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Original Research Article

Evaluating public health awareness and hygienic interventions amidst the COVID-19 outbreak: insights from three districts in Himachal Pradesh, India

Gurinder Kaur Walia, Richa Sharma, Diksha Chopra*

Department of Zoology and Environmental Sciences, Punjabi University Patiala, Punjab, India

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***Correspondence:**
Dr. Diksha Chopra,
E-mail: Chopradiksha31@gmail.com

ABSTRACT

Background: This study aimed to elucidate the awareness, knowledge, and adoption of COVID-19 prevention measures, including the utilization of masks, hand sanitizers, social distancing, proper sanitation, and adherence to lockdown protocols, among residents of Hamirpur, Bilaspur, and Mandi in Himachal Pradesh, India. With a particular focus on vaccination strategies, this research investigates the pivotal role of vaccination in curbing the spread of the pandemic and reducing the associated morbidity and mortality rates.
Methods: A cross-sectional survey was conducted from April to May 2022, involving a structured questionnaire designed to assess environmental impacts, testing knowledge, public health behaviors, and vaccine perceptions. The survey sample included participants from diverse socio-economic backgrounds. Data were analyzed using descriptive statistics and inferential analysis to identify correlations between socio-educational factors and adherence to COVID-19 prevention measures.
Results: The findings indicate a moderate level of awareness and knowledge around 93.76% about COVID-19 prevention measures among the residents. However, significant gaps were identified, particularly in understanding the importance of vaccination and proper sanitation practices. The analysis revealed that socio-educational factors significantly influenced public attitudes and behaviors towards COVID-19 prevention. Notably, lower socio-economic groups exhibited lower adherence to recommended health behaviors.
Conclusions: The study underscores the critical need for targeted awareness campaigns to enhance public understanding of COVID-19 transmission, severity, and preventive measures. Educational initiatives should prioritize clear and accessible communication, especially for lower socio-economic groups, to mitigate the impact of the pandemic. Empowering communities with comprehensive knowledge is essential for effective public health management and reducing COVID-19 morbidity and mortality.

Keywords: COVID-19, Himachal Pradesh, Pandemic, Transmission, Vaccination

INTRODUCTION

In December 2019, the global health community was alerted to a novel coronavirus, responsible for severe respiratory illnesses and exhibiting high transmissibility. This pathogen was first identified in Wuhan, China, on December 31, 2019, through the isolation of the virus from three patients with pneumonia linked to an acute respiratory infection cluster.[1] The rapid spread of the virus nationally and internationally led the World Health Organization (WHO) to declare a pandemic, marking the onset of the COVID-19 global health emergency.[2] Prior to the COVID-19 pandemic, only two other coronaviruses had led to widespread outbreaks. The first,

the SARS coronavirus, caused the severe acute respiratory syndrome (SARS) outbreak in 2002 in China. This epidemic predominantly affected mainland China and Hong Kong and concluded in 2003. The second, MERS-CoV (Middle East Respiratory Syndrome Coronavirus), emerged in 2013 in Dubai, lead to a severe and often fatal disease. Between 2013 and January 15, a total of 2,506 cases of MERS-CoV were reported, with 862 fatalities.[3]

SARS-CoV-2, the causative agent of the coronavirus disease (COVID-19), leads to an infectious condition predominantly characterized by mild to moderate respiratory symptoms. The majority of those infected recover without the need for specialized medical intervention. However, a segment of the population may experience severe illness necessitating medical care, particularly older adults and individuals with pre-existing health conditions such as cardiovascular disease, diabetes, chronic respiratory conditions, or cancer. Despite the potential for severe outcomes at any age, comprehensive knowledge about the disease and its transmission mechanisms is crucial for prevention and control.[4] Preventative measures include maintaining a minimum distance of one meter from others, wearing masks correctly, and frequent hand washing or the use of alcohol-based hand sanitizers. On 16th January 2021, India embarked on one of the world's largest COVID-19 vaccination campaigns, successfully vaccinating over 6 million people. According to a statement by the government's Press Information Bureau posted on 8th February, "India is the fastest country to vaccinate 6 million beneficiaries countrywide".[5]

India confirmed its first case of COVID-19 on January 30,2020, involving a 20-year-old woman presenting with symptoms at Thrissur General Hospital with a travel history from Wuhan, China. The initial three instances surfaced towards the end of January and the beginning of February 2020. Following these cases, there was a pause in reports from February 4 until March 1, 2020. However, starting from March 2, 2020, there was a noticeable uptick in cases across various states within India.[6]

The virus received its official designation as "severe acute respiratory syndrome" by the International Committee on Virus Taxonomy in 2020. India experienced its initial COVID-19 wave in 2020, followed by a more devastating second wave in March 2021, and a third wave impacting minors from August to October 2021. India's vaccination drive in 2021 included AstraZeneca's Covishield and the domestically produced Covaxine, with later approvals for Sputnik V and the Moderna vaccine. By 2021, over 1.7 billion vaccine doses had been administered, fully vaccinating more than 720 million people. Himachal Pradesh achieved the milestone of administering the first vaccine dose to 100% of its adult population.[7]

COVID-19: clinical presentation and pathophysiology

COVID-19, designated as coronavirus disease 2019, is an infectious condition precipitated by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Transmission of the virus primarily occurs through respiratory droplets and aerosols expelled by an infected individual during coughing, sneezing, talking, or breathing.

Clinical manifestation

The clinical spectrum of COVID-19 varies widely among individuals, with the majority presenting mild to moderate symptoms that do not necessitate hospitalization. These manifestations can be broadly classified into common, less common, and severe symptoms, reflecting the disease's impact on various bodily systems (Table 1).[8,9]

Table 1: Symptoms, transmission and application of various digital technologies during COVID-19.

Common clinical symptoms	**Fever, cough, fatigue, loss of smell, loss of taste, difficulty breathing**	**Up to 87% report fever; 68% report cough**
Less common symptoms	Sore throat, headache, muscle pain, joint pain, diarrhea, skin rash	Skin rash in 20% of cases; diarrhea in 5-10%
Severe symptoms	Significant breathing difficulty, loss of speech/mobility, confusion, chest pain	Severe symptoms in 15-20% require hospitalization
Modes of transmission	Respiratory droplets from coughing, sneezing, speaking, or breathing; aerosol transmission in poorly ventilated areas; contact transmission from contaminated surfaces	
Transmission period		
Mild symptomatic	Isolation for at least 5 days after symptoms, mask for an additional 5 days post-isolation	
Asymptomatic	Isolation ends at least 5 days after a positive test, with mask for 5 days post-isolation	
Critically ill	Isolation for 10-20 days after symptom onset, considering fever reduction and symptom improvement	
Recovered patients	SARS-CoV-2 RNA detectable up to 3 months post-	

Continued.

Common clinical symptoms	Fever, cough, fatigue, loss of smell, loss of taste, difficulty breathing	Up to 87% report fever; 68% report cough
	recovery, but unlikely to be infectious	
Digital technologies/strategies		
Temperature gun	Non-contact temperature measurement	Used at 85% of public building entrances during peak periods
Contact tracing	Identifying and isolating individuals who may have been exposed	Enabled self-isolation of 500,000 individuals in a month
Containment	Tools and strategies to limit infection spread	40% reduction in transmission in affected areas
Lockdown	Government restrictions on movement	60% decrease in mobility nationwide during initial phase
Quarantine	Isolating individuals exposed to the virus	Over 3 million quarantined
Screening	Assessing individuals for signs of disease	Screened 10 million air travelers, identifying potential cases
Testing	Medical tests to confirm diagnosis	Over 300 million tests conducted
Planning and tracking	Aarogya setu app for contact tracing and monitoring	Downloaded by over 100 million users
Full body sanitizer machine	Devices for whole-body sanitization	Installed in 50% of airports and train stations

Individuals with mild symptoms generally exhibit a robust response to home-based management strategies. The incubation period, or the time from exposure to SARS-CoV-2 to symptom onset, averages 5-6 days, albeit it may extend up to 14 days in certain cases, underscoring the virus's variable pathogenesis.

Transmission dynamics and viral load

SARS-CoV-2 infection is marked by its high transmissibility. Viral load studies indicate that the peak viral load coincides with or precedes symptom onset, contributing to the virus's widespread transmission in asymptomatic and pre-symptomatic stages (Table 1).[10]

Immunopathology

The host immune response to SARS-CoV-2 is a critical determinant of disease severity. An effective immune response can lead to symptom resolution and recovery, whereas a dysregulated response, characterized by a cytokine storm, can precipitate systemic inflammation, multi-organ dysfunction, and severe clinical outcomes (Table 1).[11-14]

Global impact of COVID-19 and the importance of regional studies

The COVID-19 pandemic has profoundly affected all aspects of human life, causing significant morbidity and mortality, straining healthcare systems, disrupting economies, and altering social behaviors. It led to widespread unemployment, business closures, and supply chain disruptions. Education faced major challenges with a shift to online learning, worsening educational inequalities. Socially, the pandemic increased mental health issues, domestic violence, and altered interactions due to lockdowns and social distancing.[15]

Regional studies are crucial for understanding and combating COVID-19 as they highlight the varied experiences of different areas influenced by healthcare infrastructure, government policies, population density, cultural practices, and socioeconomic conditions.[16] These studies provide insights into public health interventions, vaccine distribution, and socioeconomic impacts, helping tailor responses to each area's needs. They also inform global strategies by showcasing successful approaches and challenges. Effective management in Taiwan and New Zealand contrasts with difficulties in resource-limited countries, emphasizing the need for global support and cooperation. Regional disparities in vaccine access and health infrastructure highlight the importance of addressing global health inequalities.[17]

The survey aimed to assess COVID-19 awareness and preventive measures among residents of Bilaspur, Hamirpur, and Mandi districts, examining the influence of socio-educational backgrounds and the impact of vaccinations on reducing transmission and severity.

Validation of questionnaire

The COVID-19 questionnaire was rigorously validated for reliability and validity. Content validity was ensured through a literature review and expert consultation, covering key aspects like environmental impact, transmission dynamics, and public health measures. [18] Face validity was confirmed by expert review, while construct validity was verified via factor analysis. Criterion validity was supported by correlating results with established COVID-19 measures. Reliability testing showed strong internal consistency (Cronbach's alpha =

0.85). Limitations include potential self-report biases and variations in respondent interpretation. Overall, the validated questionnaire is a robust tool for assessing COVID-19 impact.

METHODS

A cross-sectional descriptive study was conducted from April to May 2022 in the districts of Hamirpur, Bilaspur, and Mandi in Himachal Pradesh (Figure 1). A structured questionnaire assessed environmental impacts, knowledge, public health behaviors, and vaccine perceptions. The survey included 102 participants from diverse socio-economic backgrounds. Data were analyzed using descriptive statistics and inferential analysis to identify correlations between socio-educational factors and adherence to COVID-19 prevention measures.

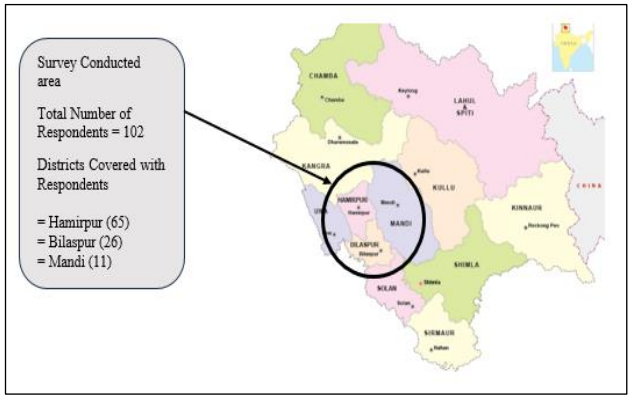

Figure 1: Map showing three districts of Himachal Pradesh.[19]

Inclusion criteria

Participants aged 18 years and above who were residents of Hamirpur, Bilaspur, and Mandi districts and consented to participate in the study were included.

Exclusion criteria

Individuals below 18 years of age, non-residents of the selected districts, and those who did not provide consent were excluded from the study.

The following ethical considerations were addressed in the study:

Informed consent: Participants aged 18 and above from Hamirpur, Bilaspur, and Mandi districts participated only after providing consent.

Confidentiality: Standard practices ensured the confidentiality of participant responses by anonymizing data and securing it against unauthorized access.

Voluntary participation: Participation was voluntary, with no coercion or undue influence.

Ethical approval: Ethical approval was not required.

The COVID-19 pandemic, affecting people globally, prompted a survey to assess awareness and knowledge among residents of three districts in Himachal Pradesh. The survey included 102 respondents: 65 from Hamirpur, 26 from Bilaspur, and 11 from Mandi. This effort aimed to quickly gauge the community's understanding of the pandemic in these regions.

Status of COVID-19

Among the 102 participants surveyed, 11% tested positive for COVID-19, 36% tested negative, 7% were unaware of their COVID-19 status, and 46% experienced symptoms of COVID-19 but did not undergo testing (Figure 2).

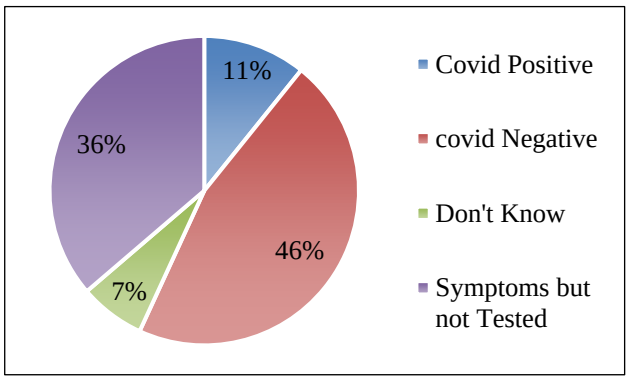

Figure 2: COVID-19 histories of respondents.

Respondent knowledge about COVID-19

All 102 participants were aware that SARS-CoV-2 targets the respiratory system and recognized the primary symptoms: cough, fever, and difficulty breathing.

Safety, sanitation, and precautions

Participants understood the importance of mask-wearing, hand hygiene, and social distancing to prevent the spread of COVID-19 and reduce other respiratory infections.

Quarantine and isolation

Initial fears about quarantine and isolation due to separation and monotony decreased as people recognized their benefits, leading to a reduction in apprehension among respondents.

Lockdown

Lockdowns, or "stay-at-home" orders, effectively curbed COVID-19 spread by restricting movement. Respondents were aware of the lockdowns and their purposes, notably the 21-day lockdown in India initiated on 23 March 2020 by Prime Minister Narendra Modi.

Effect of COVID-19 in Himachal Pradesh

Himachal Pradesh experienced relatively low COVID-19 cases, attributed to its clean environment and greenery, despite the global impact of multiple waves.

Vaccination

Himachal Pradesh became the first state to administer the first dose of COVID-19 vaccines to its entire adult population. Respondents were well-informed about the vaccination process, its importance, and timing, reflecting effective public health communication and strategies.

RESULTS

Age groups of respondents

The survey participants were categorized by age groups, with the breakdown as follows: 10 respondents aged between 20 and 30 years, 18 respondents in the 30 to 40 years age range, 13 in the 40 to 50 years bracket, 24 between 50 and 60 years, and 37 respondents aged over 60 years, as depicted in (Figure 3). The largest group consisted of 37 individuals aged above 60 years, representing the highest number of respondents in the survey.

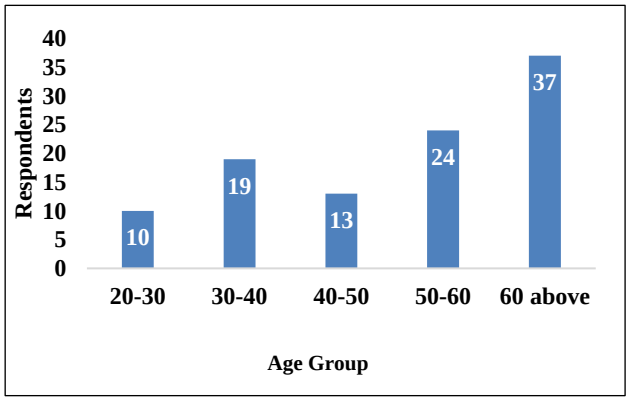

Figure 3: Age groups of respondents.

COVID awareness

Most participants demonstrated high awareness of COVID-19 guidelines, primarily sourced from the state's Department of Health. The local community took health recommendations seriously, showing good understanding and compliance. The survey revealed that 83.64% could distinguish COVID-19 symptoms from a common cold (Figure 4), and 80% were aware that COVID-19 originated in China.

Awareness levels by socio-economic background

The survey revealed significant socio-economic disparities in COVID-19 awareness and compliance. Among higher-income groups, 92% had reliable health information access, 95% practiced social distancing and mask-wearing, and only 12% encountered frequent misinformation. In contrast, lower-income groups had only 58% access to reliable health information, 70% managed preventive practices, and 65% encountered frequent misinformation. These disparities highlight the urgent need for targeted interventions to bridge these gaps and ensure equitable health outcomes.

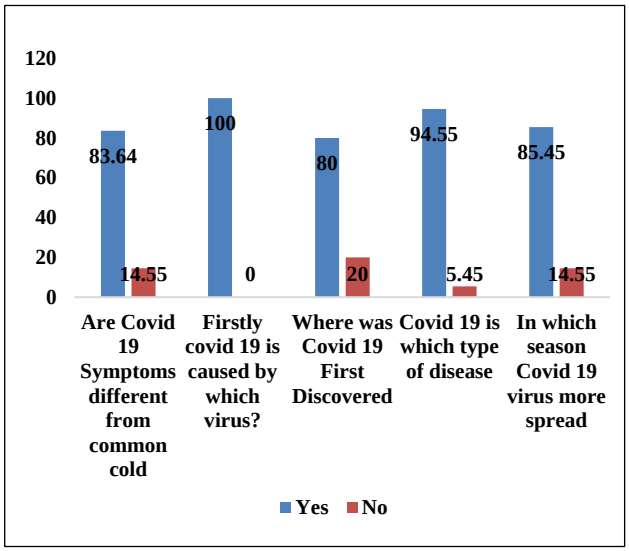

Figure 4: COVID-19 awareness.

Safety measure

The survey underscores the efficacy of masks in reducing COVID-19 transmission. Following fines for non-compliance, 98% of respondents adhered to mask protocols outdoors. However, many reported respiratory discomfort with prolonged mask use. Additionally, 94% adopted sanitizer use, acknowledging its effectiveness in reducing viral contagion (Figure 5).

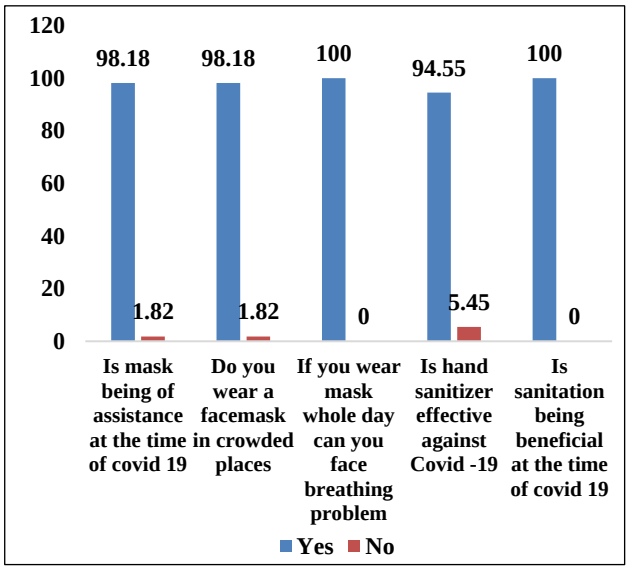

Figure 5: Safety measure.

Sanitation

The survey revealed that 96.36% of respondents experienced skin problems from frequent hand sanitizer use. Additionally, 85.45% reported washing their hands more often, with 90.91% preferring handwashing with soap. All respondents consciously avoided contact with sick individuals, even close contacts, and 96.36% adopted saying "namaste" instead of handshaking (Figure 6).

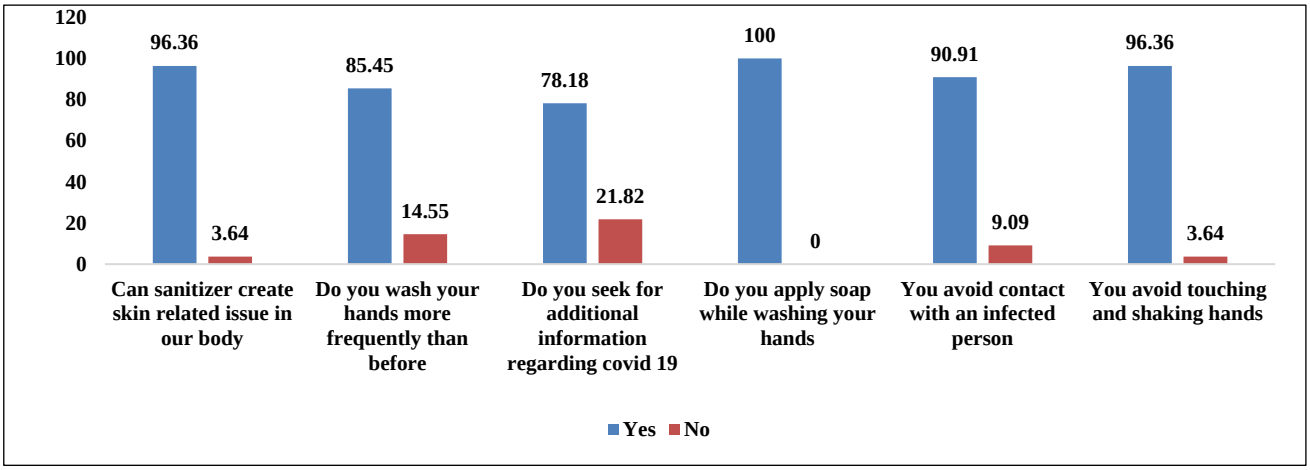

Figure 6: Sanitation.

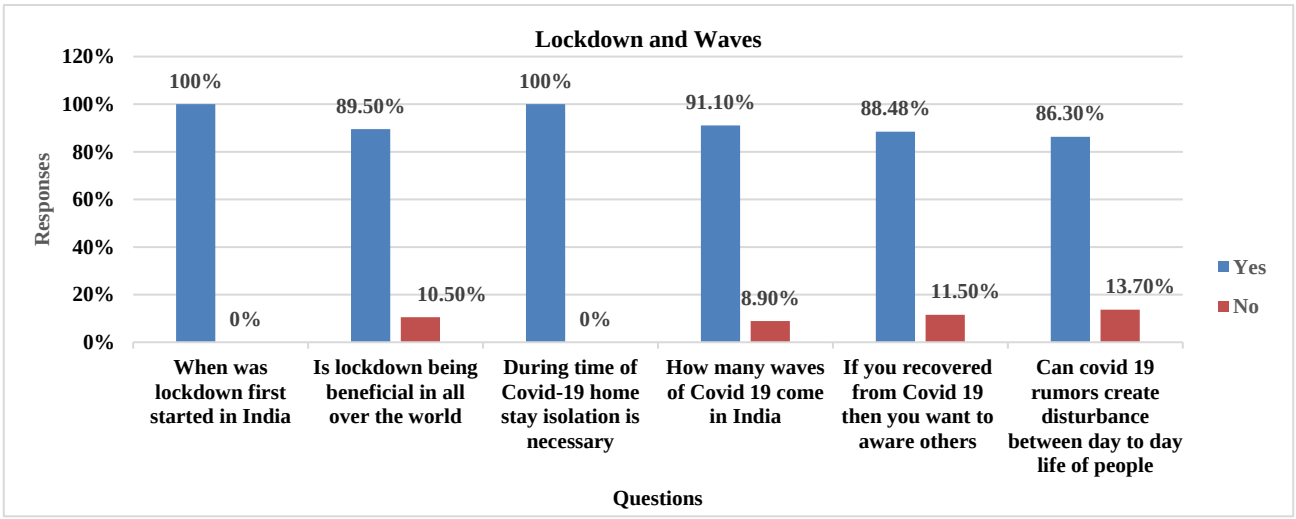

Figure 7: Lockdown and waves in India during COVID-19.

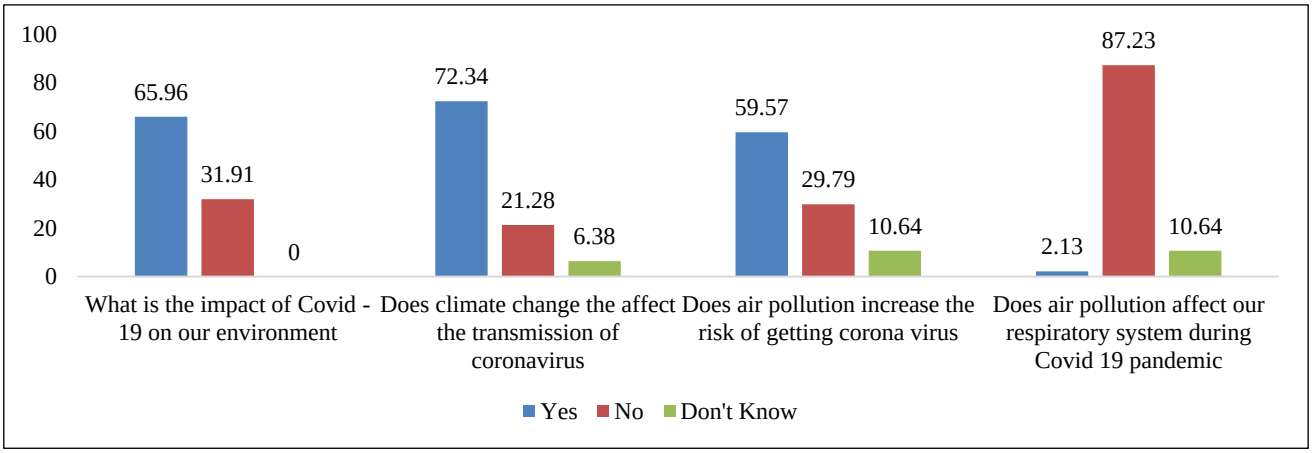

Figure 8: Effect of COVID-19 on environment.

Lockdown and waves

Survey findings show a global consensus on the effectiveness of lockdowns. All respondents knew the lockdown began on March 22, 2020, and were aware of COVID-19's three significant waves (Figure 7). During the lockdown, 89.09% experienced disturbances due to rumors, and 88.48% felt it was their duty to inform others if they had recovered from COVID-19.

Effect of COVID-19 on environment

Survey findings indicate that the COVID-19 pandemic has notably affected both people and the environment, leading to enhancements in air and water quality. The reduction in transportation and industrial activities due to lockdown measures has led 87% of respondents to believe that air pollution had a lesser impact on respiratory health during the pandemic (Figure 8).

Vaccination

Himachal Pradesh achieved the milestone of being the first state to administer the initial dose of the COVID-19 vaccine to all eligible adults. A survey revealed that 97% of respondents were informed about the vaccination process and its importance. Most participants knew the appropriate treatments for COVID-19 (Figure 9). Additionally, 91% were aware of vaccinations available for children, and 87% knew about the single booster dose. Furthermore, 95% understood the need to maintain safety measures, such as wearing masks and using hand sanitizers, even after vaccination.

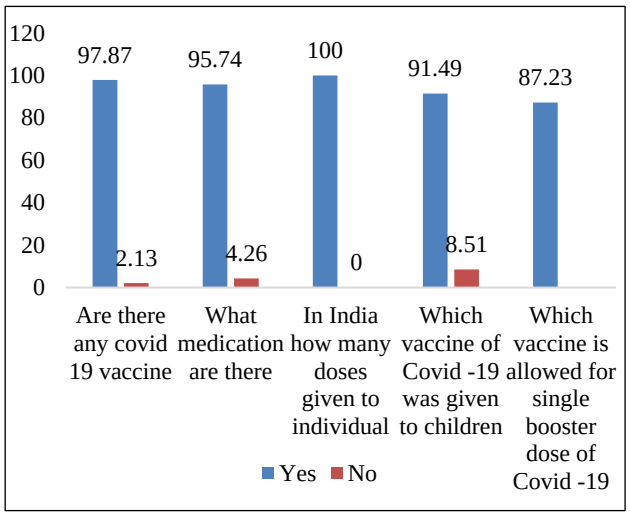

Figure 9: Vaccination.

DISCUSSION

Age groups of respondents

The survey shows a higher participation rate among older adults, with 37 respondents (37%) aged above 60 years. Older adults are more engaged in health surveys due to increased vulnerability to COVID-19.[20]

COVID-19 awareness

Awareness of COVID-19 was high among respondents: 83.64% knew the symptoms differ from the common cold, and 80% recognized China as the origin of the virus. These findings are consistent with reports indicating significant awareness of COVID-19 transmission and prevention strategies.[20,21]

Safety measures

Nearly all respondents (98%) wore masks, although 100% reported experiencing breathing difficulties with prolonged use. Additionally, 94% used sanitizers. This reflects high compliance with safety measures, emphasizing the importance of masks and sanitizers in reducing transmission.[22]

Sanitation practices

The survey noted increased handwashing, with 85.45% washing hands more frequently and 90.91% using soap. However, 96.36% experienced skin issues from sanitizer use. All respondents avoided contact with sick individuals and preferred non-contact greetings. These findings align with similar reports emphasizing hygiene practices as crucial for COVID-19 control.[23]

Lockdown and waves

Respondents understood the importance of lockdowns, with 89.09% affected by rumors during these periods and 88.48% feeling responsible to inform others if they recovered from COVID-19. This aligns with reports highlighting the socio-economic impact of lockdowns, especially on lower-income groups.[24]

Socio-economic disparity

The survey highlighted significant socio-economic disparities in the impact of COVID-19, with lower-income groups, including daily wage earners and small traders, being disproportionately affected by lockdown measures. These groups faced severe financial instability, increased psychological stress, and, in some cases, suicides. Even salaried employees experienced prolonged effects due to job insecurity and reduced income.

The disparity is driven by several factors: 1) Limited access to reliable health information, resulting in misinformation and poor understanding of preventive measures; 2) Reduced healthcare accessibility, preventing timely support; 3) Higher susceptibility to misinformation due to limited credible sources; 4) Economic constraints that hinder the ability to purchase preventive supplies and force individuals to work in high-risk environments to sustain their livelihoods.

The survey underscores the urgent need for targeted interventions to bridge these gaps and provide equitable support to mitigate the adverse effects of future public health crises.[24-26]

Environmental impact

A significant portion (87%) of respondents noted improved air quality during the pandemic due to reduced transportation and industrial activities. Reports have highlighted positive environmental effects, such as decreased pollution and improved biodiversity.[27]

Vaccination awareness

Vaccination awareness was high, with 97% of respondents aware of COVID-19 vaccines and 91% informed about children's vaccinations. However, only 87% were aware of the booster dose. Reports have discussed the effectiveness of vaccination campaigns in increasing public awareness and vaccination rates.[28]

This study has few limitations. The study's focus on only three districts in Himachal Pradesh may not represent broader regions. Reliance on self-reported data could introduce biases, and the cross-sectional design captures only a specific point in time, missing long-term impacts and evolving public health strategies. Broader and longitudinal research is needed.

CONCLUSION

Comprehensive awareness campaigns on COVID-19 are critical, particularly for lower socio-economic groups, to educate on transmission, severity, and prevention strategies. Clear, accessible communication is essential to empower all community segments to mitigate the virus's impact and enhance public health protection.

Recommendations

Targeted public health campaigns with clear communication, especially for lower socio-economic groups, are essential. Educational initiatives should address knowledge gaps in vaccination and sanitation to effectively manage and reduce COVID-19 morbidity and mortality.

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Ethical approval: Not required

REFERENCES

1. Bastola A, Sah R, Rodriguez-Morales AJ, Lal BK, Jha R, Ojha HC, et al. The first 2019 novel coronavirus case in Nepal. Lancet Infect Dis. 2020;20(3):279-80.
2. Rodriguez-Morales AJ, Cardona-Ospina JA, Gutiérrez-Ocampo E, Villamizar-Peña R, Holguin-Rivera Y, Escalera-Antezana JP, et al. Clinical, laboratory and imaging features of COVID-19: A systematic review and meta-analysis. Travel Medi Infect Dis. 2020;34:101623.
3. Al-Tawfiq JA, Gautret P. Asymptomatic Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection: Extent and implications for infection control: A systematic review. Travel Medi Infect Dis. 2019;27:27-32.
4. Vitiello A, Ferrara F, Auti AM, Di Domenico M, Boccellino M. Advances in the Omicron variant development. J Inter Medi. 2022;292(1):81-90.
5. Bagcchi, S. The world's largest COVID-19 vaccination campaign. Lancet Infect Dis. 2021;21(3):323-31.
6. Ministry of Health and Family Welfare, Government of India. COVID-19 Dashboard. Available at: https://www.mohfw.gov.in/. Accessed 01 January 2024.
7. Cirrincione L, Plescia F, Ledda C, Rapisarda V, Martorana D, Moldovan RE, et al. COVID-19 pandemic: Prevention and protection measures to be adopted at the workplace. Sustainabil. 2020;12(9):3603.
8. Larsen JR, Martin MR, Martin JD, Kuhn P, Hicks JB. Modeling the onset of symptoms of COVID-19. Front Publ Heal. 2020;8:551338.
9. Alimohamadi Y, Sepandi M, Taghdir M, Hosamirudsari H. Determine the most common clinical symptoms in COVID-19 patients: a systematic review and meta-analysis. J Prevent Medi Hyg. 2020;61(3):E304.
10. SanJuan-Reyes S, Gómez-Oliván LM, Islas-Flores H. COVID-19 in the environment. Chemosphere. 2021;263:127973.
11. Arnold J, Winthrop K, Emery P. COVID-19 vaccination and antirheumatic therapy. Rheumatol. 2021;60(8):3496-502.
12. Tao K, Tzou PL, Nouhin J, Gupta RK, de Oliveira T, Kosakovsky Pond SL, et al. The biological and clinical significance of emerging SARS-CoV-2 variants. Nature Revi Genet. 2021;22(12):757-73.
13. Khanna RC, Cicinelli MV, Gilbert SS, Honavar SG, Murthy GV. COVID-19 pandemic: Lessons learned and future directions. Ind J Ophthalmol. 2020;68(5):703-10.
14. Vargo D, Zhu L, Benwell B, Yan Z. Digital technology use during COVID-19 pandemic: A rapid review. Human Behav Emerg Technolog. 2021;3(1):13-24.
15. WHO. Impact of COVID-19 on people's livelihoods, their health and our food systems, 2021. Available at: https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems#:~:text=As%20breadwinners%20lose%20jobs%2C%20fall,indigenous%20peoples%2C%20being%20hardest%20hit. Accessed 01 January 2024.
16. United Nations. Policy Brief: The Impact of COVID-19 on the World of Work, 2020. Available

at: https://unsdg.un.org/resources/policy-brief-world-work-and-covid-19. Accessed 01 January 2024.
17. World Bank. COVID-19 to Add as Many as 150 Million Extreme Poor by 2021, 2021. Available at: https://www.worldbank.org/en/news/press-release/2020/10/07/covid-19-to-add-as-many-as-150-million-extreme-poor-by-2021. Accessed 01 January 2024.
18. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, Li Y. 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;16(10):1745.
19. Maps of India. Himachal Pradesh map. Available at https://www.mapsofindia.com/maps/himachalpradesh/himachalpradesh.htm. Accessed 01 January 2024.
20. Akwa TE, Muthini MJ, Ning TR. Assessing the perceptions and Awareness of COVID-19 (Coronavirus) in Cameroon. Europ J Med Educat Technol. 2020.
21. Ray S, Reddy AB. COVID-19 management in light of the circadian clock. Nature Revi Molec Cell Biol. 2020;21(9):494-5.
22. Pan L, Wang J, Wang X, Ji JS, Ye D, Shen J, et al. Prevention and control of coronavirus disease 2019 (COVID-19) in public places. Environm Pollut. 2022;292:118273.
23. Purnama SG, Susanna D. Hygiene and sanitation challenge for covid-19 prevention in Indonesia. Jurnal Kesehatan Masyarakat Nasional Kesmas. 2020;15(2):6-13.
24. Singh K. Impact of COVID-19 on Mental Health in India. Ind J Psych. 2020;62(Suppl 3).
25. Vyas L. Impact of COVID-19 on small traders and daily wage earners in India. Econom Polit Weekly. 2020;55(28):23-5.
26. Aneja R, Ahuja V. An assessment of socioeconomic impact of COVID-19 pandemic in India. J Public Affairs. 2021;21(2):2266.
27. Verma A, Prakash S. Environmental impact of covid-19 pandemic: positive and negative effects. Environm Res Publ Heal. 2020;17(14):5104.
28. Kumar R, Singh P, Sharma M. National expert group on vaccine administration for COVID-19 in India: recommendations and implementation. Vaccine. 2021;39(32):4394-402.

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