby districts of their own residences. When looking at the sample distribution by district (see table 1), it can be seen that 169 samples (nearly 47 percent) are collected from Balasore districts. Similarly, 86 (nearly 24 percent) and 105 (nearly 29 percent) samples are collected from the other two districts (i.e., Bhadrak and Jajpur), respectively (see table 1). The samples were chosen at random by the researchers from various assembly sites in the village (like the village playground, local market, bathing point, community hall, village assembly points, village temple, etc.). In an attempt to understand the different behavioural patterns of using facemasks or hand sanitizer among the various age groups, the researchers have tried to include samples from all age groups (like younger people, older people, children, etc.). Similarly, to know the gender effect on the use of a mask or hand sanitizer, the researchers have also included samples from both male and female categories. In total, out of 360 samples, 234 males (65 percent) and 126 females (35 percent) are included in the survey. Furthermore, to know the socio-economic condition of the respondents, some questions related to their income, occupation, educational status, family size, marital status, type of family (i.e., nuclear or joint), number of elderly or under-five children, etc. were asked of the respondents.

Table 1*Sampling Details*

Details of the personal Interview			
<i>Socio-demographic Profile</i>		<i>Number of observations</i>	<i>Percentage</i>
District Name	Balasore	169	46.94
	Bhadrak	86	23.89
	Jajpur	105	29.17
Gender	Male	234	65
	Female	126	35
Marital Status	Unmarried	162	45.00
	Married	198	55.00
Age Group	Less than 15 Years	5	1.39
	15 to 29 Years	168	46.67
	30 to 59 Years	150	41.67
	60 and above	37	10.28
Occupation	Farmer	36	10
	Private Employee	75	20.83
	Government		
	Employee	13	3.61
	Student	93	25.83
	Shop keeper	36	10
	House wife	63	17.5
	Others	44	12.22
Educational Qualification	Illiterate	66	18.33
	Primary	45	12.5
	Upper Primary	58	16.11
	Secondary	32	8.89
	Higher Secondary	50	13.89
	Graduate and Above	109	30.28

Source: Author's estimation using primary survey data

The researchers prepared a semi-structured individual interview schedule with both close-ended and open-ended questions. In order to gather the data, a random sampling method is applied. The survey work was conducted with the consent of the respondents and following all the COVID guidelines. The researchers did not pay any monetary remuneration to the participants. All the respondents participated voluntarily in this study. The questions were asked in Odia (the regional language of Odisha state). For each respondent, the interview lasted for nearly 25–30 minutes.

Strategy for Econometric Analysis

Furthermore, to analyse and explain the data better, both descriptive statistics and the econometric method have been used in this study. The study uses basic descriptive statistics to provide an overview of sample details. The descriptive statistics (which include both descriptive tables and figures) provide the socio-economic condition of the sample data and the overall relationship between various socio-economic variables and facemask and hand sanitizer usage during this pandemic. However, the descriptive statistics do not depict any cause-and-effect relationship. Thus, in order to measure the various socio-economic factors impacting the usability of facemasks and hand sanitizer among rural people, an empirical study is required.

Therefore, this study endeavours to empirically examine the impact of various socio-economic factors on the usage of facemasks and hand sanitizers during the COVID-19 pandemic in rural Odisha. The study uses two dependent variables (i.e., one is for the usage of a facemask and another is for hand sanitizer practices), which are binary in nature. This study runs two regression models. In model 1, the dependent variable is “Use of Mask (1 for yes and 0 for no), and in model 2, the dependent variable is “Use of Hand Sanitizer (1 for yes and 0 for No).”Based on the binary nature of the dependent variable and the small sample

size, the logit regression model is the appropriate choice to examine the socio-economic determinants of the use of masks and sanitizers during the COVID-19 pandemic in rural Odisha. Moreover, this method usually fits linear logistic regression models for binary or ordinal response data by the process of maximum likelihood (Hosmer et al., 1989).

The logit model runs a function of the probability that a case falls in a specific category of the dependent variable on the linear combination of independent variables (X_i). For model 1, the dependent variable is *Use of Mask*, which is symbolised as UMS, and the independent variables are symbolised as (X_i). So, the general form of the logit regression model for model 1 is as follows.

$$UMS = f \left(\beta_0 + \sum_{i=1}^n \beta_i X_i \right) \dots \dots \dots (1)$$

$$UMS = \begin{cases} 1 = Yes & if \ UMS > 0 \\ 0 = No & if \ UMS \leq 0 \end{cases}$$

Where β_0 has a constant value and β_i is the coefficient value which varies for different independent variables.

Similarly, for model 2, the dependent variable is *Use of Hand Sanitiser*, which is symbolised as UHS and the independent variables are symbolised as (Z_i). So, the general form of the logit regression model for model 2 is as follows.

$$UHS = f \left(\gamma_0 + \sum_{i=1}^n \gamma_i Z_i \right) \dots \dots \dots (2)$$

$$UHS = \begin{cases} 1 = Yes & if \ UHS > 0 \\ 0 = No & if \ UHS \leq 0 \end{cases}$$

Where γ_0 has a constant value and γ_i is the coefficient value which varies for different independent variables.

Results and Discussion

The second wave of the COVID surge is spreading aggressively to rural areas, where nearly 65 percent of India's population lives. The recent rise of COVID deaths and the incident of floating dead bodies in the Ganga River in Uttar Pradesh and Bihar (Singh, 2021) have revealed the colossal devastation that rural India has confronted during this second wave. On the other hand, India has failed to provide adequate vaccines to the people. When the urban vaccination centres are running out of vaccine (Alluri, 2021; Ellis-Petersen, 2021; Jain, 2021), it is quite unimaginable to even think about the provision of adequate vaccine to the rural masses. In this context, the use of facemasks, hand sanitizer, and maintaining social distance are the only preventive measures that can protect the rural masses from the infection of COVID-19 diseases. Conversely, it was found that the majority of rural people in India were not using or practicing facemasks, hand sanitizer, or social distancing (The Lancet, 2021) during this COVID-19 pandemic.

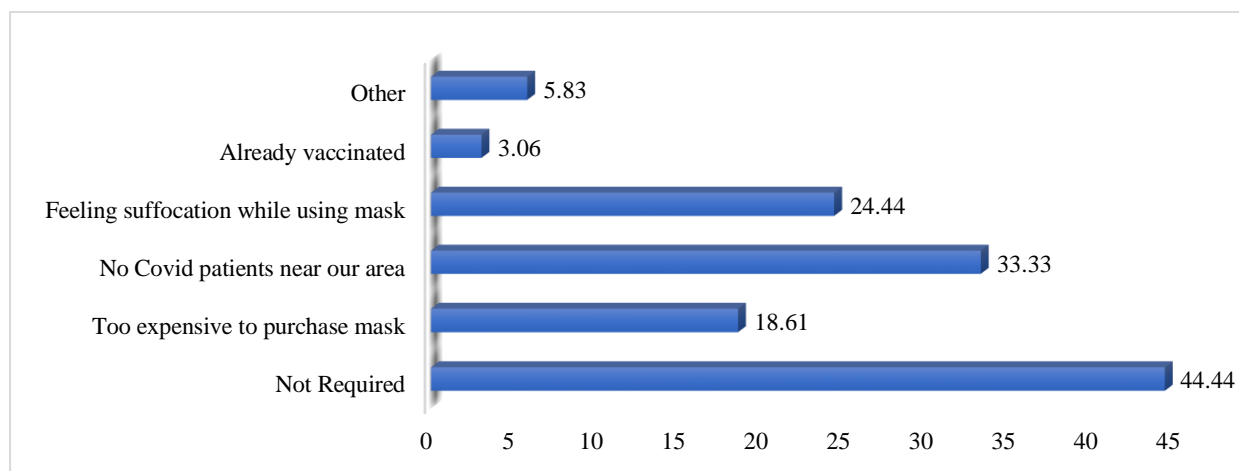
To know the social, economic, and behavioural factors that restrict people from using facemasks and hand sanitizer, this study asks a few questions related to the reasons for not using facemasks and hand sanitizer. Our survey results from rural Odisha depict that 54.72 percent and 61.67 percent of people did not use any facemasks or hand sanitizer during the COVID-19 pandemic period. If such a large population is avoiding using facemasks and hand sanitizer, then surely this would rapidly spread the COVID-19 virus among rural people. Hence, while asking the reasons for not using the facemask, we found diverse responses from the respondents (see Fig. 1). From Figure 1, it can be observed that the majority of respondents think that it is not required for them to wear a facemask. This response clearly indicates the lack of health literacy among rural people. Though the transmission of COVID-19 disease is dispersing very first in rural areas, the people have not realised the life-damaging nature of this virus. Similarly, the second major reason people have revealed is that

they would not prefer to wear a facemask because no COVID patients were found in their nearby areas. Again, this response also shows the degree of health illiteracy among rural people. Understanding the diffusion of the virus through the air, the World Health Organisation and other health experts have repeatedly advised people to wear masks (Greenhalgh et al., 2021; Morawska & Milton, 2020), even if there is no COVID patient detected in their area. Even the government of India has directed people to wear a mask inside their homes. However, the rural masses are ignorant of this information.

Likewise, many people have also responded that because of suffocation and the high purchasing cost of a facemask, they are not using one. Similarly, a few respondents have said that they would not desire to wear a mask as they have already been vaccinated.

Figure 1

Different Reasons for not Using Facemask During the COVID-19 Pandemic



Source: Author’s estimation using primary survey data

Use of Facemask and Hand Sanitizer by Socio-Economic Groups

While comparing the usage of facemasks and hand sanitizer by the diverse socio-economic status of the respondents, it was found that a more significant number of males are using facemasks and hand sanitizer than their female counterparts (see Tables 2 and 3). Out

of the total male samples (i.e., 234), nearly half of the respondents (i.e., 50 percent) have reported using a facemask. While in the case of female respondents, the number of usages of the facemask is quite low (i.e., nearly 37 percent are using a facemask). Similarly, in the case of hand sanitizer practices, nearly 43 percent of male respondents use hand sanitizer, in contrast to nearly 36 percent of their female counterparts. As male members are the breadwinners of the family, they frequently visit outside for work purposes. That has induced the male members to wear facemasks and to use hand sanitizer while going outside. On the other hand, mostly women in rural Odisha are working as housewives; hence, due to their limited social mobility and low income, they do not prefer to use facemasks and hand sanitizer.

Similarly, while observing the data from all age groups, it was found that more people from the 15 to 29 age group are using a facemask and hand sanitizer than the older age population (i.e., 60 and above). People from below 15 years and 30 to 59 years are also using a facemask in quite a greater number than the older age population (see table 2). Similarly, the age group-wise comparison of hand sanitizer practice reveals that nearly 56 percent of younger people (i.e., 15 to 29) are using hand sanitizer. Our study has found only 5 samples for children under the age of 15, and all five have reported that they were not using any sanitizer during the COVID-19 pandemic. Similarly, between 30 to 59 and 60 and above age group people, only 25 percent and 16 percent, respectively, use hand sanitizer during this pandemic (see table 3). The low usage of facemasks and hand sanitizer among older people indicates low outside mobility and less health awareness among them.

Moreover, while observing the usage of a facemask and hand sanitizer from a marital status perspective, it is observed that unmarried people are using more facemasks and hand sanitizer than married individuals. It can be observed from Table 2 that nearly 63 percent of unmarried people use facemasks, while only 31 percent of married people prefer to use

facemasks. Likewise, the age group-wise comparison of the use of hand sanitizer depicts that nearly 56 percent of unmarried people use hand sanitizer, in contrast to only 24 percent of married persons (see table 3). This might be happening because the unmarried group includes school-going children and educated youth individuals who might be using facemasks and hand sanitizer more frequently due to their high awareness. On the other hand, most of the older people are in the married category. Thus, lack of proper health education, low literacy, low outward mobility, and less income must be restricting older people from using facemasks and hand sanitizer during this pandemic. As a result, the married population as a whole uses fewer facemasks and hand sanitizers.

Furthermore, while looking at the data from a family type perspective, we did not observe any significant differences in the usage of facemasks between members of the nuclear family and the joint family (see table 2). However, in the case of hand sanitizer practices, a significant difference has been observed between nuclear and joint family members (see table 3). The usage of hand sanitizer practices from the family type perspective shows that joint family members are using hand sanitizer in a greater number (i.e., nearly 42 percent) than nuclear family members (which is nearly 35 percent). This result is expected because joint families have more members in their family, so there are high chances of coming into close contact with other family members. Hence, in order to protect from virus transmission, joint family members are using hand sanitizer in greater numbers.

Table 2*Use of Mask by Socio-Economic Groups in Rural Odisha During COVID-19*

Categories	Number of Observation			Percentage Figure (%)		
	Yes	No	Total	Yes	No	Total
<i>By Gender</i>						
Male	116	118	234	49.57	50.43	100
Female	47	79	126	37.3	62.7	100
<i>Age Groups</i>						
Less than 15 Years	2	3	5	40	60	100
15 to 29 Years	104	64	168	61.9	38.1	100
30 to 59 Years	52	98	150	34.67	65.33	100
60 and above	5	32	37	13.51	86.49	100
<i>By Marital Status</i>						
Unmarried	102	60	162	62.96	37.04	100
Married	61	137	198	30.81	69.19	100
<i>By Type of Family</i>						
Nuclear family	93	114	207	44.93	55.07	100
Joint family	70	83	153	45.75	54.25	100
<i>By Occupation Groups</i>						
Farmer	8	28	36	22.22	77.78	100
Private Employee	46	29	75	61.33	38.67	100
Government						
Employee	13	0	13	100	0	100
Student	59	34	93	63.44	36.56	100
Shop keeper	18	18	36	50	50	100
House wife	5	58	63	7.94	92.06	100
Others	14	30	44	31.82	68.18	100
<i>By Monthly Family Income</i>						
No Income	38	92	130	29.23	70.77	100
₹2000-₹5000	10	25	35	28.57	71.43	100
₹5000-₹7000	21	30	51	41.18	58.82	100
₹7000-₹10000	24	26	50	48	52	100
₹10000-₹15000	16	11	27	59.26	40.74	100

₹15000-₹20000	14	6	20	70	30	100
₹20000 and Above	40	7	47	85.11	14.89	100
By level of Education						
Illiterate	7	59	66	10.61	89.39	100
Primary	8	37	45	17.78	82.22	100
Upper Primary	17	41	58	29.31	70.69	100
Secondary	13	19	32	40.63	59.38	100
Higher secondary	34	16	50	68	32	100
Graduate and above	84	25	109	77.06	22.94	100

Source: Author's estimation using primary survey data

Moreover, occupation-wise comparison finds that people working in government organisations, engaged in the private sector, students, and shopkeepers are using a facemask in greater numbers than other occupation groups (such as farmers, housewives, etc.). This finding is quite obvious because the people working in private and government organisations are likely to go outside for their official work; thus, they are strictly following the COVID guidelines. Similarly, a greater number of facemask usages among the students indicates better COVID awareness among them. Likewise, out of the total 36 shopkeeper respondents, 50 percent of the respondents (i.e., 18) are wearing a facemask. As the shopkeepers are more likely to come into close contact with other people, that may be inducing them to wear facemasks during the COVID pandemic. However, our occupation-wise comparison of hand sanitizer practices illustrates a slightly different story than its earlier narration with context to facemasks. The results of Table 3 show that government employees (nearly 77 percent) and students (nearly 62 percent) are greater users of hand sanitizer during this pandemic. Unlike facemask results, the private employees and the shopkeepers are not using hand sanitizer in such a large number. Correspondingly, farmers, housewives, and people engaged in other occupations use hand sanitizer at a very low rate.

Furthermore, our income group comparison of facemask and hand sanitizer usage depicts that people with higher incomes are using facemasks and hand sanitizers in greater

numbers than their lower-income group categories (see tables 2 and 3). This clearly indicates the relationship between income and the use of a facemask and hand sanitizer. It is always difficult for the poor and low-income group of people to buy facemasks and hand sanitizer more frequently with their little income. Additionally, as many of the low-paid workers work as daily wage labour, there is a high chance that their facemask will tear down more frequently. Therefore, for poor and low-paid workers, it is much more difficult to purchase facemasks and hand sanitizer.

Similarly, another major variable, such as level of education, can be considered an important factor that influences the usage of a facemask and hand sanitizer. Thus, while looking at the relationship between level of education and usage of facemasks and hand sanitizer, it was found that people from lower education levels and the illiterate category were rarely using facemasks and hand sanitizer during this pandemic. Conversely, people from higher education levels are using facemasks and hand sanitizer in a greater number (see tables 2 and 3). This result is quite expected because a higher level of education brings a higher level of awareness among the individuals, which would induce them to wear a facemask and hand sanitizer to protect themselves from the infection.

Table 3

Use of Sanitizer by Socio-Economic Groups in Rural Odisha During COVID-19

	Use of Sanitizer (in number)			Rate of Sanitizer use (%)		
	Yes	No	Total	Yes	No	Total
<i>By Gender</i>						
Male	54	72	126	42.86	57.14	100
Female	84	150	234	35.9	64.1	100
<i>Age Groups</i>						

Less than 15 Years	0	5	5	0	100	100
15 to 29 Years	94	74	168	55.95	44.05	100
30 to 59 Years	38	112	150	25.33	74.67	100
60 and above	6	31	37	16.22	83.78	100
<i>By Marital Status</i>						
Unmarried	90	72	162	55.56	44.44	100
Married	48	150	198	24.24	75.76	100
<i>By Type of Family</i>						
Nuclear family	73	134	207	35.27	64.73	100
Joint family	65	88	153	42.48	57.52	100
<i>By Occupation Groups</i>						
Farmer	5	31	36	13.89	86.11	100
Private Employee	30	45	75	40	60	100
Government						
Employee	10	3	13	76.92	23.08	100
Student	58	35	93	62.37	37.63	100
Shop keeper	11	25	36	30.56	69.44	100
House wife	13	50	63	20.63	79.37	100
Others	11	33	44	25	75	100
<i>By Monthly Family Income</i>						
No Income	7	28	35	20	80	100
₹2000-₹5000	12	39	51	23.53	76.47	100
₹5000-₹7000	17	33	50	34	66	100
₹7000-₹10000	45	85	130	34.62	65.38	100
₹10000-₹15000	12	15	27	44.44	55.56	100
₹15000-₹20000	13	7	20	65	35	100
₹20000 and Above	32	15	47	68.09	31.91	100

By Level of Education						
Illiterate	4	62	66	6.06	93.94	100
Primary	7	38	45	15.56	84.44	100
Upper Primary	10	48	58	17.24	82.76	100
Secondary	11	21	32	34.38	65.63	100
Higher secondary	28	22	50	56	44	100
Graduate and above	78	31	109	71.56	28.44	100

Source: Author's estimation using primary survey data

Empirical Findings and Discussion

Here, the study has endeavoured to empirically examine the various socio-economic factors that are determining the usage of facemasks and hand sanitizer among the rural people of Odisha during the COVID-19 pandemic period. For conducting the empirical testing, we have chosen some major social and economic factors that are playing a significant role in influencing the usage of both facemasks and hand sanitizer. This study included two separate empirical tests. One empirical test examines the use of facemasks, while the other examines the use of hand sanitizer among rural Odia inhabitants.

Moreover, based on the coefficient sign of our regression results, it can be observed that females are less likely to wear facemask during the pandemic time. It is observed from our survey that generally, women are working as a housewife in their home. Hence, the less outward mobility has induced them not to wear facemask inside the home. Furthermore, it is also observed that whenever they go outside from their home, they normally use their *saree*¹ or *pallu*² to cover their face instead of using facemask. Additionally, the lower participation

¹ A typical dressing style for women, basically seen in South Asian sub-continent.

² Women in Indian sub-continent uses it to cover their head while going outside of their home or talking to any elderly/unknown person.

of women in the labour market led to low income, which is also restricting them from purchasing facemask for them. Similarly, in case of the use of sanitizer, we found a similar kind of results for women individuals. Like the usage of facemask, women in rural Odisha are also using less hand sanitizer in comparison to their male counterparts (see Table 5).

Table 4

Determinants of Mask use in Rural Odisha (Logit Regression Results)

Variables (Dep. Var: Mask use)	Coefficient	z-value	Marginal Effect(dy/dx)
Gender dummies (Reference Category: Male)			
Female	-0.46	-1.11	-0.07
Age group dummies (Reference category: 60 Years and above)			
15 to 29 Years	0.15	0.21	0.02
30 to 59 Years	0.24	0.41	0.04
Marital status dummies (Reference category: Unmarried)			
Married	-0.01	-0.01	-0.001
Education dummies (Reference category: Illiterate)			
Primary	0.52	0.85	0.08
Upper Primary	0.75	1.33	0.11
Secondary	1.06	1.64	0.15
Higher Secondary	2.44	3.72***	0.35
Graduate and Above	2.69	4.19***	0.39
Types of family dummies (Reference category: Nuclear family)			
Joint Family	0.1	0.31	0.01
Number of Children under 5 Years	0.14	0.39	0.02
Number of Elderly members	0.04	0.12	0.01
Type of house dummies (Reference category: Kaccha house)			
Pucca house	0.38	1.08	0.06
Occupation dummies (Reference category: Other occupation)			
Farmer	-0.1	-0.17	-0.01
Private employee	0.56	1.29	0.08
Student	0.1	0.17	0.01
House wife	-1.78	-2.12**	-0.26

Monthly income dummies (Reference category: less than ₹7000)

No income	-0.56	-1.1	-0.08
₹7000-₹15000	0.12	0.3	0.02
More than ₹15000	1.11	2.26**	0.16
No awareness among people	-2.09	-2.34**	-0.3
No Awareness programme by authority	-0.61	-1.97**	-0.09
Constant	-1.47	-1.7*	---
Number of Observation		360	
LR chi2(22)		175.02***	
Pseudo R2		0.353	
Log likelihood		-160.41348	

Source: Author's estimation using primary survey data.

Note: *, ** and *** imply statistical significance at 5%, 10% and 1% levels respectively.

While looking into the age group dummies, we found the youth population (15–29) is more likely to use both facemasks and hand sanitizer as compared to the elderly population. Though the coefficient signs for both facemask and hand sanitizer shows positive for youth population, the level of significance is not similar for both variables (i.e., facemask and hand sanitizer). For the youth population, our empirical result found an insignificant impact on the usage of facemasks (see table 4). Conversely, our results found a significant impact on the use of hand sanitizer (see table 5).

Similarly, our result from marital status shows that married people in rural Odisha are less likely to wear facemasks in comparison to their unmarried counterparts. This result and its analysis are purely supporting our descriptive analysis (see table 2). As most of the elderly persons are coming under the married category, their lack of health literacy or awareness is discouraging them from using facemasks. Additionally, some of the elderly respondents have also reported that they feel suffocated while using a facemask. As a result of all these reasons, married people are less likely to use facemasks than unmarried people. Conversely, most of the young people are in the unmarried category. It has been observed in the field that youth mostly prefer to go outside. Hence, because of heavy COVID guidelines by the state

government, the youth are bound to obey the rules and use a facemask. Similarly, in the case of hand sanitizer practices, we found a similar type of result. That means unmarried people are more likely to use hand sanitizer than their married counterparts (see table 5).

Furthermore, while looking at the role of education on the use of facemasks and hand sanitizer, our result depicts that people with higher education levels are more likely to use both facemasks and hand sanitizer during this COVID-19 pandemic. Additionally, people with a lower level of education are also having a positive influence on the use of facemasks and hand sanitizer, but the impact is not statistically significant (see tables 4 and 5). That means a higher level of education promotes more health awareness among the rural people, which persuades them to use facemasks and hand sanitizers to protect themselves from virus transmission.

Moreover, we found that families with children under 5 years old are more likely to use facemasks and hand sanitizer while coming close contact with their children. Because of their low immunity, children are more likely to be infected by the virus. Thus, parents and other family members always prefer to use masks and hand sanitizer to protect their children from virus transmission. From our empirical results, we found a positive and significant impact for hand sanitizer (see table 5), while the use of a facemask had an insignificant result (see table 4).

Likewise, occupations related to higher education, like studentship, and private or government employees are more likely to use facemasks and hand sanitizer. Though we have found a positive impact of these occupations on facemask and hand sanitizer usage, the impact is not significant. However, in facemask usage, we found a negative and insignificant result for farmers and a negative and significant result for housewives (see table 4). Similarly, we found negative and insignificant results for both farmers and housewives in rural Odisha

for hand sanitizer practices (see table 5). It is found that most rural people are engaged in their agricultural activities. Farmers mostly belong to lower education groups, for which they have less COVID-related awareness among them. Additionally, because of less vigilance by the local authority on the use of facemasks, rural farmers are also not using facemasks regularly. Even if they are using it occasionally, instead of wearing a mask, they prefer to use their own towel. However, in the case of housewives, it is found that because of their lower outward mobility, they are less likely to use a facemask.

Similarly, while looking at the influence of individual income on the usage of facemasks and hand sanitizer, our empirical findings show that people with higher incomes (>15000) are more likely to use both facemasks and hand sanitizer as compared to their lower-income groups. It is more common that people with higher incomes will always prefer to protect themselves from the disease infection. Their higher standard of living allows them to purchase facemasks and hand sanitizer more frequently. As a result, people with high incomes are more likely to use both facemasks and hand sanitizer during this pandemic (see tables 4 and 5).

Except for these socio-economic variables, we found that community awareness programmes by the local authority and the degree of self-awareness also influence the chances of using facemasks and hand sanitizer among rural people. Our empirical findings show that people with a lower degree of self-awareness are less likely to use both facemasks and hand sanitizer. Similarly, the lack of a community awareness programme in their vicinity also negatively impacts the usage of facemasks and hand sanitizer among the rural people. Because of the low degree of awareness among the people and the lack of initiative from the local authorities, people are less likely to use both facemasks and hand sanitizers (see tables 4 and 5).

Table 5*Determinants of Sanitizer Use in Rural Odisha (Logit Regression results)*

Variables (Dep. Var: Sanitizer use)	Coefficient	z-value	Marginal Effect(dy/dx)
Gender dummies (Reference Category: Male)			
Female	-0.99	-2.28**	-0.14
Age group dummies (Reference category: 60 Years and above)			
15 to 29 Years	1.26	1.65*	0.17
30 to 59 Years	0.28	0.44	0.04
Marital status dummies (Reference category: Married)			
Unmarried	0.02	0.04	0.003
Education dummies (Reference category: Illiterate)			
Primary	0.94	1.31	0.13
Upper Primary	0.43	0.63	0.06
Secondary	1.37	1.92*	0.19
Higher Secondary	2.06	2.86***	0.28
Graduate and Above	2.61	3.71***	0.36
Types of family dummies (Reference category: Nuclear family)			
Joint Family	0.29	0.89	0.04
Number of Children under 5 Years	0.85	2.24**	0.12
Number of Elderly members	-0.21	-0.64	-0.03
Type of house dummies (Reference category: Kaccha house)			
Pucca house	0.41	1.09	0.06
Occupation dummies (Reference category: Other occupation)			
Farmer	-0.16	-0.23	-0.02
Private/govt. employee	0.28	0.5	0.04
Student	-0.43	-0.78	-0.06
House wife	-0.09	-0.11	-0.01
Monthly income dummies (Reference category: less than ₹7000)			
No income	-0.23	-0.44	-0.03
₹7000-₹15000	0.4	0.84	0.05
More than ₹15000	1.39	2.7***	0.19
No awareness among people	-1.92	-2.17**	-0.26

No Awareness programme by authority	-1.43	4.41***	-0.2
Constant	-2.21	-2.14**	---
Number of Observation		360	
LR chi2(22)		173.41***	
Pseudo R2		0.3618	
Log likelihood		-152.93719	

Source: Author's estimation using primary survey data.

Note: *, ** and *** imply statistical significance at 5%, 10% and 1% levels respectively.

Conclusion

The primary objective of this study is to empirically examine the different socio-economic and behavioural factors that might be influencing the usage of facemasks and hand sanitizers during this COVID-19 pandemic among the rural people of Odisha (India). Thus, to execute the above-cited objective, the study has gathered 360 individual samples from three districts of rural Odisha. Additionally, to empirically examine the impact of various socio-economic factors on the usage of facemasks and hand sanitizer, the study has used a logit regression model. The major empirical findings of our study depict that in the case of facemask use, some socio-economic factors such as being a male member, being in a young age group, being unmarried, education, joint family, having children under 5, having an elderly member in the family, pucca house, being a student, working in private or government organisations, and having a high income are positively influencing the usage of a facemask. On the other hand, being a woman, being older, being married, living in a kaccha house, being a housewife, working as a farmer, having no income, a low level of self-awareness, and a lack of government health awareness programmes all have a negative impact on the use of a facemask in rural Odisha. Similarly, in the case of hand sanitizer, socio-economic variables like being a male individual, young age population, being unmarried, educated, joint family, families having children under 5, pucca house, working in

a private or government organisation, and high income positively influence hand sanitizer practices. Oppositely, being a female person, older people, being a married individual, having an elderly member in the family, working as a farmer or housewife, having no income, having a lower degree of self-awareness, and having fewer government health awareness programmes have a negative influence on the usage of hand sanitizer.

Policy Suggestions

From figure 1, it can be seen that a large number of sample respondents have reported that wearing a facemask is not required for themselves. Similarly, some of the respondents have also reported that because of no Covid patient detected in the nearby areas and due to suffocation, they are not interested to use facemask. This kind of response clearly indicates the lack of health awareness/literacy among rural people. Correspondingly, our empirical result also shows the low degree of self-awareness and less government awareness programme have negatively influenced the usage of both facemask and hand sanitizer. That means it is necessary for the government authorities to provide more health awareness/literacy programme in the rural areas. Furthermore, our empirical result shows that the income level of an individual plays a significant role in the usage of both facemask and hand sanitizer. Based on this finding, this study would suggest that if the government could provide facemask and hand sanitizer at free of cost to the rural people through the local ASHA (Accredited Social Health Activist) or *Anganwadi* employees, then it would surely encourage them to wear facemask and hand sanitizer.

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Conflict of Interest

The study declares no conflict of interest.

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