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COVID-19 Pandemic: Perceptions from Australia and the Asia Pacific

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Readers should be aware that this Special Covid Issue was not a planned or promoted issue but has been published as a direct result of authors submitting articles on the topic. In fact, some 17 articles were submitted with 13 articles being published. This represents articles predominantly from Asia Pacific countries, some eleven countries that reflect both the authors origin and the health system of the country on which they report.

The decision to publish what amounts to a third issue half way through our normal three issue annual series responds to that demand and a sense that the APJHM should respond to our authors and readers in what is a significant moment in health systems globally. The Journal believes it is important to record the pandemic event as perceived by academics and health professionals so that their voices are heard and that this might provide a basis for further research and publication as events unfurl and the pandemic continues.

In doing so we also apologise to other authors who have submitted articles on non-pandemic subjects for delayed attention to their submissions, but it is still our intention to assess those articles for our final issue towards the end of the year.

The editorial written by Briggs and Isouard, both from the University of New England is entitled 'Going forward, going back: Covid pandemic where to from here? It is a collaborative effort that raises concerns and perceptions based on events predominantly but not entirely Australian and the events traversed continue to 'be in play' as we write. Some authors also to some extent editorialise in their articles, particularly in contrasting between different nation states approaches to the pandemic. We make no claim to having the solutions but believe we have raised issues that need further consideration in future debate about health systems approaches to pandemics.

We start in the context of culture. Our first article with a review article about 'intrinsic cultural factors that helped Vietnam overcome the Covid–19 pandemic compared with other countries' by Ngoc Cindy Pham and colleagues, who are based at USA universities, some originally from Vietnam and from Bangladesh. The article was one of the first received and they argue that eastern Asian cultural traits played a role in reducing the spread of Covid-19. They address Hofstede cultural dimensions theory and traverses issues of collectivism and individualism.

The emphasis on culture continues with our second article from the Philippines that attempts to discover the sociocultural factors affecting the Covid-19 dispersion factors in that country. Laurence Garcia and colleagues from the Research Institute for Ageing and Health at the Cebu Normal University utilise an analysis of published official data to describe the local context and also draw on the Hofstede cultural dimensions theory as it describes the socio-cultural factors evident in that country.

Tejativaddhana, Suriyawongpaisal, Kasemsup and Suksaroj predominantly from the ASEAN Institute for Health Development, Mahidol University, Thailand, provide our third article, an analysis of management practice. They describe the successful interventions in addressing the pandemic in Thailand with an emphasis on the role of village health volunteers and interventions at the local district level. They demonstrate a successful approach based on primary healthcare and public health and extensive community and local organisational engagement.

Our fourth article is provided by Lloyd, Walker and Goswami of Griffith University, the Queensland University of Technology, and the Salvation Army respectively and provides a commentary on health information, applications and challenges in the Covid–19 pandemic. They describe the strong reliance on data and information

in addressing the pandemic and the challenges this presents in terms of data capture, reliability, accuracy, how it is presented and visualised. They suggest that those who have strong data and information systems have achieved better health system preparedness and a better prepared public in managing their responses.

Nankervis and colleagues of the Hunter New England and Central Coast Primary Health Network present the fifth article, an analysis of management practice that describes the experience of one Australian Primary Health Network in exercising its responsibilities and in engaging with government, health providers, health professionals and communities, in the pandemic. The activities and processes are described as is the evaluation of the period by the PHN described in phases with positive engagement in the PHC and PHN context and strong uptake of telemedicine. Key future strategies are also addressed.

The next group of articles published point to the global dimension of populations that culturally come from Asian countries but are know significant populations of residents and international students in differing nation states. The impact of the pandemic on international students is of importance to many nation states. The sixth article, a viewpoint by Fong and Law of the Hong Kong College of Professional and Continuing Development, the Hong Kong Polytechnic University is entitled 'Covid-19, a tale of two cities, being Seattle and Vancouver'. The article traverses the experience of two closely located cities, in two different democratic nations, albeit with different political and health systems. They contrast the approaches and experience and also draw on other nations experience in addressing the pandemic.

In further addressing the global impacts of the pandemic Pham and Shi provide a qualitative research article on mental distress of Vietnamese students in the USA in the pandemic period. International students are a global feature in the universities of many nations and are all in some way impacted by this event. This study analyses interviews of Vietnamese students in the New York City university contexts. This article is followed by the eighth article, from Pham and colleagues in presenting research to understand mental health services and help seeking behaviours of college students in Vietnam in a university in Ho Chi Minh city. They conclude by providing some guidance about the factors that encourage students to seek professional mental care.

Continuing the emphasis on mental healthcare Chakraborty and colleagues, predominantly from India and also Poland, examine how to address the mental burden during lockdown in developing country contexts of India, in the ninth article. In the tenth article the authors are concerned with health, wellbeing and prevention and suggest that yoga presents a medium for individuals to establish physical, mental, and spiritual balance. The authors Malik and Sharma are from the Amity University, Jharkhand, India. Their research reported on using a tele-yoga- based intervention to a group of participants across India through live television. The results suggest decreased stress levels, improved energy and better sleep. Our eleventh article is by Perihan Eren Bana of the İstanbul Yeni Yüzyıl Üniversitesi, Turkey. The review article draws on the Turkish health systems experience in the epidemic in psycho-social contexts and impacts on health professionals.

Das, Datta and Kumar, from the University of Delhi, the Bureau of Indian Standards, New Delhi and the Indian Institute of Management Rohtak, Haryana, India provide the twelfth article, a research article that identifies key exit strategies to mitigate the impact of Covid-19. They suggest a multi criterion decision making techniques of Interpretive Structural Modelling and cross–impact matrix multiplication analysis. They go on to suggest the strategies identified in their study can assist governments and policymakers.

In our thirteenth article Gupta and Trived from the National Academy of Indian Railways the Indian Institute of Management-Kapishipur and Maharaja Sayajirao University, Vadodara, India, respectively have provided a review article. This article examines the pandemic in the context of engagement in international trade, healthcare expenditure and population density, related to the pandemic death toll. The findings indicate positive correlation between international trade and the pandemic death toll.

In conclusion the library bulletin prepared by Yaping Liu provides articles relevant to the Covi-19 pandemic.

We thank all our authors, reviewers and colleagues that provide editorial support for the contributions they have made to this special issue.

DS Briggs
Editor in Chief

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EDITORIAL

GOING FORWARD, GOING BACK: COVID PANDEMIC WHERE TO FROM HERE?

David S Briggs AM, Editor in Chief; Godfrey Isouard, Invited Contributing Editor

A decade ago, APJHM published an editorial that referenced Janus, from Roman mythology as follows:

> 'Janus is the god of gates, doors, doorways, beginnings and endings', [1] and is depicted as having two faces, looking in opposite directions, looking into the future and the past. This description of Janus includes being patron of 'concrete and abstract beginnings of the world, the human life, new historical ages and economical enterprises.' [1] Importantly, to the theme of this editorial, Janus was frequently utilised 'to symbolise change and transitions such as the progression of past to future, of one condition to the other, of one vision to the future' . . . and was 'representative of the middle ground'. [1,2]

This reference from history is an excellent descriptor of where we all find ourselves in this current Covid pandemic experience. Despite those who are unaware of or are currently challenging the importance of history, there is a strong case for us to be aware of the history of pandemics and how they were all overcome. The concept of both looking forward and looking back is a powerful metaphor to describe what should be a sensible discussion and consideration of where we might be going.

This editorial and special issue is being published because our readers have submitted an overwhelming number of articles to us for publication. It is an attempt to allow us all to hear the voices and the experience of a diverse range of health professionals across the health systems within the Asia Pacific in encountering this pandemic.

The editorial goes to the personal and professional challenges we are facing as managers and leaders in health systems and in our communities. There is a realisation that we are going to face these challenges over a longer time frame and that we will not quickly return to the past status quo. It is uncertain as to what the future might present, perhaps, an uncertain 'new normal'. This is not meant to be negative in connotation. What might be the 'new normal' could well be innovative and provide different and better ways to deliver healthcare!

The articles in this issue all give differing perspectives on how the pandemic occurred and was declared and acted on. However, It was the Australian Prime Minister who was firmly determined that we were entitled and should be informed about the event, the occurrences and the timelines of the global pandemic, so that we might learn from what had occurred, to ensure better future approaches. His leadership and that of others saw most democratically elected governments support that initiative with a review commencing.[3] A recent article describes what 'good leadership looks like during this pandemic' as requiring 'acting with urgency, communicating with transparency, responding productively to missteps and to engage in constant updating'. [4] the authors also describe depending on expert advice and elements of being inclusive, engaging and demonstrating empathy. These concepts are consistent with both the Australian and New Zealand approaches to addressing the pandemic.

The next significant Australian initiative to address the pandemic was the establishment, by the Prime Minister of a 'National Cabinet' that saw the State and Territory Premiers included in as members to address our local and national challenges. For those of you who are unfamiliar with Australia as a nation, it was established in 1901 as a Federation of States and Territories with an overarching Commonwealth government and a division powers between both major levels of government. This context tends to create unnecessary duplication of funding and

roles with the States basically directing the public acute care sector and the Commonwealth partly funding acute care and directly funding general practice and aged care providers, both operating as independent businesses and services.

If you live in a Federation you require collaboration co-operation and shared use of resources across local, state/territory and the Commonwealth or national levels of government. This, in normal circumstances is difficult to achieve, let alone in managing and resolving a pandemic. The creation of the 'National Cabinet' inclusive of State and territory Premiers/First Ministers demonstrated inclusive leadership at the national level. It was quickly followed by the dismantling of the previously functioning Council of Australian Governments (COAG) that had responsibility for across levels of government policy making and was quickly replaced by the formation of the National Federation Reform Council to change the way governments work together.

At all times, the national and state/territory political leaderships were inclusive of chief medical officers in their public media presentations. The chief medical officers of the States and Territories are part of the Australian Health Protection Principal Committee, chaired by the Australian Chief Medical Officer, and is the key decision-making committee for emergencies. While the speed required in responding sometimes meant that health professionals and providers heard policy announcement at the same time as communities, the political and bureaucratic levels of government in Australia have been well informed during the pandemic and mostly singly purposeful in their respective decision making.

The next positive Australian approach was an obvious and intended emphasis by the collective political leadership on projecting and insisting on a public and inclusive interaction with the entire national population on an almost daily basis that was repeated on a state/territory and local government level. The message was clear simple and direct. We were encouraged more so than directed and the political leadership gave agreed messages supported by medical and scientific advice.

While some sections of the media suggested publicly that they might be considered a 'safe and trusted' sources of Covid_19 information, they were surpassed by the Prime Minister and the Australian Chief Medical Officer and the Premiers and their State Health officers and, even to the extent that local members of parliament, district police inspectors and the local mayor all replicated the Covid_19 messages at the more local level. This was consolidated by the health system with Primary Health Networks (PHNs) at the primary healthcare (PHC) level and local health districts (LHDs) at the acute care sector all contributing post Covid_19 action, education, mainstream media, and social media.

While, initially there was forecasting based on modelling, published like the climatology debate modelling on global warming, these pronunciations predicting dire consequences in Australia proved short term and substantially inaccurate and, soon dissipated.

The disappointing and recent trend in Australia at the state and territory levels, with differing perspectives of philosophy and ideology tended to see different policy making and implementation, seemingly inconsistent with the 'national cabinet' view! Consequently, we have seen some state premiers' close borders, restricting the normal movement of both trade and commerce and 'ordinary, everyday Australians' in pursuing a normal life. We have seen the 'protest movements' and the consequences that these would subsequently bring to vulnerable groups and communities generally handled differently from state to state. No doubt some will argue that these variations reflect the fine line and balance between competing interests of economic, health and the social needs of community, and nation. Judgement over time, by the electorate will determine the public view.

It is disappointing, that historical lines on a map are used in a way that diminishes us as a Nation. It should be obvious to most that one size does not fit all. It seems logical that we are Australians first and, for example, the communities of southern Queensland and the NSW northern border and the similar conurbations of Albury and Wodonga could easily stand alone as regions and states in their own right! Perhaps an agenda item for the National Federation Reform Council. It seems to make common sense to isolate and lockdown where the evidence suggests there is a problem and not lock down vast sparsely populated areas because they are part of a state or territory! This is even more so where health staff from one State or territory are denied access to their place of employment to provide health care because of a notional line on a map that denotes a state border? It raises the question as to what is an appropriate geographical scale and identity to be regarded as a State or region of Australia?

The political and bureaucratic levels of government were careful in not 'blaming' themselves and others for poor decision making or not being prepared to act quickly enough. However, it was obvious that haste was an important factor as in the context of cruise ships, where a Special Commission of Inquiry is in process to adjudicate the disappointing context and outcomes. Returning interstate and international travellers, meatworks, some aged care facilities, hotel isolation practices all could have been better addressed and in some way are under criticism or the subject of formal Inquiries. All would be aware that responsibilities come with accountabilities and although lessons learned are important there are sometimes consequences.

The disturbing circumstances was that different states and territories had differing levels of capacity to respond and were at differing levels of responsibility in the health systems hierarchies for public health. At a National level we would want significant public health monitoring of potential infectious disease and a high-level responsiveness at the state/territory and local government levels. The inadequacies appeared obvious. It was pleasing to see that some states/territories did present a strong public health presence at both the State and regional level. In addressing future directions for healthcare organisation and delivery, policy makers would be well advised to maximise the concepts of localism and the principle of subsidiarity, where government decision making delivers services as close as possible to the people meant to receive those services and not from distant levels of government. [5] Current organisational responsibilities and arrangements, have been criticised for some time. [6] It has been obvious over a considerable period of time that the development of hospitals into large systemized health systems continues to demonstrate variable utilization and outcomes evident across the system and between States and territories. [7]

Looking further afield to other democracies of larger scale in populations and with differing political systems seems to suggest that we in Australia have done relatively well. Australians have culturally not been overstimulated by the political and bureaucratic processes and not markedly surprised by what occurs. They seem to understand that the 'public good' of services is an accepted concept for the benefit of the population and of communities. The other distinction for Australia is that not only do we have a right to vote we are in fact required to vote. As some former politicians have said of the Australian electorate, the voters generally get it right.

This is an important feature of the Australian democracy and our national identity that stands in stark contrast to the individualism and supremacy of individual rights above that of the majority community, in other countries, who have a right to vote but are not required to exercise that vote. If you think this view is unfair here, seek out the writing of 'a newer chum', a newer Australian from England now embedded in Melbourne. [8] There was a mature, conforming response by most Australians to self-isolation and social distancing. A willing response to conform and at natural ease with bureaucracy.

In those countries where public policy seems to evolve from direct public engagement, talking at each other and between the individual, the media, and political interests more so than talking with each other, through the political process, we are confronted with disappointing and violent behaviours. Yes, Australians deserve commendation for the majority approach.

In other countries, notably Asian in the region we again see mostly national governments with culturally respectful populations who are used to living in close proximity but who have also placed PHC and public health at the centre of their health systems. There is little debate in those countries about the merits of wearing masks, washing hands and self-distancing. Many of them have done well and even better than those where there is a greater focus on acute care.

Ageism in a pandemic has surfaced with the aged workforce, being stood down 'so we could protect them' while those whose home is 'in residential care' becoming isolated from family and friends so 'we could protect them' and the acute care and aged care sectors having some differing views about were the aged might best be treated when acute symptoms present. There has been little discussion abought individual rights and autonomy and it is a difficult and challenging area for all. It is a conversation that needs to happen across age groups and across and between providers and employers. There are a number of us, health professionals who are suddenly being defined as aged, a notion some of us reject while we continue to lead active and fulfilling roles and lives. Perhaps, a visit to the 'EveryAgeCounts' website might be a good starting point for us all. [9]

While the economy is being maintained in the hope that the current investments can sustain us there is an underlying need to get us all mobile and re-engaged in life. Acute care elective surgery has been on hold and some media is already pointing to surgery waiting lists extending out. At the same time the private hospital sector remains limited in activity and it seems in a viable public/private sector that government could be more concerned with using that private sector capacity to help address demand rather than channelling acute care funding through traditional geographic boundaries that can be described as historical lines on the map. Reform in the acute care sector in how capacity is used might be a way forward. In PHC there is an increased campaign to encourage patients not to remain distant from their PHC providers. At the same time there is immense interest in continued access and use of telemedicine and telehealth, particularly in rural and remote communities. There is much to be done in rural areas particularly as many of those communities are vulnerable and have poorer health outcomes. The value of PHNs in delivering a wide range of PHC services is evident, they delivered well in collaboration with LHD services. These initial successes should be strengthened post Covid.

While current difficulties continue as we publish, we need to give serious consideration to where to from here! The education and professional development of health professionals in the management of health systems and in the leadership of health teams and services across traditional organisational boundaries has become paramount. Managing emergency, disasters and pandemics is new territory for many. Understanding, that these circumstances present opportunity for change and health reform should be foremost in all our minds. The potential for innovation and advancing healthcare through technology and, making new arrangements as to how we might deliver healthcare should be our focus. Australia and the Asia Pacific are well served by a collegiate approach to engaging together at the professional development level and in teaching education and research and the preferred approach has been well documented. [10] We all need to stand up and demonstrate that leadership here.

DS Briggs AM, Editor in Chief and
G, Isouard, Invited Contributing Editor

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REVIEW ARTICLE

INTRINSIC CULTURAL FACTORS THAT HELPED VIETNAM OVERCOME THE COVID-19 PANDEMIC COMPARED WITH OTHER COUNTRIES.

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ABSTRACT

The Coronavirus Disease 2019 (COVID-19) pandemic emerged in Wuhan, China, spread nationwide and then onto many other countries between December 2019 and early 2020. The implementation of strict quarantine measures in Vietnam has kept a large number of people in isolation and has eventually put the disease under control. Social and physical distancing turned to be an efficient way of slowing the spread of disease and stopping chains of transmission of COVID-19 as well as preventing new ones from appearing (World Health Organization, 2020). Analyzing the World Health Organization (WHO) data, we could see a clear difference in the reported numbers between Vietnam, a developing country, and the USA, one of the leading developed countries in the western hemisphere. We tried to address the question if there are factors that helped local governments to implement helpful rules. We argue that Eastern Asian cultural traits played a role in reducing the spread of COVID-19. We recommend to take this commentary paper, and further research those cultural factors that positively affected the slowdown of the spread of the COVID-19 pandemic in Vietnam.

KEYWORDS

COVID-19, Intrinsic Cultural, Factors, Confucius

INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) pandemic emerged in Wuhan, China, spread nationwide and then onto many other countries between December 2019 and early 2020. The implementation of strict quarantine measures in Vietnam has kept a large number of people in isolation and has eventually put the disease under control. Social and physical distancing turned to be an efficient way of slowing the spread of disease and stopping chains of transmission of COVID-19 as well as preventing new ones from appearing. [1]

We provide a table comparing timelines of events in Vietnam and USA and then turn to a discussion of Holstedes Theory to help address the differing cultural aspects of the comparisons.

TABLE 1: COMPARING THE TWO COUNTRIES COVID-19 PANDEMIC TIMELINE

TIMELINE	VIETNAM	USA
Dec. 31, 2019 First cases reported in Wuhan, China. [1]	No cases reported	No cases reported
Jan 2020	The first two cases reported. The individuals arrived from China.	The first case reported in Washington State. [2]
Jan. 29	The Vietnamese Government, through the Ministry of Health, deploys forty mobile emergency response teams.[3]	The formation of the Coronavirus Task Force is announced by President Donald Trump.[4]
Early February	Less than a dozen cases are reported by the Vietnamese Government [5]	Nine cases are confirmed on Feb. 2 [6]
Feb. 11	The 10th case confirmed in Vinh Phuc triggers the quarantine of 10,600 residents of the Son Loi village for 14 days, which was finally removed on Mar. 3. [7-9]	Additional cases are reported in California, mainly from evacuees from China [10]
Feb. 25/26	Vietnam is temporarily free of COVID-19 cases, as the 16th was released from the hospital after being tested negative. Nevertheless, quarantine measures are still in place. [11]	President Trump asserts that 'When you have 15 people, and the 15 within a couple of days is going to be down close to zero, that's a pretty good job we've done.' [12]
Mar. 16	The identification of 'patient 61' triggers the closing of a mosque in Saigon and the quarantine of the whole Ninh Thuận province. [13, 14]	President Trump releases guidelines to limit discretionary travel and social gatherings of 10 people or more, but quarantine recommendations are avoided. [15]
End of March	With little over 200 cases reported nationwide the Vietnamese Government ordered countrywide isolation from Apr. 1 to Apr. 15. [16]	185,991 cases and 3,809 deaths are reported. Different states implement disparate rules – no single policy exists for the country.
April 17 - 23	No new cases were confirmed. The death toll remains the same. [17]	The count of total cases rises to 862,605 and the number of deaths to 44,038
May 5	271 confirmed cases, 232 recoveries, and no deaths are reported	US Deaths crossed the 71,000 mark.

HOFSTEDE CULTURAL DIMENSIONS THEORY

HIGH POWER DISTANCE

The cultural dimensions proposed by Hofstede [18] may help understand the reasons behind Vietnamese people's compliance with their government orders.

Like other East Asian countries, Vietnam applies the Confucian social philosophy in daily life. Compliance attitude toward orders from those who are in higher positions is rooted in Vietnamese society for thousands of years. For example, the saying from monarch times 'Quan xu than tu, than bat tu bat trung' (aka When the King wants you to die, if you don't die, you are not loyal) shows that expectation of obedience. Therefore, Vietnamese people are more likely to listen and observe the Government's requests for staying home and keeping social distancing. In the case of Vietnam, data suggests that strict policy on social distancing and population compliance helped prevent the spread of Coronavirus.

Additionally, Confucian philosophy emphasizes the virtue of respect for parents, elders, and ancestors. Vietnamese children are taught – 'Kinh lao dac tho' (aka the youth should show respect to the elderly). A similar respect-based relationship can be found between Vietnamese teachers and students. The proverbs 'Ton su trong dao' (Respect the teacher, respect the education) and 'Nhat tu vi su, ban tu vi su' (A person that teaches you anything, big or small, is your teacher) explain why Vietnamese students will abide by their teachers' instructions to follow the social distancing rules dictated by the Government.

COLLECTIVISM (VS. INDIVIDUALISM)

Collectivist cultures emphasize organizational belonging and the preponderance of the interest of the group over the individual one. The saying 'Mot nguoi vi moi nguoi' (One should put the benefits of the group above his) is a reflection of that characteristic. In Vietnam, people are integrated into strong and cohesive groups under a collectivist society. These groups reward the individuals' unquestioned loyalty with protection. [19] In collectivistic cultures, group decisions are regarded as superior over any individual opinions. Therefore, individual initiative is not highly advocated, and differences in opinion or behaviors are not usually been accepted or recognized. [18]

In contrast, individualistic cultures celebrate the values and beliefs to be responsible for oneself, individual achievement, and emotional independence from organizations or groups. [18, 20] In those highly individualistic cultures, individuals are expected to pursue their interests.

UNCERTAINTY AVOIDANCE

Risk-taking attitude is also an important aspect to consider when evaluating the phenomenon Covid-19 spreading in Vietnam compared with the US. The uncertainty avoidance dimension of culture captures the 'extent to which a society, organization, or group relies on social norms, rules, and procedures to alleviate the unpredictability of future events.'[21] People in high uncertainty avoidance cultures focus on stability and security, whereas in low uncertainty avoidance cultures tend to demonstrate more tolerance towards unstructured and ambiguous situations.[22] Members in uncertainty avoidance societies appreciate confirmation and prefer predictability in their lives. [23] [19] Vietnamese people's tendency to avoid uncertainty is likely to influence their behaviors during the COVID-19 pandemic. When the COVID-19 situation is unclear, Vietnamese individuals (with higher uncertainty avoidance) turn to be more cautious than the American one (with lower uncertainty avoidance). That fact ended up protecting them better during the pandemic evolution.

OTHER CULTURAL ASPECTS

Vietnamese practice Confucius's group orientation. They follow the saying 'Phep vua thua le lang' (aka the will of the King yields to the people's customs). In other words, people are expected to follow their close group's rules. Hence, it will be difficult to break the neighborhood's rules. During the COVID-19 quarantine, once the neighborhood commits to social distancing rules, members will follow each other's behavior. If any individuals violate the rules, they can expect different levels of enforcements, from gentle reminders, to warnings, to reports to the neighborhood Board.

'The Dien' (face-saving) plays a big part in Vietnamese culture. Individuals are expected to act according to the social norms and rules to avoid public embarrassment. In Vietnamese society, when an individual "loses face," it means he loses his reputation and respect from others. One of the punishments Vietnamese law enforcers used during the COVID-19 social distancing toward those who violated the law was to publish his or her name in media outlets such as TV, local newspapers, and radio. These persons may also

be reported to their workplace or school to receive further penalties for their wrongdoings. Those who visited a different city had to report themselves to the Neighborhood Management Board and self-quarantine for 14 days. Failure to report to the Board members and self-quarantine may result in being ashamed by the neighborhood, or even receive fines and jail time. Vietnamese people try to avoid such public shaming at all costs. On the other hand, those who follow the rule are praised as heroes on national media.

Moreover, Vietnamese try to keep harmony with their neighbors. They believe these people are whom they can count on in a time of need. The proverbs 'Ban anh em xa mua lang gieng gan' (aka your siblings who are living far away cannot help you as much as the next-door neighbor) or 'Hang xom toi lua tat den co nhau' (aka You have your neighbor when it is dark) reflect the belief of Vietnamese reliance on their close community. Thus, following the neighborhood's rule is what Vietnamese people try to do.

Furthermore, the culture of Vietnamese since the end of the civil war in 1975 is that "Tai mat la quan chung nhan dan" (aka the government's ears and eyes are people). It means the Government encourages people to report what they think is suspicious or wrong to officers of the law. In other words, the Vietnamese Government promotes peer to peer observance.

Vietnamese assign great importance to their family. People consider the family unit takes precedence over themselves. It is assumed that the harmony of the whole society depends on each family. Obedience, moderation, and self-restraint are highly valued among family members. Therefore, when the Government announced a policy towards COVID-19, people obeyed and self-restrained as a family. Some elements of social distancing were already present in Vietnamese people's lives, which helps to stop the chains of transmission of COVID-19. For example, Japanese and Chinese consider wearing a mask in public as standard behavior, while most Americans believe it is unusual and awkward.

CONCLUSION – SOME TRADEOFFS

The success of the Vietnamese Government in stopping the spread of COVID-19 in their country shows that the strict rules on social distancing indeed helped prevent a high rate of cases and deaths. They imposed mandatory 14 days quarantine in national centres for those who arrived from other countries and restricted gatherings of people. Vietnamese individuals strictly followed these laws, mostly because of the cultural implications presented in this paper.

Obviously, the conclusion to the saga of COVID-19 has not yet been written. While Asian countries in general, including China, seemed to have fared better than the West in eliminating the virus so far, it is not clear what the social costs have been in these countries. Would Americans agree to lose their privacy freedoms for China-like surveillance if that meant a lower risk of death and infection? For some Americans, founding-father Patrick Henry's phrase 'give me liberty or give me death' would apply not only to a foreign power but against a virus. [24] There are deep cultural and historical reasons for American individualism that address both the value of the individual's physical life and the intellectual prerogative to live as the individual sees fit. In terms of value of individual life, the historical source is the Judeo-Christian sanctity for human life. While Asian Confucianism places a clear preference of public survival over individual survival, this is not so in Jewish and Christian teachings, which do not allow the sacrifice of an individual life to save the lives of many others. [25] Consider a situation where a forced quarantine would endanger the life of the individual but would protect the life of the community. Such a move to sacrifice the individual life for the greater community may be acceptable under Confucianism but not under Judaism and Christianity.

The second aspect of Western individualism is the intellectual prerogative to choose in defiance of authority. This aspect derives from ancient Greek philosophy which respected logic over traditional consensus. In fact, the hero of Greek philosophy, Socrates, was put to death because he refused to conform intellectually to that of the majority consensus. A prime example of such individualism today is Elon Musk, who openly defied the lockdown restrictions of his California plant. Musk [26] tweeted: 'Tesla is restarting production today against Alameda County rules. I will be on the line with everyone else. If anyone is arrested, I ask that it only be me.' The confidence to openly defy albeit-local government officials is a testament to the American respect for individual points of view.

In the long-run both Asian and Western societies will have to grapple with the questions: (1) At what point do individual liberties cost too much in terms of human lives

and (2) At what point does increased safety and security from the disease cost too much in terms of restrictions on liberty and encroachment on privacy?

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RESEARCH ARTICLE

UNDERSTANDING COVID-19 DISPERSION IN THE FILIPINO SOCIOCULTURAL CONTEXT

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ABSTRACT

This study aims to discover the sociocultural factors affecting the disease dispersion pattern of the COVID-19 in the Philippines. This is an ecological study where the unit of observation is the cases of COVID-19 in the country. The cases compared was defined in various ways to create an explanation of the dispersion pattern of COVID-19 in the country. Data was taken from the official reports of the Philippine Department of Health as of March 13, 2020, on the 52 confirmed cases of COVID-19 in the country. Data gathered from the reports were age, sex, existing diseases, acquisition (local or international), proximity to carrier and health status. Results revealed that older male Filipinos are at higher risk of acquiring COVID-19 with prognosis defined by certain culturally-related diseases. The dispersion of the disease in the country is further compounded by the sociocultural context the Filipinos are in.

KEYWORDS

COVID-19, Social Behaviour, Sociocultural Factors, Infectious Disease, Public Health

BACKGROUND

Historically, scientists trying to anticipate the trajectory of infectious diseases focused on properties of the agent itself, like its level of contagion and lethality. But infectious diseases need help to spread their misery: humans meeting humans, in person. [1] An infection occurs when a microorganism survives and multiplies within another, usually larger, organism. To trigger infection, pathogens must first reach the host, where they may survive unnoticed unless an internal or external event triggers the disease. In most cases, pathogens reach the human host from the external environment through a variety of transmission systems. [2]

The novel SARS-CoV-2 coronavirus that emerged in the city of Wuhan, China, last year and has since caused a large scale COVID-19 epidemic and spread to more than 70 other countries. [3] Conventional routes of transmission of SARS-CoV, MERS-CoV, and highly pathogenic influenza consist of respiratory droplets and direct contact, mechanisms that occur with SARS-CoV-2 as well. Majority of the patients affected had visited a city, or had contact with city residents infected with the virus. These findings echo the latest reports, including the outbreak of a family cluster and transmission from an asymptomatic patient. [4] These behaviors further lead to disease dispersion when there is weakened disease defense potential due to natural causes like ageing process or presence of underlying health conditions. This can be further increased by the host behavior as described through host travel and the number of contacts. [5]

Despite dealing with biomedical practices, infection prevention and control is essentially a behavioural science. Human behaviour is influenced by various factors, including culture. Hofstede's model of cultural dimensions proposes that national cultures vary along consistent dimensions

which can be grouped and scored as specific constructs. [6] In the past decade or so, leading investigators have begun to incorporate social networks into their models, trying to identify and analyze patterns of individual behavior that amplify or mute potential pandemics. [1] The introduction of diseases to a country with myriads of human inhabitants like the Philippines is consequence of various factors which includes social and cultural. There is a need to understand health and disease, not only through the medical science, but also through social science within the sociocultural context. [7] It is in these contexts, that this study is undertaken. This primarily aimed to provide understanding on how the COVID-19 spread in the Philippines looking into consideration the characteristics of people infected by the virus.

DATA AND METHODS

The study is an ecological study where the unit of observation is the cases of COVID-19 the country. The cases compared was defined in various ways to create an explanation of the dispersion pattern of COVID-19 in the country. Data was taken from the official reports of the Philippine Department of Health as of March 13, 2020 on the 52 confirmed cases of COVID-19 in the country. These are summarized reports about the individual cases of COVID-19 with specific characteristics of each case. The data gathered from the reports were age (actual age reported), sex (1 – Male; 2 – Female), presence of existing diseases (1 – immunocompromised; 2 – with lifestyle disease/s; 3 – unknown), acquisition (through 1 – local or 2 – international travel), proximity to carrier (1 – spouse; 2 – relative; 3 – others); and health status (1 – dead; 2 – critical; 3 – stable; 4 - recovered). The data were analyzed using cluster analysis since there is no prior information about the group or cluster membership for any of the objects. The data was grouped into three clusters with the aid of SPSS. The analysis of the clusters was based on the judgment of the researcher and interpreted in terms of cluster centroids with the cluster closest to the Grand Centroid as basis for the interpretation.

RESULTS

The results of the cluster analysis presented in Table 1 led to the formulation of hypotheses.

TABLE 1: CLUSTER ANALYSIS

VARIABLE	CLUSTER 1	CLUSTER 2	CLUSTER 3	GRAND CENTROID
Age	50.3913	71.8421	29.5	54.2115
Sex	1.3043	1.5263	1.2	1.3654
Existing Diseases	2.8696	2.9474	2.8	2.8846
COVID-19 Acquisition	1.4348	1.2632	1.5	1.3846
Proximity to Carrier	2.4783	2.1579	2.9	2.4423
Health Status	2.8261	2.5789	3.0	2.7692

Codes: Age (actual age reported), Sex (1 – Male; 2 – Female), Existing Diseases (1 – immunocompromised; 2 – with lifestyle disease/s; 3 – unknown), COVID-19 acquisition (through 1 – local or 2 – international travel), Proximity to Carrier (1 – spouse; 2 – relative; 3 – others); Health Status (1 – dead; 2 – critical; 3 – stable; 4 - recovered)

Table 1 focusing on Cluster 1 revealed that in terms of age, Filipinos affected with COVID-19 are in their 50s within the range of 40-60 years old. Majority of them are males with pre-existing lifestyle diseases. They acquired the disease through travel in affected cities within the country and through close continuous contact with relatives or housemates. Good to note is that even with the infection, health status is stable.

DISCUSSION

COVID-19 is a new disease and researchers are still learning how it spreads, the severity of illness it causes, and to what extent it may spread. Some factors can affect the risk of coming into contact with the virus, while other factors can affect the risk of developing severe illness. It is noted that older adults, 65 years and older, are at higher risk for severe illness. [8] But it affects other age groups also, only that

those younger age groups affected may have good prognosis over others, as what the data in this study suggested.

Majority, have a stable condition. With those having older ages and pre-existing conditions succumbing to death. This is also true to other similar illnesses. Age is the most significant risk factor for increased seasonal influenza-related mortality, with 90% of seasonal influenza-related deaths occurring in individuals over the age of 65 years. [9] It is more frequent in older adults to have comorbid conditions. Many comorbid conditions, both the number and type of comorbid conditions, predispose people to infections. [10] Furthermore, individuals at highest risk for severe disease and death include people with underlying conditions such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease and cancer. Specifically, patients with comorbid conditions had much higher crude fatality rates: 13.2% for those with cardiovascular disease, 9.2% for diabetes, 8.4% for hypertension, 8.0% for chronic respiratory disease, and 7.6% for cancer. [11] Similarly, in a study which included 1099 patients with confirmed COVID-19, three of the most common comorbidities are hypertension (15%), diabetes mellitus (7.4%), and coronary heart diseases (2.5%). [4] In addition, out of the 140 patients infected with SARS-CoV-2 in Wuhan, China, hypertension (30.0%) and diabetes mellitus (12.1%) were the most common comorbidities. [12] Among the most common disease of the Filipinos are lifestyle diseases they acquired due to a lot of cultural practices, making them more susceptible to this new disease.

It is also notable that in this study, males are most affected. The factors that might account for the sex differences in infectious diseases in humans are multiple, and include social, behavioral and biological factors. [13] Incidences of higher infection in men may be attributed to behavioral factors as well as biological factors particularly on how sex hormones regulate the immune response of the body. [14] Gender influences both patterns of exposure to infectious agents and the treatment of infectious disease. For example, gender roles influence where men and women spend their time, and the infectious agents they come into contact with, as well as the nature of exposure, its frequency and its intensity. [15] The differences in the susceptibility to infectious diseases between adult males and females can be ascribed more to their varied exposures rather than on biological attributes. [16]

One of the common differences that may influence the exposure patterns and treatment is the time spent from home and away from home. In most societies, males spend more time away from home leaving them more exposed to infectious agents outside the home while females tend to have more exposure to infectious agents inside the home. Another factor that influences exposure patterns and treatment is the responsibility of taking care of the sick. Females tend to get the role of "care-giving" in the home and in healthcare institutions than males exposing them to more infectious agents. [15] In this case, despite societal evolution, majority of the Filipino men take the role of a breadwinner making them go out of the house to find means of supporting the needs of the family. It is also assumed that those affected with the disease are men with high position in their areas of work allowing them to travel and get in contact with people, like business owners or company managers.

In addition, a study using single-cell sequencing, found that expression of ACE2 (the receptor for severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) was more predominant in Asian men, which might be the reason for the higher prevalence of COVID-19 in this subgroup of patients than in women and patients of other ethnicities. [17]

SARS-CoV-2 spreads from person to person through close communities. When people with COVID-19 breathe out or cough, they expel tiny droplets that contain the virus. These droplets can enter the mouth or nose of someone without the virus, causing an infection to occur. The most common way that this illness spreads is through close contact with someone who has the infection. Close contact is within around 6 feet. [8] This is supported by the data in the study wherein the close continuous contact with an infected family member induced the increase in number of infected.

The disease is most contagious when a person's symptoms are at their peak. And, it is innate in Filipinos to care for their sick family members making them more vulnerable to acquiring the disease. However, it is possible for someone without symptoms to spread the virus. A new study suggests that 10% of infections are from people exhibiting no symptoms. Droplets containing the virus can also land on nearby surfaces or objects. Other people can pick up the virus by touching these surfaces or objects. Infection is likely if the person then touches their nose, eyes, or mouth. [8] It can still be linked to the Filipino close family ties. Most

activities within the day, including meals, are to be shared by all members. Practices like kissing the hands exposes everyone to acquiring the disease from an asymptomatic family member.

Filipinos tend to be very sociable people, wherein every opportunity to gather is grabbed, take for example attendance to religious events, lunch outs during Sundays, visits to relatives and attendance to parties. It is noted in the data, that the cases are concentrated in certain areas. These areas are centers of urbanization and trade where a lot of people converge. The risk of coming into contact with the virus depends on how far it has spread in a person's local area.

The virus that causes COVID-19 seems to be spreading easily and sustainably in the community ("community spread") in some affected geographic areas. Community spread means people have been infected with the virus in an area, including some who are not sure how or where they became infected. The WHO state that the risk of developing COVID-19 is still low for most people. However, this is changing as the virus spreads. The risk is higher for anyone in close contact with people who have COVID-19, such as healthcare workers. Viruses can also spread more in certain areas, such as highly populated cities. [8]

The discussion of these factors, however, is based on inferences taken from the limited data available online, without actually going into in-depth data gathering per case. There are weak assumptions presented, but this allowed an investigation of the phenomenon of the COVID-19 dispersion using the sociocultural context as a basis, leading to understanding and more exhaustive explorations.

CONCLUSION

Thus, older male Filipinos are at higher risk of acquiring COVID-19 with prognosis defined by certain culturally-related diseases. The dispersion of the disease in the country is further compounded by the sociocultural context the Filipinos are in. It is then recommended that cultural practices of Filipinos be looked into in crafting policies to contain the dispersion of the disease and for effective programs to be implanted.

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ANALYSIS OF MANAGEMENT PRACTICE

THE ROLES OF VILLAGE HEALTH VOLUNTEERS: COVID-19 PREVENTION AND CONTROL IN THAILAND

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ABSTRACT

Thailand has effectively responded to the COVID-19 pandemic with effective focus on primary healthcare and multi-sectoral collaboration with effective and open communication of powerful health messages. This article reviewed the central role of village health volunteers and their significant contribution to the disease control. The lessons from recent experiences need to be further evaluated to consolidate the lessons learned in anticipation of meeting continuing and future challenges.

KEYWORDS

COVID-19, management, prevention and control, Thailand, village health volunteers

INTRODUCTION

Since December 2019, coronavirus disease 2019, or COVID-19 in short, has been a global challenge. Currently, there are 15,785,641 confirmed cases with an increase of 200,625 new cases and 640,016 deaths globally.[1] Surprisingly, countries in America like USA and Canada and European countries like UK and Italy recognized for their state of the art healthcare and use of screening and vaccination, have not done as well as some Asian countries like Thailand.[1] For example, while most of the hospitals in UK provide preventive care, the affluent appear to have better access to the service. One explanation to this issue is increasing privatization of health service and lower subsidization from the government, thus it increases health expenditure with low financial protection across the population.[2] On the other hand, the strong foundation of primary healthcare in Thailand complement the limited resources in health facilities in halting COVID-19.

According to the Declaration of Astana 2018, the success of primary health care depends on multi-sectoral policy and actions, empowered people and communities, together with primary care and the essential public health function.[3] The success in implementing primary health care not only mitigates the magnitude of the pandemic, but also reduce treatment costs for patients who need medical attention while promoting productivity of individuals who survived the pandemic.

Up till 27th July 2020, Thailand has 3,295 confirmed cases with 3,111 discharged cases and 58 deaths. [4] Nonetheless, with a strong foundation of a primary healthcare system, Thailand is able to control the disease within three months after country lockdown in March 2020 with the report of 'zero' new domestic cases for 48 consecutive days since June 2020.[5]

Among the key success factors of primary healthcare in Thailand is proactive collaboration between health and non-health sectors at the local level that helps infected individuals and their community members to live under the 'new normal' norm including social distancing, strictly using hygienic means to reduce infection, and so on. The patterns of collaboration can be divided into two

categories: passive services and proactive services. Passive services include detection, screening, treatment, and follow-up on patients whereas active services cover health promotion activities. Each collaborative arm has been used simultaneously to decrease the burden of COVID-19 at the local level. However, some limitations in passive services hinder their effectiveness to tackle the disease at population scale. For example, setting up equipment and/or field health facilities for local quarantine require a large investment in order to support new and existing patients who need medical attention. As a result, the Ministry of Public Health (MOPH) and local authorities turn towards proactive services to promote the health of local individuals.[6]

However, delivery of proactive services can be troublesome at the local level due to limited resources, health personnel in particular, and trust-based communication to encourage health promotion for the locals. In this scenario, Thai village health volunteers (VHVs) play an important role in empowering people and their community to fend off the disease while assisting the health sector in reducing the burden of hospitalization of the patients. This article will describe the roles and the contribution of VHVs in addressing COVID-19 crisis at local scale.

BACKGROUND OF VILLAGE HEALTH VOLUNTEERS

The Thai government ratified the World Health Assembly Resolution on Primary Health Care in 1978 to expedite coverage of health care services at the local level. After adoption of the resolution, village health communicators (VHCs), whose main roles were to provide health communication, were formed along with VHVs. However, drastic improvement in primary health care and relevant management system ushered changes in roles of the VHCs and, in 1995, VHCs were integrated into VHVs with expanded roles relevant to supporting health professionals and facilitating collaboration between health and non-health sectors at local level.[7] In addition, the Centre for Community Primary Healthcare was formed at local in 2000 to enhance coordination of VHVs in their community.[6,7] The centre in each district offers basic health services provided by VHVs as well as provides a public space for improving local engagement in public health activities.[7]

The Thai government, particularly in the health sector, prioritises the importance of VHVs in empowering local individuals and communities to become resilient in respect to health issues. Training and retraining of VHVs were offered by the Ministry of Public Health (MOPH) to increase VHV's competencies for better collaboration with other health professionals in their local setting. Those competencies include screening, surveillance, follow-up and educating individuals to become better at taking care of their own health. Additional to MOPH, programs or projects supported by Sub-district Health Fund [a sub-district funding source for operationalizing health-related projects or programs at sub-district level] of National Health Security Office (NHSO) promotes capacity building on health promotion and disease prevention of VHVs.[7]

Aside from the support of health sector, district health boards (DHBs), a novel local structure supporting the promotion of health and well-being, is another supporting mechanism enabling VHV's contribution to policy implementation.[7] The DHB comprises of district level representatives from health and non-health sector with the District Chief as the chairperson of each DHB and the head of District Public Health Office as the secretariat. Some DHBs have Sub-district Health Boards (SHBs), a sub-structure of DHB, which facilitate district policy translation and implementation at sub-district level. VHVs involved in most SHBs as a committee member from health sector. Since VHVs were elected by their local communities, some health-related problems which might have been undetected by the local government were properly addressed. As a result, VHVs are essential contributors to DHB and local health system.[7]

ROLES OF VILLAGE HEALTH VOLUNTEERS AGAINST COVID-19

In Thailand, VHVs' performance to assist both government, health professionals, and local individuals was one of key factors in mitigating the spread of COVID-19. During the pandemic, VHVs' remarkable performance includes [6,8,9,10],

1. Empowering people and community by promoting self-care and capacity of individuals to care for others through education to individuals in the community on prevention against COVID-19 (e.g., wearing masks, washing hands, and social distancing)
2. Supporting local surveillance system by assisting field epidemiological processes (e.g., proactive screening,

timely report of early detected cases, follow-up on treated individuals, etc.) as well as assisting health professionals and individuals for local quarantine process

3. Reducing burden in hospitalization for COVID and non-COVID patients including forming a 'Grab Drug' network to help chronic patients acquire their medication without visiting a local hospital.
4. Help local community in managing Sub-district Health Fund to mobilize resources for COVID-19 prevention and control

Since January 2020, VHVs have demonstrated their roles in prevention of COVID-19 spreading. Their main responsibility included screening individuals in each household with particular focus on those who travelled back from foreign countries or high-risk areas at national level. The VHVs then contacted Sub-district Health Promotion Hospital in their working areas for referral of cases needing medical attention. Also, VHs provided emotional support for individuals to mitigate mental impact from the outbreak in their living areas and provided logistic service to improve access to medications for individuals with chronic conditions. [8,9]

Door-to-door assistance and close kinship between VHVs and local individuals promote compliance to national guidelines on prevention against and self-care for COVID-19 including hand washing, applying hand sanitizers, hygienic mask wearing, and social distancing.[10] Unlike service delivery provided by health professionals at local health facilities, the door-to-door service reduce duration and distance gaps making it easier for performing early detection in remote areas. Also, the use of online communication platforms like LINE facilitate communication among the VHVs, local individuals, and health professionals which increase chance of referral for treatment at early sign of symptoms and online surveillance for local-quarantined individuals.[6]

Support from local authorities like DHB and collaboration at national level also enhance VHV efforts in COVID-19 prevention and control. The disease become the top policy priority in every district. As a result, resources including local funds were directed towards disease reduction. The Sub-district Health Fund is also utilized to support capacity building for surveillance and health promotion for VHVs.[10] Additionally, a Thai telecommunication company collaborates with MOPH in developing an online application to promote a local surveillance system.[11]

DISCUSSION

VHVs and relevant supporting systems for primary healthcare in Thailand is crucial to ameliorate COVID-19 pandemic and future outbreaks, particularly in empowering individuals and communities to become resilient on health issues.[12] Without VHVs, the Thai health system may be overburden by increasing treatment costs and number of patients and, in the long run, it will result in a crippled national economy and welfare.

In March 2020 [12], an Emergency Decree was announced to contain the spread of the disease. Regulations according to the decree restrict travelling across provinces and setting up screening stations along provincial borders. However, before official announcement, most of Thai people started travelling to visit their family during Songkran Festival, a new-year celebration according to the Thai calendar. As a result, identification of infected patients was difficult. In addition, facts and rumours related to COVID-19 were mixed, thus making it even harder for local people to correctly comply with official guidelines.

However, VHVs who were stationed across different areas in each province were quick to respond to the pandemic and collaborate with the District Health Board to assist both health and non-health actors to control the disease. Since most VHVs grew up in their hometown and knew most of their community members, this helps them gaining trust from community members including those travelling back from other provinces. Hence, cooperation for screening and compliance with government guidelines for COVID-19 was mostly successful. This reinforces that 'trust' between the communities and health providers is essential in the time of pandemic, especially for addressing the issue in low-resource setting.[13]

However, there is room for improvement to optimize functionality of VHVs. First of all, the success of control of the disease is limited to some districts, if not provinces. This is due to the lack of systemic communication which can maximize efficiency of the communication across different provinces to share and customize good practices in

[1] The innovation was adapted from 'Grab Bike', a food delivery service, and has been operated by Thai VHVs to transport drugs from local hospitals to individuals at home. [7,8]

COVID-19 prevention and control. Taiwan, as one example, demonstrated effective communication system to inform local individuals to effectively protect themselves against COVID-19 (e.g., when and where to wear masks and effective handwashing). Also, the communication system encouraged coordination across government sectors to mitigate the loss of opportunities and income during the outbreak while regulating activities that may affect disease control (e.g., hoarding masks, falsified information on the disease, failure to control immigration).[14,15] Secondly, VHVs may prove to be an effective mechanism in non-urban areas since the bond between community members and local VHVs is tighter than their urban counterparts. As a result, should the disease reemerge in the future, operationalizing of health volunteers requires customization for urban context.

CONCLUSION

Performance of Thai VHVs during COVID-19 pandemic contributes to the success of the disease prevention and control under the concept of primary healthcare as described in the Declaration of Astana 2018. Trust-based value in primary healthcare helps individuals living in remote areas reach essential services. However, capacity building for VHVs for using advance technology for communication can optimize timely healthcare delivery to avert future epidemic. Also, understanding relationship between individuals and healthcare providers in urban setting can unlock more opportunities to mitigate the magnitude of epidemics in densely populated areas.

LIMITATIONS

The article reflects commentary based on the analysis of current management practice during the pandemic. Subsequent evaluation and research into the longer-term outcomes of this approach may further improve the effectiveness of VHV mechanism.

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COMMENTARY

HEALTH INFORMATION: APPLICATIONS AND CHALLENGES IN THE COVID-19 PANDEMIC

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ABSTRACT

Global health systems are under immense pressure with the exponential growth and spread of COVID-19. Public health and health system responses to the pandemic have relied on health information reporting, visualisation, and projections of incidence, morbidity, and mortality. This commentary aims to explore how health information has been used to inform the public, manage risk, understand capacity, prepare the health system and to plan public health strategy. We also aim to share the health information challenges and our insights to inform future debate and strategic investment. This paper will be relevant to health service and health information managers wanting to understand vulnerabilities and focus for future health information initiatives.

KEYWORDS

health information, visualisation, COVID- 19

INTRODUCTION

The planning for, and response to, the COVID - 19 pandemic have relied heavily on health data and information. The importance of reporting systems, co-ordination of data submissions and presentation of data have been implicit parts of successful responses in countries such as Australia, New Zealand, and Taiwan. Early use of data and information to plan health system capacity, aligned with decisive public health responses have resulted in low community transmission and death rates in these countries.

In this commentary we take a broad view of information management and consider its use for decision making, the uptake of digital health solutions (e.g. telehealth) and the role of data in informing the public in large scale emergency events. From our perspective as health information and health service managers, COVID - 19 has highlighted that health information issues have been prominent. Challenges such as how to best present information, what should be presented to aid comparison and monitoring, privacy, the role of social media, information sharing, telehealth, data quality and relevance of data items will be discussed as well as solutions and options for future investment, planning and debate.

CHALLENGES AND SOLUTIONS

The reliance on data and information to successfully manoeuvre through the pandemic reinforces the need for strong health information systems, data capture, analysis and reporting to support clinical care and the effective management of the health system including the workforce.

COVID- 19 has also reinforced the need for:

- accurate and timely data provision
- precise counting and consistent definitions

- consideration of access and equity issues i.e. telehealth infrastructure, the elderly, technological literacy
- prediction and modelling techniques to answer questions such as when will COVID-19 end?

DATA AND INFORMATION USE DURING COVID-19

Since the emergence of COVID-19 in January 2020, countries like Australia and New Zealand have become familiar with the communication of health information in press conferences, newspapers, social media posts, mobile apps, news, and current affairs programs. The public have been exposed to graphs, charts and numerical tables and understand what is meant by concepts such as flattening the curve. One of the ways that data has been presented to aid this familiarisation has been through graphs and visualisations.

Powerful and simple visualisation of tables for consumption by the public has been critical to what has been regarded as a first-rate response in these countries. We have seen new graph and plot types, for example bullet graphs and bubble charts. Heat maps have been used to show hot spots of disease outbreaks, daily summaries of status of the pandemic including new cases and deaths.

DODGY DATA AND COUNTING

The World Health Organization (WHO) describes eight pillars in their COVID-19 Strategic Preparedness and Response Plan with data usage prominent, including its use for active monitoring and reporting of disease trends (e.g. case fatality ratios) and for the provision of robust and timely epidemiological and scientific data analysis that can be used to continuously inform and support operational decision making and risk management. [1] Public trust and confidence in the accuracy and representativeness of the data presented is vital.

In Britain, problems with reporting of testing data has contributed to a poor result for the population '…. knowing the scale of infection entails understanding the data. Understanding the data entails trusting the data. And right now Britain's data on testing cannot be trusted' [2]. A news article in June 2020 stated that 'here in Britain we don't know how many people have been tested for the disease'. We know that the testing of all suspected cases provides an understanding of the scale of the outbreak. [3]

In the United States, inconsistencies in public reporting of nursing home deaths may have led to significant underestimates of the death toll [4]. Consequently, in late April the United States did not know how many were dying of COVID-19. [4] This was remedied and the US Centre for Disease Control and Prevention requested that nursing homes start reporting the number of confirmed and presumed cases and deaths.

Predictions are important for planning in the complex environment of a pandemic. Modelling by the Doherty Institute was used to inform the Australian response. Early modelling showed that if the pandemic was allowed to progress without mitigation then the capacity of the Australian health system would be exceeded. [5]

In early days when the progress of the pandemic was uncertain, health service managers in Australia used data to inform the preparation of the health system, predicting staffing shortfalls and requirements and hospital capacity and intensive care bed numbers. This data flowed from multiple sources and resulted in innovative and pragmatic potential solutions. Health Information Managers needed to rapidly upskill to be able to present the data in ways that supported its use for these purposes.

Similarly, the United Kingdom in planning for the way out of lockdown analysed a broad data set that has included NHS 111 (a dedicated number for urgent medical problems) and ambulance calls, GP consultation data, surveillance related to hospital admissions, critical care bed occupancy and deaths.[6]

RIGHT DATA, RIGHT TIME, AND QUALITY

COVID – 19 pandemic has triggered a tsunami of data and generated enormous amounts of data, referred to as 'datanami'.[7,8] Amidst the chaos, data quality has gained traction globally, as political leaders around the world are embracing the importance of data driven decision making for formulating strategies and reopening their countries.

While different types of datasets are available publicly, there are real concerns about the quality of the data underlying some metrics that are being used to compare and monitor our progress in fighting against the disease. For example, the method of data collection and reporting on metrics such as 'new case counts' and 'hospitalisations' in the United States is not consistent from hospital to hospital.[7] This leads to data quality issues with

inconsistency in the national 'beds and heads' numbers as well as models that are developed based on these numbers. If we want to compare 'apples with apples' we need to understand the sources and context of data collection.

When examining mortality data, according to the Australian Bureau of Statistics (ABS) the completeness of data is important. The ABS state that lags 'between the date of death and date of registration means that only 40-50% of those registrations are deaths that occurred in the month being reported'. ABS further notes that disease surveillance systems have been used in Australia to capture COVID-19 data to ensure timeliness. [9]

Raw data is widely reported in the media and on websites leading to challenges in interpretation. Reporting on the basis of numbers of infections and deaths, without any context of population size or the use of rates can contribute to misinterpretations or distortion of the size and impact of pandemic and its progress.

Interpreting data is complex due to differences in definitions, interpretations, and the breadth of data collections. We also need to consider what data indicators mean. To reliably understand death rates between Australia and Sweden, countries that have taken radically different approaches to the management of the pandemic, we need to calculate the cause specific mortality rates.[10] Comparisons of this indicator demonstrate that by managing the pandemic in Australia we have saved 10,383 COVID-19 deaths as a result of our strategy. [10]

According to the Grattan Institute, in Australia at the outset of the pandemic there was no nationally coordinated approach to the release of real time data on confirmed cases and deaths. [11] In coming out of the pandemic they suggest the continuing inclusion of a 'surveillance strategy for data collection, analyses and reporting on a national scale. Timely and precise reporting would also help health professionals, government officials and decision makers in getting 'pandemic ready'. [11]

VISUALISATION AND HOW IT HAS BEEN USED DURING THE PANDEMIC

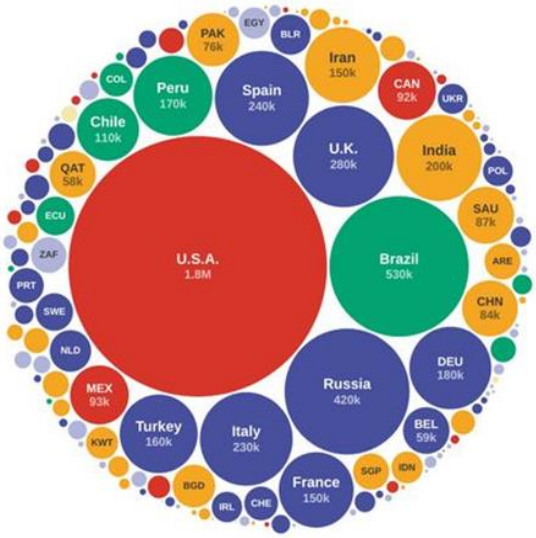
Visualisation tools can be used to present performance data to synthesise large amounts of data and information to show trends over time.

'The focus is on visual displays in which graphical approaches play a central role in communicating information in a meaningful way. Information visualisations are ubiquitous and critically important to understanding several fields today. With the omnipresent access to large amounts of data, computational techniques have become integral to the burgeoning practice of visualizing data'. [12]

Visualisation of data is a powerful information management reporting tool as large amounts of data can be summarised in ways that tell a story. Visualisation also converts raw data in meaningful ways with high visual appeal to enable intuitive interpretations. [13,14]

Data visualisation tools like Tableau, Qliksense and PowerBI are used to help understand patterns, processes and relationships between the different elements of data. [15] These tools visualise the data in a way that makes the data and or information easy to interpret and digest using colour, size and shapes for example bubble charts [16,17] and as shown in Figure 1 below. [18] This interactive bubble chart by Cheung and cited by Creagh and Kamradt-Scott in the Conversation [18,19] can be fully appreciated by following the link below.

FIGURE 1: COVID 9 INTERACTIVE BUBBLE CHART [18]



Source: https://observablehq.com/@unkleho/covid-19-bubble-chart-with-d3-render

SOCIAL MEDIA

Social Media influences how we consume news and communications online and past pandemics such as the H1N1 Influenza pandemic (also known as the Swine Flu), the

Ebola epidemic and the Zika outbreak all had prominence on social media platforms.

Social media has been used by Federal and State Health Departments in Australia to educate the public and to report daily case numbers as shown in Figure 2 below. [20] Social media has been used during the pandemic to share health information, COVID statistics and promote public health messaging. In New Zealand, Prime Minster Adern regularly uses FaceBook Live to broadcast updates on the COVID- 19 status and response.[21]

FIGURE 2: DAILY FACEBOOK POST SOURCE QUEENSLAND HEALTH [20]

Platforms such as Twitter have been active sharers of information and COVID related research. [22] Controversy and debate have emerged over mask wearing and new evidence reviews have been promoted on Twitter. [23] #Masks4all.org.uk was established by more than one hundred doctors to promote the wearing of home-made masks to reduce direct transmission and environmental contamination. This group is active on Twitter, Instagram and Facebook and share the emerging evidence on masks.[24]

International and national bodies such as the WHO and the United States Centres for Disease Control and Prevention have expanded their use of social media and websites to communicate important health information to ensure that the population is well informed. The general public have become voracious consumers of health news and information and many are able to discern truth from fiction/fake news. [20]

EHEALTH AND TELEHEALTH

Past barriers and obstacles slowed the uptake of information and communications technology to support remote patient consultations, but the pandemic has seen an explosion in the use of telehealth. One of the Commonwealth Government's early healthcare interventions was to dramatically expand Australians' access to telehealth.

New 'temporary' items were added to the Medicare Benefits Schedule with speed and include seeking advice from allied health workers and specialists. Changes to facilitate dispensing enabled electronic delivery of prescriptions to the pharmacy, with the ability for patients to have medications delivered to their homes. [25]

Use of telehealth by Australians has been well received, particularly telephone consultations, with more than 4.3 million medical and health services delivered to three million patients in the first month of its availability Minister Hunt quoted in Duckett.[11] A Royal Australian College of General Practitioners (RACGP) survey of more than 1,000 GPs found that 99 per cent of GP practices were now offering telehealth services, with 97 per cent also continuing to offer face-to-face consultations. [11]

PRIVACY

There have been several privacy related challenges in Australia when it comes to data and the use of technology by the general public: one such example being the COVIDSafe app, a contact tracing mobile application. Whilst uptake of the app was reasonably high this type of application potentially poses threats to an individual's privacy. Concerns related to breaches of the data or unintended uses relating to mass surveillance and data breaches due to insufficient protection.

The Australian Broadcasting Commission, reported by the Sydney Morning Herald noted that epidemiologists and others have been concerned that data collected by the app may be subpoenaed under America's CLOUD Act that can require data storage services, such as Amazon which won the contract to store Australia's data in Australia, to produce personal data irrespective of where it is held. [5]

To address these concerns, in May 2020, the Privacy Amendment (Public Health Contact Information) Act was passed to support the COVIDSafe app and ensure users' privacy is protected.

In Blackwater, Queensland a major health emergency was called when a resident who had been named, returned a positive COVID-19 result, subsequently and tragically died with an autopsy then confirming other causes of death. This scenario led to community and family fear and distress and was widely reported by the media. It represented a possible breach of the privacy of the family and the individual. [6]

CONCLUSIONS

The COVID-19 pandemic has exposed health systems' strengths and weaknesses. Data and information have been found to be essential for rapid policy development. In Australia we have been able to manage the outbreak and plan health system capacity and resources because of the rapid availability of relevant data. The data has been used to tell the story of the emerging and continuing pandemic. Not everyone can understand complex concepts, but these can be better explained when visualised. The important role of data scientists, information managers and others in producing the data in easily useable and understandable forms has been vital. However, issues such as privacy and the role of data and information to drive decisions are still prominent. Governance over data and a balance between its use for public good and the maintenance of the privacy of personal information requires strengthening.

Through our analysis we believe that future health information effort and investments should be focussed on ensuring that data for surveillance in pandemics is available when needed, health care organisations have an appropriately skilled workforce equipped with health information, analytics and visualisation skills. We support others who recommend the extension and facilitation of telehealth for effective health care delivery for the future. Processes for the governance of data and information to protect privacy must be robustly agreed after the disruption of the pandemic to protect individuals and society. Social media can be a fast and accurate way to inform and educate the public with wide reach.

The pandemic has demonstrated that those who have strong health information and reporting systems and have used data and information well to prepare for health system readiness and to inform the public have better managed their responses to the pandemic.

COMPETING INTERESTS

None declared.

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ANALYSIS OF MANAGEMENT PRACTICE

COVID-19: PERSPECTIVES FROM THE EXPERIENCE OF ONE AUSTRALIAN PRIMARY HEALTH NETWORK

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ABSTRACT

The Covid-19 pandemic is still current but has been particularly well addressed, so far, in the Australian context. This article presents an analysis of management practice to describe the experience of one Primary Health Network (PHN) and its approach and response to the pandemic within its geographical region in accordance with Federal government directives. The PHN is a large geographic area that includes the Central Coast, just north of the Sydney basin, the Newcastle and Hunter Valley region and the Northwest/New England region that extends from Tamworth to the Queensland Border.

The article describes the PHN function within its primary healthcare role (PHC) in respect to responding to national initiatives to address and reduce the impact Of the Covid-19 event. The article recounts the Federal Governments directive described through the 'National Cabinet' and the Federal Health Department and the PHN response to those directives and initiatives. The article also recounts the actual cases of Covid-19 over the period of the epidemic.

The article describes the governance, leadership, and management initiatives. The article then describes the PHN approach to evaluation of its approach from the perspective of general practice and other PHC providers as well as providing perspectives from governance, management, and staff. The evaluation process identified significant impacts on providers and strong support for the continuation of telehealth measures. There were positive responses to the PHN activity and as a strong sense of trusted information, ongoing education, and general engagement.

KEYWORDS

Covid-19 Pandemic, primary healthcare, primary health networks

INTRODUCTION

The Covid-19 pandemic while still current has been particularly well addressed, so far, in the Australian context. The 'post-Covid' phase, at time of publication is proving more problematic, with some significant spikes in notifications occurring at an individual state and territory level.

This article presents an analysis of management practice to describe the experience of one Primary Health Network (PHN) and its approach and response to the pandemic within its geographical region. The PHN is a large geographic area that includes the Central Coast, just north of the Sydney basin, the Newcastle and Hunter Valley region and the Northwest/New England region that

extends from Tamworth to the Queensland Border. This PHN operates as the Hunter New England and Central Coast (HNECC) PHN which incorporates two state based acute sector local health districts within its geographic footprint. This PHN has previously been more fully described. [1]

The authors analyse internal documentation, reports and minutes and include their own perceived experiences of the PHN function within its primary healthcare role (PHC). The article recounts the Federal Government's directives described through the 'National Cabinet' and the national or Federal Health Department in the PHN response. The article also recounts the actual cases of Covid-19 over the period of the pandemic.

The PHN evaluation of its approach from the perspective of general practice and other PHC providers is analysed. Perspectives from governance, management, and staff are included. The evaluation process identified significant impacts on providers and strong support for the continuation of telehealth measures. There were positive responses to the PHN activity and as a strong sense of trusted information, ongoing education, and general engagement.

THE PHN COVID_19 PANDEMIC CONTEXT

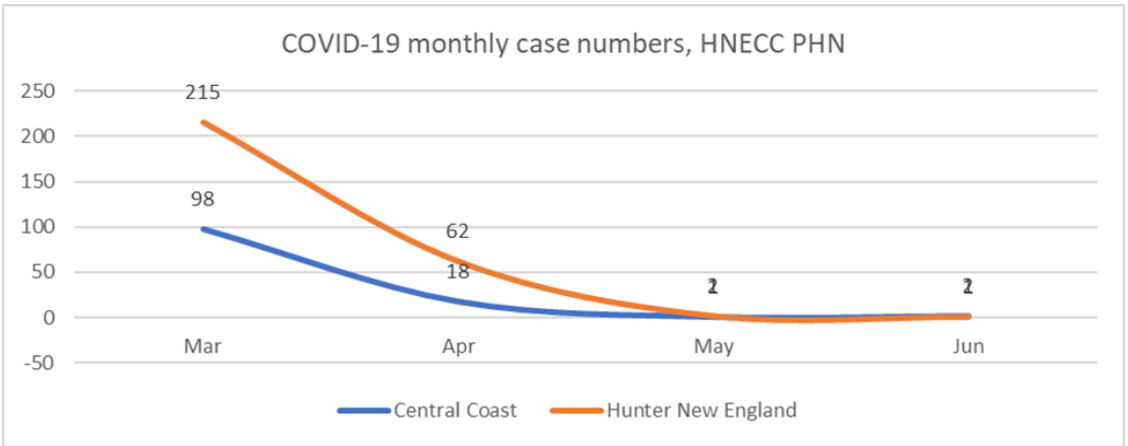
The context of the Australian health system is that acute care is mostly delivered through acute care facilities managed and operated by local health districts (LHDs) at the individual state and territory level. Primary Health Care (PHC) is mostly provided through individual general practices that are both for profit and not for profit, and other PHC providers such as allied health. PHC providers are supported by the Commonwealth, Federal or national government through regionally based primary health networks (PHNs). The PHNs also commission and contract a range of PHC services through these PHC providers on behalf of the Federal government. Addressing the pandemic requires collaboration and engagement of these two major organisational arrangements and of the three levels of government in Australia at national, state and territory, and local government structures.

The PHN role in the Federal government's' response to Covid-19 was initially requested on 21st February 2020 prior to local increases in cases, to assist with distribution of respiratory masks to general practices, community pharmacies and Aboriginal Community Controlled Health Services (ACCHSs), also described as Aboriginal Medical Services (AMS).

As the number of positive cases started to rapidly increase, it was announced by the Federal Government on 10th March 2020 [2] that PHNs would assist in identifying locations for up to 100 Community Respiratory Clinics (CRCs). These CRCs were intended to complement other Covid-19 clinics operated by LHDs and private pathology providers. By the following day, PHNs had additionally been verbally requested by the Federal Government to provide Covid-19 training to general practitioners and the broader primary care workforce. Within the PHN region of Hunter, New England and Central Coast, at the time the region had less than 10 positive Covid-19 cases. Within two weeks this had increased to 168 case on 25th March 2020, and within a month had escalated to 378 cases on 9th April 2020. [3]

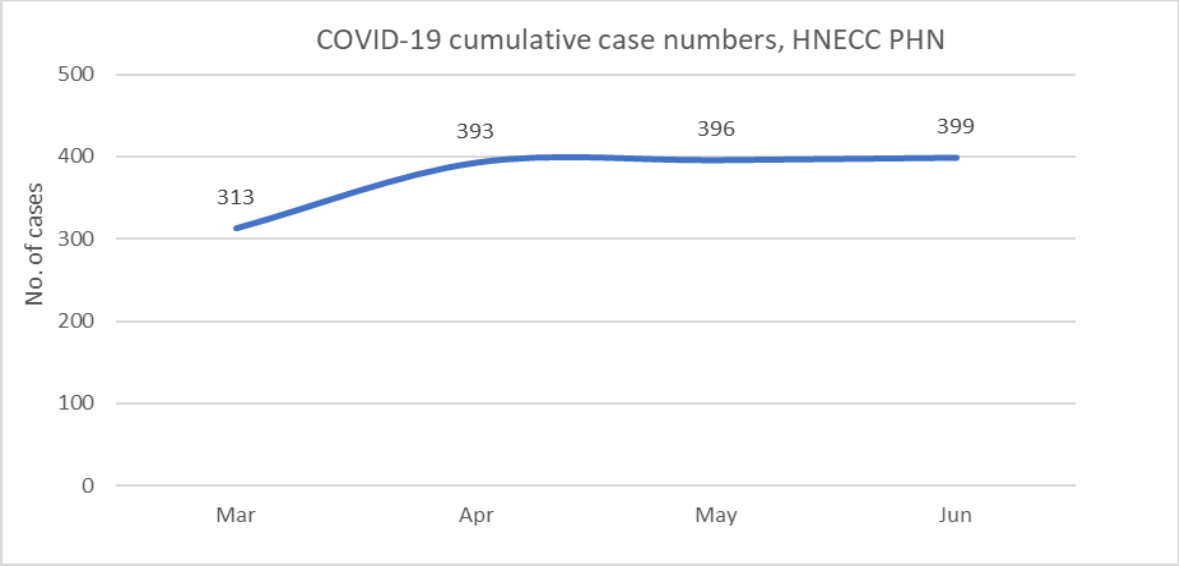
This activity is described in Figure 1 below in terms of monthly case numbers and in Figure 2 that describes the cumulative case numbers.

FIGURE 1: COVID_19 MONTHLY CASE NUMBERS, HNECCPHN



Source: Internal PHN documents

FIGURE 2: COVID_19 CUMULATIVE CASE NUMBERS HNECCPHN



Source: Internal PHN documents

Within the region, the greatest numbers of cases have been concentrated in the following local government areas (LGAs):

- Central Coast (117 cases)
- Lake Macquarie (56)
- Newcastle (55)
- Mid-Coast (39)
- Port Stephens (34)
- Maitland (32)
- Cessnock (24)

The detail of cases from each local government area is described in Table 1 below:

TABLE 1: CASES PER 100,000 POPULATION BY LOCAL GOVERNMENT AREA

LGA	CASES	CASES PER 100,000
Armidale Regional	4	12.7
Central Coast NSW	117	33.3
Cessnock	24	40.3
Dungog	5	53.0
Glen Innes Severn	2	22.5
Gunnedah	1	7.8
Gwydir	0	0
Inverell	3	17.9
Lake Macquarie	56	26.9
Liverpool Plains	2	25.3
Maitland	32	37.2
Mid Coast	39	41.2
Moree Plains	1	7.5
Muswellbrook	1	6.0

Narrabri	0	0
Newcastle	55	32.5
Port Stephens	34	46.8
Singleton	4	16.8
Tamworth Regional	13	20.7
Tenterfield	1	16.0
Upper Hunter Shire	1	7.0
Uralla	1	16.3
Walcha	0	0

Source: NSW Health (https://data.nsw.gov.au/nsw-covid-19-data/cases)

Sources of infection for cases in HNECC PHN have been:

- Overseas (76.3%)
- Locally acquired - contact of a confirmed case and/or in a known cluster (15.1%)
- Locally acquired - source not identified (7.3%)
- Interstate (1.3%)

THE PHN RESPONSE TO THE COVID_19 PANDEMIC

The PHN response to its role in support of regional primary healthcare services and in the safety and security of regional communities can be described in terms of three phases. Phase 1 is described as 'control and preparation', phase 2 is described as 'emergency pandemic management' and Phase 3 is described as 'recovery and planning ahead'. Events of this emergency nature, of course, do not occur in an ordered fashion or flow, so the above descriptors represent an organisational attempt to give the reader a logical order in which to understand circumstances that mostly occurred simultaneously.

PHASE 1 CONTROL AND PREPARATION

The response of the PHN can be described as agile and involved rapid allocations of responsible executives for external delivery of both internal and external operational matters, and the rapid implementation of a Covid-19 response team. In part this was enabled by a decline in the PHN's normal business activity. The strategies and operational responses included:

Governance, leadership, and management initiatives

This Covid-19 response leadership team comprised of the managers of all key response functions and ensured an agile and coordinated response. A coordinated communications protocol was introduced, to ensure effective communication with the PHN board, federal and state departments of health, primary care providers, local hospitals, and internal staff. Involvement of GPs, allied health, ACCHS teams and aged care providers was rapidly increased.

Internal operations were altered, involving redeployment of the majority of the PHN workforce into Covid-19 response activities, and involving most staff working from home, apart from the primary care support, mask distribution and other emergency operations.

Policies for working from home and business continuity were updated, and risk and critical function plans were implemented and adapted through the pandemic. This work included priority ratings and descriptions of the priority of critical functions, lead and alternate staff members, and strategies to manage critical functions in the event of serious illness or incapacity.

The PHN was able to utilise a pre-existing technology base which serviced a dispersed regional office structure. This enabled staff the capability to work from home.
Key insights from surveying the executive and staff following this experience include:

- Staff self-reported being more productive when working remotely (e.g. can complete tasks at a higher standard without interruption and meet deadlines). Staff also acknowledged that working from the office allows for incidental collaboration, attendance at important meetings and the building of personal and professional relationships. After this experience, staff would like to continue a mixture of working from the office and remotely.
- Staff valued the digital capability at the PHN. Regular video meetings and 'team huddles' have resulted in more cohesive teams and cross functional teamwork has increased since working remotely. Most of our managers have staff across various office locations and having all staff working remotely increased perceived trust and equability across teams.
- The executive of the PHN have identified challenges in enabling further dispersion of the workforce, while maintaining levels of teamwork and cohesion that enable a positive culture and ongoing successful delivery.

The experience of working in responsive teams with increased flexibility in roles has been positive, but also a challenge to continue in post-Covid-19 operations. Similarly, the increase in engagement with GPs, allied health, Aboriginal health, and aged care providers during Covid-19 has been identified by the PHN as a key challenge to continue.

Examples of major involvements of the PHN in Phase 1 include the following:

Mask and personal protection distribution

The acquisition of product, mostly masks was predominantly through the Federal Department of Health with 287,000 masks (6864 boxes), described as PPE (personal protective equipment), distributed by the PHN. Significant mask distribution continues to occur through the Aboriginal Health Access Team (AHAT) and Primary Care Improvement officers (PCIO) of the PHN. In addition to masks supplied through the Federal government, the PHN was the recipient of donated masks from the NIB Health Foundation (a foundation of a private health insurance fund), and a further contribution from funds organised by the Australian Chinese community, facilitated by the Society for Health Administration Programs in Education (SHAPE), an association representing university health management programs in Australia and the Asia Pacific. These latter donations enabled the PHN to assist the broader cross section of PHC providers (particularly Allied Health) while the government provision was directed towards general practices, ACCHSs and community pharmacies. These initiatives enabled a greater profile and engagement with the region's service providers.

Community respiratory clinics

Community respiratory clinics (CRCs), an initiative of the Federal government to provide a further option for testing, have been established across the PHN region with assistance in establishment from a private government contractor and from the PHN. These clinics were established and still operate at Raymond Terrace, Tamworth, Erina, Moree, and Boggabri, with a sixth being established at Taree. As at the beginning of June more than 6000 patients have been assessed at CRCs within the HNECC region. In addition to these clinics and testing at general practices, the two State based local health districts (Hunter New England and Central Coast Local health Districts) that have a significant state based acute care provision role, also conducted extensive general community testing across the two districts within the PHN region.

Training for GPs, ACCHS, commissioned services and residential aged care facilities

As part of the PHN strategic response some 27 events with more than nine thousand participants were provided. Some events were provided with the support of, or through other organisations such as the Asthma Foundation. These events were held substantially as live stream webinars at both the regional and in some cases, sub regional level.

The PHN drew upon the expertise of local clinical experts, including infectious diseases and public health physicians and enabled direct access to advice for local primary care clinicians. Recent events included a webinar for allied health and commissioned services about 'managing stress through resilience and self-care' and business continuity, and a mastermind class on E-prescribing and Plan-Do-Study-Act (PDSA) approaches to service delivery and safe practices in the pandemic context. Webinars were hosted with focus areas, including clinical pandemic preparedness and management of that context for residential care facilities (RACF) and the Aboriginal and Torres Strait Islander communities. The high levels of attendance and participation rates underline the importance and positive appreciation of providers for this educational support. The recorded events remain

accessible through the PHN website and the content of 'HealthPathways' has been aligned with webinar content.

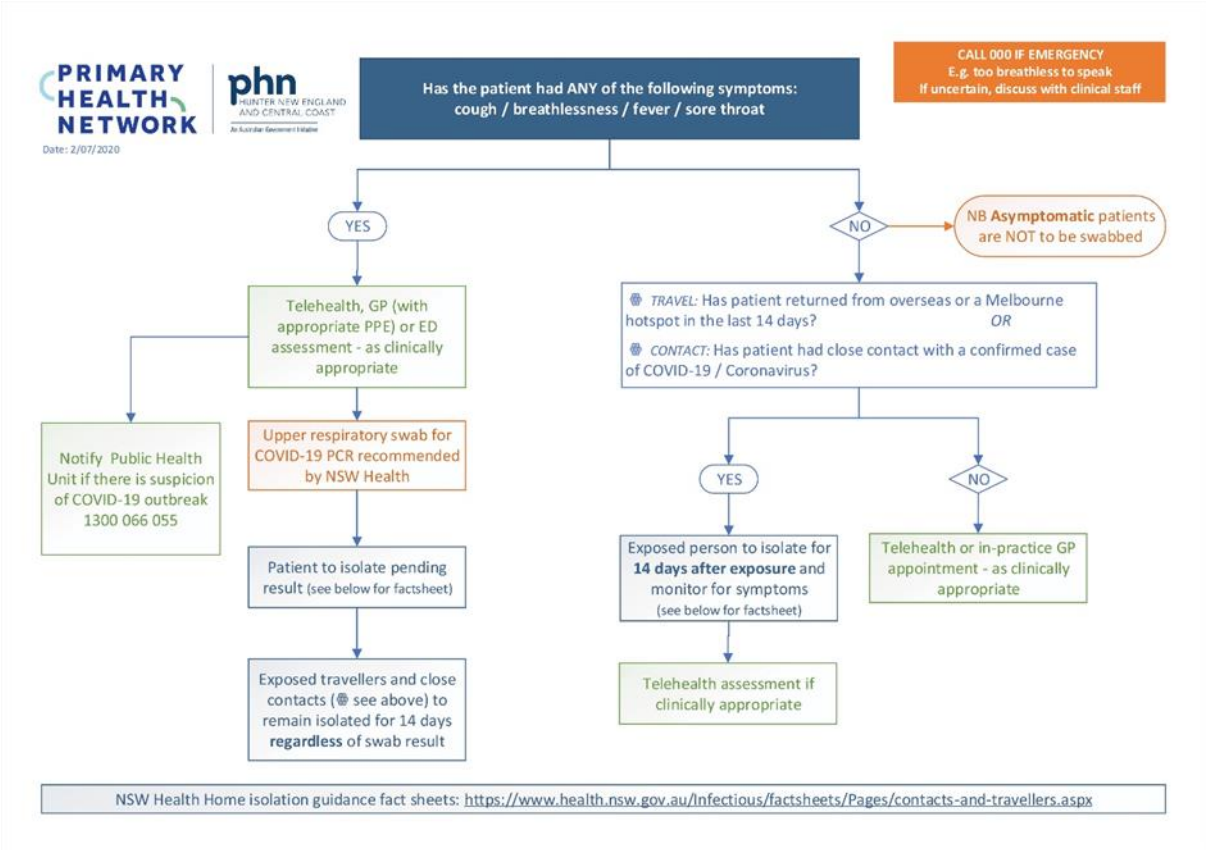
The success of the training and education initiatives suggests an ongoing strategy for the PHN in the 'new normal' of a sustainable element of business strategy.

Information for GPs, ACCHS, patients and communities

'HealthPathways', a set of pathways and options for clinicians to use at the point of care in referral and management of patients through the health system, were rapidly updated to include Covid-19 pages of added content specific to within the region. These pages were utilised by PHC providers on more than 82,000 occasions. Disability resources were added to the initial assessment and management pathway.

Pathways for Covid-19 assessment and management in children and in palliative care pathway have been added. The Central Coast ongoing assessment and management pathway is now operational and strengthening of Aboriginal health content and resources continues. Patient information views were greater than twenty thousand and daily updates by email now has more than 3451 subscribers. The utilisation of 'HealthPathways' was extensive and favourably supported by providers. An example of one pathway is described in Figure 3 below:

FIGURE 3: COVID-19 GP TRIAGE FLOW CHART, HNECC PHN



Source: Hunter New England Community 'HealthPathways' https://hne.communityhealthpathways.org/707728.htm

PHASE 2: EMERGENCY PANDEMIC MANAGEMENT

The main features of this phase included scenario planning to respond to outbreaks and the development of a general practice template for this purpose that was distributed to general practices through the PCIO team. A capacity status tracker has been developed based on a model from the United Kingdom National Health Service. [4] This innovative capacity tracker is an online tool where general practice, Aboriginal medical services and residential aged care facilities can provide real-time information during (and after) the Covid-19 pandemic. This helps to rapidly link with response and support plans and services.

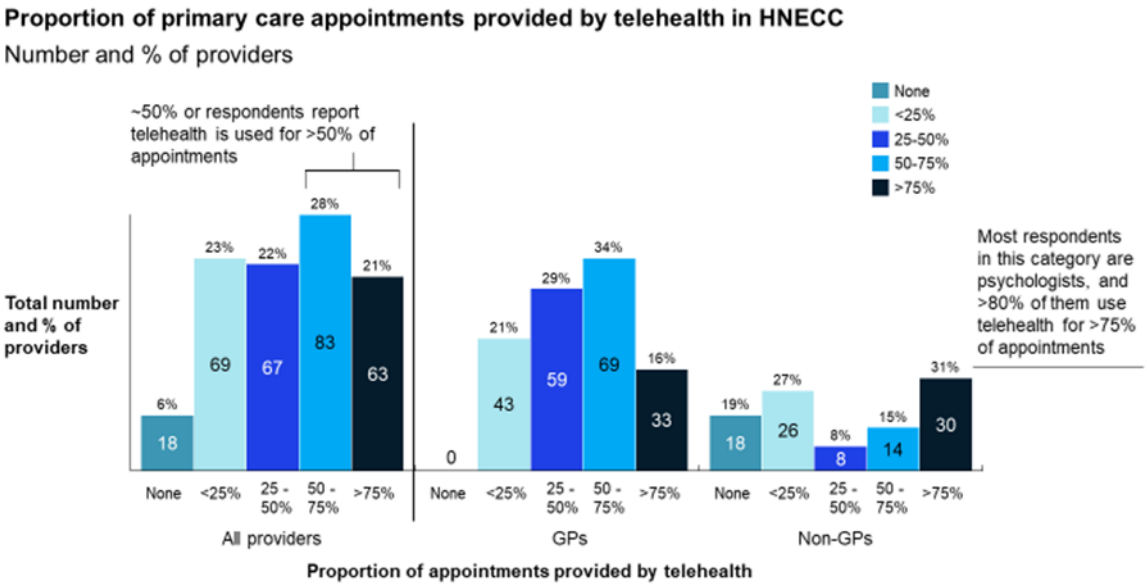
The tracker currently has 189 registered users, including 83 general practice and Aboriginal medical services that represents 20% of providers. More than 63% of residential aged care facilities (RACF), 106 in number are registered users.

The complexity of the pandemic and the need for the PHN to operate not only across internal teams but also together with other state and commonwealth organisations saw the PHN take the initiative in the establishment of an emergency operations centre. This enabled an increase in the out of hospital emergency coordination between the major organisations, being the HNECCPHN and the local health districts of the HNELHD and the CCLHD. This collaboration was effective and consistent with the 'national cabinet' approach and was additionally benefited by the ongoing inclusion of LHD representatives in the PHN's board governance. The collaboration at the regional level also developed a comprehensive primary and aged care risk matrix.

EVALUATION – PHASE 1 AND 2

The PHN conducted a Covid-19 impact survey over the April/May period of 2020. The survey, distributed online through the PHN digital channels, received 300 responses predominantly from general practices and additionally from other PHC providers such as allied health practices. The 204 general practices represent 50% of general practitioners in the region. All 8 AMS' also responded to the survey. Further, detail of the response is provided in Figure 4.

FIGURE 4: PROPORTION OF PRIMARY CARE APPOINTMENTS PROVIDED BY TELEHEALTH IN HNECCPHN



Source: Incorporating telehealth into the future of Australian Primary Healthcare – Continuation of Telehealth MBS Items post Covid-19. May 2020 [5]

MAJOR FINDINGS

The key findings and results indicate that pandemic has had a significant negative impact on many general practices and allied health practices across the region. The acceptance and uptake of telehealth has been extraordinary and the feedback from practices has endorsed the work of the PHN as being appreciated and useful. It is intended that the results will be utilised to enable further consultations with clinicians and providers on key issues, priorities, success, and innovations to guide further responsive delivery from the PHN.

The results indicate that 26% of practices tested for coronavirus. This was in addition to the testing undertaken by the two LHDs and that of the CRCs. 46% of practices reported a serious negative impact on practice caseloads. At the same time 37% of practices reported a serious impact on the emotional wellbeing of staff. 59% were concerned about the future emotional wellbeing of staff. In addition, 74% of practices found 'healthpathways' and PHN regular updates provided the most valuable Covid-19 support.

These updates were described by one member of the Community Advisory Committees (CACS) as her most trusted sources of Covid-19 information throughout this period. This feedback was consistent across general feedback and survey results. In addition to the positive 'healthpathways' support the provision of information through specific webinars and the provision of PPE supplies were also favourably supported.

'HealthPathways' is an online health information portal for GPs and other primary health clinicians, to be used at the point of care. It provides information on how to assess and manage medical conditions, and how to refer patients to local specialists and services.

Specifically, general practices reported that they were testing for Covid-19 in 24% of practices in the Hunter sub region, 33% in the New England Northwest and 27% in the Central Coast. At the same time general practices reported a serious to severe negative impact on caseloads for 42% of practices in the Hunter, 53% in the New England NorthWest and 50% on the Central Coast. Additionally, there was a reported serious to severe negative impact on staff wellbeing for 32% of practices in the Hunter, 57% in the New England and 41% on the Central Coast. Again, the Hunter, New England NorthWest found 'healthpathways' and PHN updates as the most valuable, whereas the Central Coast favoured PPE supply the most.

TELEMEDICINE

The percentage of practices using telehealth for 50 -100% of appointments varied markedly with 48% in the Hunter sub region, 19% in the Northwest/New England and 71% on the Central Coast.

Extensive support for the use of telehealth was also demonstrated in the evaluation survey. 48% of practices overall reported using telehealth for 50-100% of appointments. 49% of practices were using a combination of phone and video for telehealth and at that time Zoom was the most popular video platform. The use of a combination of phone and video in general practice was consistent in the Hunter at 51%, the Northwest/New England at 52% but only at 35% on the Central Coast. Importantly 97% (95% to 98% across the sub regions) of practices asked the PHN to advocate for a continuation of the MBS telehealth consultation rebate.

Subsequently the PHN developed a proposal to government for the continued use of telehealth that was supported by other NSW PHNs and submitted as a statewide policy paper.

DISCUSSION

The impact of the PHN engagement in the pandemic response has described a capability to respond to emergency management, including the PHN's initiative in the establishment of an emergency operations centre. It demonstrated the capacity of PHC professionals and providers to work alongside each other and for both to be more effective in their respective roles. The capacity to deliver and the appetite for continuing professional development (CPD) across the sector was impressive, and further work is now occurring for its sustainability. The development of the capacity tracker by the PHN was innovative. The positive experience of working in responsive flexible teams was positive and these gains are currently being built into sustainable ways of working.

The evaluation has demonstrated significant and varied levels of impact and stress for PHC practices. The rapid and responsive utilisation of telehealth is impressive as were some rapidly implemented models of care across settings.

The PHN has faced a substantial challenge in supporting PHC through major stress and pressure. This period has seen an extraordinary and positive rise in engagement and an increased familiarisation between the PHN and PHC providers across the region. This creates both challenges and opportunities for the PHN to build on these increased relationships with PHC providers.

The senior executive and the governing body have adopted five key strategies to build upon the learnings from this period in the phase 3 recovery period. They are:

SUPPORTING GP AND ALLIED HEALTH RECOVERY

This approach intends to build on the success, lessons learned and the meaning behind some of the survey findings by utilising focus groups, and forums, webinars and training events and build on change support strategies. The intent is to identify key priorities and share support practices successes and innovative models. The recent experience has been that providers have come forward and led education and update sessions, and that this voluntary commitment needs to be retained and supported.

COMMUNITY CAMPAIGN- DO NOT DISTANCE FROM YOUR HEALTHCARE

The evaluation results demonstrated concern about the wellbeing of practitioners and staff and a reluctance on the part of patients to return to the 'old normal'. Feedback from community members indicates that this reluctance largely stems from anxiety around the pandemic and the inadequacy of traditional practice waiting areas to provide recommended distancing. The risk is that the current reduction in chronic care and immunisation processes will worsen health outcomes during and after the pandemic. The campaign is to attempt a return to perhaps a new model of what might become the 'new normal' to address these concerns. Social and local media and a recovery communication plan are being adopted to encourage a reversal of patient trends in primary care.

SUPPORTING ACCESS TO CARE

The intention here is to build on the key priorities findings described above and it may include initiatives such as pilot(s) of remote monitoring, designing optimal after hours and urgent care, increase suicide prevention, progressing telehealth and digital approaches, and supporting primary care coverage of aged care and further developing Aboriginal 'HealthPathways'. The intent is to actively develop and support a 'new normal' and future opportunities and to be able to respond effectively to emerging needs following the Covid-19 pandemic.

ALLIED HEALTH STRATEGY

It became obvious that the GP focus, funding, and contractual arrangements of the PHN role did not permit the adequate inclusion of stand-alone allied health PHC providers. The strategy will focus on clinical information management and systems, telehealth, education, and the involvement of allied health clinicians in development of clinical programs and new models of care.

PHN CULTURE AND DELIVERY - COVID-19 RECOVERY AND PLANNING AHEAD

Continuation of the approach that has already commenced to internal operational activity through staff surveys, focus groups and team consultation and development to identify and preserve gains in delivery, flexibility, and innovation.

CONCLUSION

The Covid-19 PHN experience has seen rapid and effective response of PHN staff who performed well beyond the normal expectations of workload. They seemed energised by the challenges confronted and this article is partly written to recognise and describe the commitment, innovation, and energy they have displayed throughout this period.

The other significant impact has been the response of general practitioners, allied health personnel and other clinicians and community members. These groups and clinicians unreservedly offered their time and energy to provide education seminars and webinars and to present updates to colleagues and communities as representing the PHN.

These groups, some of whom also participate as either a Chair or member of our clinical and community advisory committees, demonstrated leadership in responding to support requested by the PHN and have enhanced the collaboration generally. This represents a significant increase in engagement and collaboration, an achievement that needs to be consolidated as part of normal practice.

The authors would welcome further feedback around the contents of this article and would encourage other PHNs to publish their experiences and learnings from this period.

CONFLICT OF INTEREST

DS Briggs is both a Board member, Deputy Chair of HNECCPHN and is Editor in Chief of APJHM. As such, he was excluded from the review and editorial process of this article.

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VIEWPOINT ARTICLE

COVID-19 – A TALE OF TWO CITIES: SEATTLE AND VANCOUVER

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ABSTRACT

The coronavirus pandemic has been affecting many countries in the world over the past six months. Nowhere sees the light at the end of the tunnel. Precautionary measures, lockdown, as well as control of crowd gathering and movement have been implemented by all governments, with the sacrifice of economic activities. It is interesting to review how things were happening in North America where the United States has been hard hit by the coronavirus disease 2019 (COVID-19), scoring over two million confirmed cases and about 120 thousand deaths at the top of the list of the world. Canada ranked eighteenth with about 100 thousand cases and just about 8 thousand deaths. Both the cases and deaths per capita are lower in Canada, which shares the same border and similar culture with the United States. Seattle and Vancouver have some of the highest incomes and educational levels in both countries. These two West coast cities are only 200 kilometres apart and are near the U.S.-Canada border. They are selected for this review to study the different approaches in managing the COVID-19 pandemic.

KEYWORDS

coronavirus; pandemic; COVID-19; health care systems; public health; social distancing; masks

INTRODUCTION

Esteemed microbiologists Sir Frank Macfarlane Burnet and David White said in 1972 that 'the most likely forecast about the future of infectious diseases is that it will be very dull' and 'there was always a risk of some wholly unexpected emergence of a new and dangerous infectious disease.' From Legionnaires' disease first discovered in the 1970s, to AIDS, Ebola, the severe acute respiratory syndrome (SARS), and now the coronavirus disease 2019 (COVID-19), infectious diseases continue to affect the world populations. As of 18 June 2020, there have been 8,061,550 confirmed cases of COVID-19, including 440,290 deaths, resulting in a world mortality rate of 5.46%. [1] Experts have warned that half of the population in the world will be affected by the end of 2020, potentially leading to more than 100 million deaths. [2]

As of 18 June 2020, about 37.3% of the world's COVID-19 cases (i.e. 3.9 million cases) occurring in the North America. [3] In the 331 million population of the United States of America (U.S.), there were nearly 2.4 million confirmed cases or a prevalence of 0.72%, and nearly 116 thousand deaths or a mortality rate of nearly 4% among the confirmed cases. In Canada, there were 99.1 thousand cases or a prevalence of 0.26%, and 8,175 deaths or a mortality rate of 8.25%. [4] The confirmed COVID-19 cases and deaths in the U.S. were 29.3 times and 14.2 times respectively those of Canada. Seattle and Vancouver are selected for this review to study the different approaches in managing the COVID-19 pandemic. Seattle, with a population of 3.5 million in the metropolitan area, and city of Vancouver, with a population of about 631.5 thousand, are two border cities at the West coast that are only 200 kilometres apart. Comparison is also made with reference to Hong Kong (H.K.) as Seattle and Vancouver have 14% and 20% of Asian population respectively. Both cities are

amongst the highest incomes and educational levels in both countries.

HEALTH CARE SYSTEMS OF UNITED STATES AND CANADA

The U.S. and Canada are culturally similar, but their health care systems are very different. The U.S. system is heavily private with multiple payers whereas Canada has a predominantly publicly-funded single-payer approach, providing universal access and being more equitable. [5] The U.S. has 16% of its GDP spent on health care, much more than the 10.4% in Canada, whose system works better than the U.S. on health outcomes such as life expectancy, 83 versus 79 years, and mortality rate. However, the Americans are more satisfied with the health services provided and consider the quality of care as excellent. [6]

Public health is defined as 'the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society'. [7] There are activities to enhance public health capacities and services with the aim to improve health and wellbeing of the people. This function is obvious and crucial during disasters and pandemics. In the U.S., State and Local Health Departments are primarily responsible for health under the U.S. Constitution while the Federal Government will ensure the capability of all levels of government to provide essential public health services and to act when health threats affect more than one state, a region, or the whole country. [8] However, health care in the U.S. is provided mainly by private for-profit corporations, attending to the needs of individuals rather than those of the public. Thus, a real public health system does not exist in the U.S., and there appears to be no capacity to protect the population.

In Canada, the Minister of Health has the responsibility to maintain and improve the health of Canadians, with supports by Health Canada, the Public Health Agency of Canada, the Canadian Institutes of Health Research, and the Patented Medicine Prices Review Board. The Public Health Agency of Canada (PHAC) is remarkably like the Centres for Disease Control and Prevention (CDC) in the U.S. It aims to empower Canadians to improve personal health, through activities with partnership organisations by the public health mandate contained in legislation and regulations within each province and territory. The provincial bureaucracy carries out all core functions, roles, and responsibilities. [9,10]

OUTBREAKS IN SEATTLE AND VANCOUVER

In British Columbia (BC), the first case appeared on 28 January 2020 and community transmission in Canada was first confirmed in BC on 5 March 2020. Two weeks later, a public health emergency was declared in the province when Vancouver was also in a local state of emergency. [11] As of 11 June 2020, there were 2,709 cases in BC with 168 deaths and half of the cases, i.e. 1,396 cases and 74 deaths, occurred in Vancouver. The figures in BC were 3% and 2% of those in the country respectively, but the population of BC is 13.5% of Canada. The province has done well in combating the epidemic through effective precautionary measures such as crowds of over 50 people being banned. Restaurants, nightclubs, bars, as well as all personal service establishments were ordered to close in late March. Physical distancing was imposed in public venues. Many cities, including Vancouver, had closed public playgrounds.

The BC government has produced COVID-19 curve-flattening results that are the envy of the rest of Canada. It has been cautious about renewing physical connections and modifying public measures during the gradual re-opening of the province to contain the infection rate. Part of the "success" is attributed to random factors specific to BC, including a large Chinese community that practised physical social distancing very early in the epidemic, warmer weather, and the timing of the spring break. BC is a model for Canada in getting things under control quickly, particularly in limiting social contacts. [12] However, the elderly and people with pre-existing medical conditions are more vulnerable to the virus. Most of the COVID-19 fatalities in Canada involve residents of care homes. This suggests a systemic failure on how the most vulnerable members of society are being cared for. [13]

Seattle is a seaport city on the West Coast of the U.S. and was the fastest-growing major city in 2013. The population of Seattle metropolitan area is 3.98 million and is the largest city in the state of Washington. In March 2020, Seattle was better prepared, learning from the 3-day strike by caregivers at Swedish Health Services, the largest non-profit health care provider in Seattle, and putting systems in place to safely serve the patients. Physicians continued to work and displayed highly reliable work behaviours. The management synthesised the improvements in organisational practices, particularly in clear communication with repetition, and delegation of

authority. Seattle is the city of the first diagnosed COVID-19 cases and mortalities in the U.S. [14] The "unplanned" strike happened to be a life-saving exercise when COVID-19 struck Seattle. They had found measures with focus on people and sustainability would result in effective crisis management for the city. Such measures, together with the quick actions by the leaders of the Washington state and Seattle, helped to boost the ability of Seattle to serve its people in this time of radical uncertainty. [15] COVID-19 tests performed in the communities have improved alertness in the population.

COPING APPROACHES OF UNITED STATES AND CANADA

Professor Peter Berman, a health economist who has taught on both sides of the U.S.-Canada border, has examined the difference between the U.S. and Canada. In early May, he noted over 62,000 cases and 3,562 deaths reported in Massachusetts, or 52 fatalities for every 100,000 people; while in BC, there were just 2,112 cases and 111 deaths, or about two victims for every 100,000 population. In the U.S., hospitals are mostly private organisations without any overall government control whereas in BC, the provincial minister of health, with the advice of the provincial health officer, can instruct health authorities and facilities to take whatever actions are required. Moreover, while the American system has much expertise, there is little national coordination and divided responsibility, plus at times conflicts, even among agencies such as the National Institutes of Health, the Centre for Disease Control, and the coronavirus task force set up by the President. In Canada, community doctors are private providers and thus primary care and the hospital systems are not connected, making it difficult to enforce testing for the COVID-19 out into the population. [16]

In March when cases started to surge in the U.S., its President played down the threats of the coronavirus pandemic because the national economy needed to resume normally, despite warning from experts that the worst of the COVID-19 pandemic had yet to be experienced in the country. On the other side of the Atlantic, the British Prime Minister closed all nonessential shops, restricted travel, and enforced social distancing, by the police if necessary. The governors in the U.S. were doing a better job in handling the coronavirus outbreak, by bringing in stay-at-home orders, as well as closing nonessential businesses and schools. The U.S. has been leading the world in the number of cases and deaths since late March 2020. Americans are not vigilant enough in conforming to rules and advice from the authorities. [17,18]

Nonetheless, Seattle and San Francisco have managed better than many other U.S. cities during the pandemic. In addition to effective government policies, Challenge Seattle, an organisation made up of representatives from giant Seattle companies, including Amazon, Microsoft, Starbucks, Boeing, and Nordstrom, have been playing a major role in getting the business community to take the outbreak seriously, and they sent employees to work from home, thus mitigating the spread. With such involvement of the private sector, Seattle was able to address the pandemic earlier than other cities, especially when the vast supply networks of epidemic prevention supplies and international connections can play the important role in, for example, the procurement of 250,000 N95 masks for the Washington state. [19]

WHAT HAS BEEN AND CAN BE LEARNED ACROSS THE US-CANADA BORDER AND THE CONTINENTS?

It was truly shocking that the situation in the U.S. was getting worse because of the power and influence of its President, who has been making "contradictory" statements publicly and in his personal blog. It was almost two months after the surge of cases in the U.S. that the President had finally overcome his aversion to wearing masks in May during a visit to a vehicle factory. Ironically, the President, who was pushing to get his people to put the pandemic behind them and reopen the faltering economy, had never worn a mask in the public. [20]

In May, the Canadian Prime Minister started to wear a face mask in the public, especially when social distancing was not possible. He and his family had self-isolated at home for several weeks after his wife was diagnosed with COVID-19 in March. Canadian officials also emphasised the importance of other guidance to limit the spread of the COVID-19, including frequent handwashing and keeping two metres (six feet six inches) from others. The Chief Public Health Officer said face masks were recommended as an additional protection when physical distancing was hard to maintain, and that staying home when sick was a must because of more evidence about asymptomatic and pre-symptomatic individuals spreading the virus. [21]

Together with other western countries, the United Kingdom (U.K.) was caught unprepared because of no experience or expertise in dealing with such fast changing "natural" disaster. The U.K. and U.S. may be suffering from the arrogance or ignorance especially among the leaders, and because of a lack of action for weeks. The basic principles and practice of public health and infectious control were ignored for unknown reasons. Then the U.K. government had a new plan: Suppress–Shield–Treat–Palliate. The plan had arrived far too late in the development of the outbreak and the National Health Service (NHS) was not prepared for the surge of extremely sick patients that followed. There was also a lack of personal protective equipment and sound clinical leadership, resulting in panic and chaos within the NHS. [22]

In Europe, Germany is coming through this crisis relatively well, with 187 thousand cases and half of the case per capita of that of U.K. This is attributed to the German health care system in which all people have full access to medical care, supported by a network of general practitioners ready to deal with milder cases, allowing the hospitals to focus on the more severely ill. The government also took the COVID-19 threat seriously from the beginning. It informed the public not just about what they knew, but also about what they did not know. There were no national curfews, but citizens were asked to stay at home voluntarily and to live under severe restrictions in public and private life. Everyone remained vigilant, demonstrating a sense of responsibility for themselves and others. Transparent and accurate information was shown to be more effective than coercion. Germany also pointed out the need for global-level crisis management with multilateral cooperation. No single country could manage a pandemic alone. [23]

In the small town of Lodi, Lombardy of Italy, a major economic region with a population of 10 million in the northern Italian region, the infection exploded and became the epicentre of the European outbreak. The health system had made the biggest mistake by admitting COVID-19 patients into hospitals throughout the region. It should have established separate exclusive facilities for patients with coronavirus, like the alternative care sites in the U.S. and U.K. [24] In addition, a much centralised health care system with big hospitals as its core was attributing to the acceleration of the outbreak in northern Italy by acting as conductors of infection. It had learned that local community health services, including health clinics, family doctors, community nursing and rehabilitation facilities, were essential in combating outbreaks of this scale. Thus, the existence of advanced hospitals in Italy, with the not so advanced community health facilities, help to explain the spread of COVID-19. [25]

Dealing with health-related matters is never simple or straightforward since the outcome cannot be predicted even with the most powerful tool like big data analysis and super-computers. Health care is neither a commodity, as in the case of U.S., or wholly welfare, as in U.K. and Canada. The dual track system in Hong Kong, with both public and private sectors working in parallel to suit the needs of individuals while providing a universal healthcare safety net, is among the best in the world. [26] The Singaporeans are smart in modifying the H.K. system to perform better in imposing more co-payment incentives, which are obligations and self-responsibility in one's health. Across the border, Mainland China's health services used to be very privately oriented, but in a socialist economy, have been moving towards more state funding, particularly in primary care, supplemented by health insurance.

Nonetheless health care systems often reflect the political and social philosophy of the nation. With COVID-19 or any disastrous events, the health care systems are being tested to beyond capacity. Hence the disastrous scenes and untoward happenings have been shown in European countries and the U.S. In U.S.-Canada, concern about the undefended border is real because the novel virus has neither nationality nor preference for any nations. It has just spread through careless human habits and unguarded communities. Different systems should manage differently with different considerations, but in time of a pandemic all nations must act fast in cohesion and collaboration, not through coercion and never in opposition.

In Hong Kong, the government was quick to introduce the 'preparedness and response plan for the novel infectious disease of public health significance' and hence was sufficiently prepared for the coronavirus pandemic. The government also reminded residents to pay attention to personal and environmental hygiene via social media. Such community-oriented actions were found to work in containing the outbreak. In addition, the Centre for Health Protection and the Hospital Authority held daily press conferences and a designated official website was providing updates on the outbreak, health guidelines and pertinent information to the public, etc. There is no doubt that wearing face masks, partial lockdown, social distancing, tests, border control and quarantine centres

have been shown to work for the success of Hong Kong in combating COVID-19. [27]

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RESEARCH ARTICLE

A QUALITATIVE STUDY ON MENTAL DISTRESS OF VIETNAMESE STUDENTS IN THE U.S.A. IN THE COVID 19 ERA

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ABSTRACT

OBJECTIVE

This paper aims to examine how the COVID-19 pandemic affects the mental distress of the Vietnamese students in the USA. We explore different root causes of mental distress among international students who are away from their home country, their loved ones, and being isolated from school and community due to this outbreak.

DESIGN

In-depth interviews were conducted to probe the reasons for mental stress during the pandemic and the narrative textual analysis was subsequently performed to analyze the results. This research includes the interviews of 20 Vietnamese students in the USA during the COVID-19 era.

RESULTS

The textual analysis showed that the mental distress of these Vietnamese students were caused by limited access to on-campus facilities and activities, limited access to public services including grocery shopping, transportations, clinics, the possibility of being infected, isolated living condition due to the lockdown order, and inability to go back to the home country when wanted.

CONCLUSIONS

We found that both physical attributes (e.g., living condition, internet difficulty, overwhelmed healthcare system, restricted traveling, lack of personal interaction, limited access to public services) and psychological factors (e.g., anxiety of unfamiliar teaching modality, fear of viral infection, uncertain career aspects, cultural barrier and prejudice) directly led to the mental distress of these students. Moreover, other factors such as turbulent future job markets and potential racism toward Asians in relation with "Chinese virus" may cause the mental distress of these students.

KEYWORDS

COVID-19; Vietnamese students; mental distress; narrative textual analysis; racism

1. INTRODUCTION

Mental distress is a worldwide crisis. Around the globe, about 800,000 people died from suicide in 2016. [1] According to the National Institute of Mental Health, depression affects approximately 6.7% of all US adults but many are reluctant to seek professional help for depression. [2, 3] The mental distress persists not only in developed countries such as the United States, but also in developing countries such as Vietnam. Anxiety disorder such as panic and specific phobia, and mood disorder such as depression are all commonly observed mental illnesses. Mental distress becomes an even more important concern for the society given the current COVID-19 situation. [4, 5, 6] Students are facing new challenges including adapting to new lifestyle of working from home, social-distancing, home-schooling of children, worrying of losing jobs, and fear of the wide-spread virus. [7, 8, 9] These traumas caused

by COVID-19 significantly and negatively affect the amount of optimism, self-esteem, and social support which then lead to increased levels of mental distress among college students. [10] Several news articles have recorded the mental distress caused by COVID-19 among Vietnamese students in the USA. [7, 8, 9] Although scholarly studies of students' mental distress have been undertaken, [10, 11, 12] there exists a research gap for the mental distress of Vietnamese students in the USA during the COVID-19 pandemic.

The number of international students in the USA is 1,095,299 in the 2018-2019 academic year, with 31,613 Vietnamese students. [13,14] Many international students are coming to the USA for education, safety, security, and the possibility of future career in the US after graduation. However, during the COVID-19 outbreak, the US has the highest number of COVID-19 cases across the world. This poses serious challenges to the education and career prospects of prospective international students. Research has shown that college students are more prone to varying mental disorders. [10,11,12, 15] We think that the COVID-19 environment may accelerate the current mental disorders or serve as a catalyst for potential mental distress down the road, especially among the young population. Therefore, this paper addresses an urgent research question below:

What are the factors that could lead to mental distress of Vietnamese students in the US during the COVID-19 epidemic?

The contributions of this study are two-fold. Firstly, the in-depth interviews conducted during the time period of the COVID-19 outbreak are unique, revealing interesting insights regarding the mental distress of those who are affected by the COVID-19 crisis. Secondly, findings of this research generate important practical implications for the healthcare services and establishments, particularly among the international student population.

This paper is organized as follows. In Section 2, we briefly review the mental distress literature among college students and discuss the importance of this study. The research methodology is described in Section 3. Sections 4, 5, and 6 are dedicated to interview findings, discussion of the results, and managerial implications. Lastly, we conclude this study and explore possible avenues for future research in Section 7.

2. LITERATURE BACKGROUND OF MENTAL DISTRESS

Research in mental distress is highly relevant and important for college-aged students since mental distress has been a common health problem among this young group. [12] Just recently, several studies found that college students are at an increased risk of having mental distress. [12, 15, 16, 18, 19] In addition, it has been shown that college age is a vulnerable stage where many mental health problems, such as anxiety disorders and mood disorders, first surface. [17] A survey on U.S. college students indicated that 30% ~ 50% students were diagnosed or treated for at least one psychiatric disorder in the last 12 months. [16] Another cross-sectional study on the mental health of UK veterinary undergraduates found that 54% of the respondents had experienced mental illness. [18] In a mental health study of the Australian university students, nearly one-fifth reported the mental health problems, and an additional 67.4% of the students reported the subsyndromal symptoms. [19] More than one third of the university students in Ethiopia have suffered mental distress. [12] Without doubt, university students are the high-risk population for having mental health problems and the need for early intervention to prevent severe mental illness was therefore suggested. [12, 18, 19]

Daily stress was also found to increase depression and anxiety as well as negatively impact the long-term wellbeing of the university students. [20] At the time of COVID-19 outbreak, because of the severe disruption of daily routine and normal life along with other uncertainties, young college students are vulnerable to mental health issues. [21] Extending the extant literature, we examine the mental distress of the Vietnamese students staying and living in the USA during the COVID-19 pandemic.

3. RESEARCH METHODOLOGY

This study utilizes the in-depth interview methodology to understand the mental distress of Vietnamese students in New York City (NYC), New York, USA during the COVID-19 outbreak. The in-depth interviews help to derive individual's opinions, emotions, and feelings, providing us with unique and interesting insights into their daily life. [22, 23] The causes of the mental distress among these students are explored and discovered in the interview process.

3.1. INTERVIEW PROCEDURES

20 Vietnamese students from six different colleges in the NYC area were recruited via Facebook page of "Vietnamese students in NYC". The six universities comprise CUNY – Brooklyn College, CUNY – Baruch College, New York University (NYU), Berkeley College – NYC, Long Island University (LIU), and Kingsborough Community College (KCC).

Each interview lasted around 30-45 minutes via Zoom in March-April 2020. These participants preferred being interviewed in Vietnamese only. None of the interviews was conducted in person since social distance order was strictly required in NYC. Participants could choose to be interviewed in group of 3 to 5 or individually.

We recorded video interviews with participants' consent, preserving anonymity. Triangulation was used to ensure consistency of the interpretations of the interview transcripts with two authors' agreement on the same meaning after checking the recorded texts.

Among these 20 students, there are 8 males and 12 females. These students (aged 19-33) have been in the USA from 7 years to less than 4 months. Demographics of these students are provided in Table A1.

3.2. NARRATIVE TEXTUAL ANALYSIS

The audio and video recordings of the interviews were translated from Vietnamese to English and transcribed by two researchers who are fluent in both Vietnamese and English. We chose the narrative textual analysis because it provided us with an in-depth understanding of how participants viewed the world around them. [22, 23, 24] We first listened and observed the recorded interviews to make sense of the participants' responses and then interpreted what the participants meant. Finally, the authors must agree upon the interpretations of the interview transcripts. Then the narrative textual analysis was conducted by these two researchers to examine the participants' concerns about COVID 19 impact on their lives.

We started asking participants "what" changes COVID 19 had made to their lives and "how" they felt about the changes. By asking "what" questions, we try to learn about the different sources of mental distress these students were experiencing. "How" question tries to capture how participants were dealing with the changes caused by COVID- 19. At the same time, we also cross-checked the interview transcripts, finding similarities and comparing differences in the participants' responses.

The follow up questions, for example, "would you please elaborate what you meant by racist look or racism behaviors of the locals toward you being an Asian?" or "tell me more about your experience of remote learning" complemented the interview.

4. INTERVIEW FINDINGS

This research explores the root causes of mental distress among Vietnamese students in NYC. In the following space, we identify eight such major causes along with detailed transcripts from the interview recordings.

4.1. CAUSE 1: UNSAFE LIVING CONDITION

Yen Trinh, Master of Computer Science, has just moved from Massachusetts to a programming internship for a Wall Street financial company since January 2020. Because of the small salary on her OPT internship, she must live with six other girls from different countries in three cramped bedrooms in Manhattan.

> *'One of my roommates has been infected with COVID-19 since last week. I am and others are very scared…Eight of us here are living in a three-bedroom apartment…I can't move out. With my internship salary, I can't rent my own apartment in Manhattan.' (Yen Trinh)*

She cannot move out of Manhattan for a more affordable place because she needs to live close to her workplace.

> *'I need to be near my workplace... Morning times in Manhattan are very crowded… A lot of traffic jams... Subways are always packed in the a.m. I'm afraid of being late for work'.*

Nhi, is in a lawsuit against her landlord.

> *'I heard that one person sharing the apartment here is infected. I tried to move out A.S.A.P. but the owner does not let me break the contract… I deposited 2,000 USD, so if I moved out now, it would be lost…My one-year contract here is until this December 31st…I am looking for a real estate lawyer to fight for my right and safety…' (Nhi)*

Anh, is in an uncertain situation in his shared apartment.

> *'I share the apartment with two others. I don't know them. I just rent the room via a room-for-share*

website for students…I am praying that the other two are taking care of themselves because if they get sick, I may catch the virus too…I am wearing mask to go the common areas within the apartment such as the kitchen and restroom…I have stayed in my room all of the times'. (Anh)

4.2. CAUSE 2: INTERRUPTIONS OF SCHOOL

Nguyen, from Hanoi, is an international student of Brooklyn University. He has been in New York for 4 years. He says he loves New York because it is an energetic city with many opportunities.

'I miss my friends from the Badminton Club. I have not seen them since March 20 (the day Brooklyn College was shut down due to the pandemic).'

'I miss my practicing badminton. It was my daily ritual for the past two years here.'

'I usually stay in the library to study with friends after my classes. Now, I cannot even visit the library for printing services.'

'I enjoy group study.'

Khanh, just came to the USA in January 2020 to join the MBA program at LIU. He is sharing the apartment with seven other students also from Vietnam.

'I love going to campus. To me, it is a real schooling experience.'

'I study via Zoom everyday…Internet is disrupted sometimes… Remote-learning is not the same with going to school…'

'I took pictures of myself and then shared on Facebook so that my family and friends in Vietnam can see my international student life in the States…Lately, I seldom take pictures because they are same things every day…Nothing is new…I am basically at home the whole day…'

'My roommates are also taking online classes. We sit in the living room and study together.'

Quynh, Khanh's roommate, is an undergrad student at LIU. She is studying Accounting. This Spring is her second semester in the US.

She comments,

'This is not the study abroad life I imagined. I am home 24/7 while being in the most exciting city in the world.'

'I loved going out to shopping malls and parks to mingle with local people. I learned English from talking to them.'

'Before this mess, we often took a train to the centre of the City…Sometimes I went with the roommates. Sometimes I went with my Chinese classmates. I saw many splendid buildings…I learned a lot about America.'

Trang, MBA student at NYU. She is living with her husband in an apartment near Central Park. Her husband, Thang, is a Master student at Baruch College. They have been in NYC since 2018.

Trang said,

'More homework and assignments in remote learning classes than in face-to face classes.'

'Bored at online classes.'

'I prefer going to campus and have real lectures.'.

Thang added,

'Going to school means attending on-campus lectures. I paid for the lectures, not for theses online sessions…The experience is not the same…'

Minh, complained,

'Some professors simply converted my face-to-face classes to the 100% online format…I hardly hear from them. They just disappeared…'

Kim, added,

'Many professors posted PowerPoint slides and assignments on Blackboard. There is no online lecture since March. It has been five weeks

now…My friends from other classes even had to contact the Chairperson of the Department and the Dean for help.'

4.3. CAUSE 3: INTERRUPTIONS OF WORK

Minh Hieu, studying for a master's degree, has been in New York for 1.5 years. Hieu works part-time in a Chinese restaurant in the Brooklyn area. The restaurant was closed because of the NYC 's social distancing order, so she lost her job. Previously, with the tips received daily, she could afford the living expenses. Hieu now asks for some support from her family in Vietnam while also spending her savings.

'I have no income since the lockdown order in New York. I am using up my saving for the tuition of the Fall semester. I am worried that I may spend all of the saving for the Fall semester tuition and cannot register for classes.' (Hieu)

'I am worried if the shutdown lasts longer than the summer, I may have to go back to Vietnam…I may have no saving left for the Fall semester.' (Hieu)

In the similar situation are Lan (KCC) and My (Brooklyn College) who moved to the NYC from Vietnam in 2018. Lan was working at a nail salon while My was working at a hair salon in the Brooklyn – Chinatown area before the shutdown. They have been unemployed since then while ineligible for disaster aids from the US government.

'I was paid cash when working… I do not have the Social Security Number…I do not apply for unemployment help…' (Lan)

My added,

'I heard that the aids such as Emergency Disaster Relief are only for Americans. I am an international student here…I have received no help from the government…All my friends are in the same situation.'

Vy, from Saigon, graduated from Baruch University in 2018, working for a financial company in Jersey City. Vy now works from home. Although her job has not greatly affected by remote working, Vy also encountered some difficulties such as bad Internet connection.

'Internet at home is not strong or stable. I just have to call the IT staff from my company to help fix the Internet problems at my home yesterday…I think there are too many people working at home and using internet…'

'I miss going to the office'

'More work for me while working at home than when I was going to the office.'

'You cannot take a break when you are working at home. They (customers and bosses) expect you to be at the computer the whole time.'

4.4. CAUSE 4: GOT SICK AND HAVING LIMITED ACCESS TO HEALTHCARE SERVICES

Phuong, from Hanoi, last year student at Berkley College, was infected with COVID-19. She just recovered recently. She recounted the terrible time with all the symptoms of Covid-19.

When she found out she was infected, she called all the hospitals in NYC to get tested but no one answered the phone. She could not make an appointment in person because all of the COVID-19 testing centres and hospitals were overloaded.

'Unless you are about to die, you cannot get to the hospitals for testing or treatment.' (Phuong)

'One of my friends called the hotline for days when she got the fever, but no one answered. She recovered by herself after the sick days…It was an extremely horrible experience for her and her family in Vietnam.' (Trang)

'I heard from several students in my Facebook group that it is impossible to ask for COVID-19 test lately.' (Vy)

Apparently, health facilities here have not yet been prepared to combat this pandemic.

Phuong had to cure herself with common cold medicine according to the doctors' remote instructions.

'I have to take care of myself. I have learned to cure for myself. Before this pandemic, I was so

confident that I was living in the most developed country in the world with the best healthcare system…It seemed not…I am scared now…' (Phuong)

Vy and Giang are worried if they get infected, who will pay hospital fees – they themselves or their student insurances, and which kind of student insurance will cover the treatment of this new disease.

'We just try to protect ourselves by staying home and pray that we are not infected. We do not trust the healthcare system here anymore after the pandemic experience…They did not or could not help patients.' (Trang and Thang)

4.5. CAUSE 5: CANNOT GO BACK TO THE HOME COUNTRY

When we asked why these students chose to stay in the US, they said they were worried about the high risk of getting the virus on the planes and/or at the airport.

'I read on news that many people got infected on the plans' (Trang)

'I am fine so far here (at home). I just lock the door and stay home. I cannot control whom I may interact with at the airport.' (Vy)

'My family told me to stay right there…Don't try to go anywhere… It is safer to stay at my apartment now than on the flight.' (Khanh)

Besides, traveling back to Vietnam from the US is not as easy as before.

'There is a long list of students want to fly back to Vietnam at this time. It is not easy to go back now as compared to normal times' (Vy)

'It is not like you buy the ticket and you can fly back tomorrow or anytime soon… There are not many flights from the US to Vietnam. The Vietnamese government limits the international flights from and to Vietnam.' (Trang)

'We have to register with the Vietnamese embassy in the USA to buy flight tickets to Vietnam... There is a quota for the tickets.' (Phuong)

'Most of our friends flew back to Vietnam in February when the pandemic news broke down in the US... We have some friends decided to fly out last week (early March) which is already late… Those flights were the last chances for us…The only thing we can do now is to stay in the dorm room, avoid going out to public places, and try to take care of ourselves…' (brothers from Hanoi, Trung, and Lam, both NYU students)

Also, some students showed concerns about the mandatory 14-day quarantine once they arrive in Vietnam. Vy and Trang are worried that the 14 days of quarantine could disrupt their ongoing urgent work...

'I am taking online classes now. I need the stable internet to watch remote lectures and complete the weekly assignments…' (Trang)

'I need to access the internet every day for work.' (Vy)

'My Mom told me that everyone coming back from overseas must stay in the quarantine centres for 14 days. It is mandatory. What if the internet is bad or there is no internet, I may not be able to finish this semester.' (Khanh)

Some students raised the concern that if they leave now, they may not be able to get back to the US after the pandemic. Thus, they choose to stay in NYC.

'I am on F1-visa (international student visa status). I am afraid they (US embassy) will not renew my visa to get back here after the pandemic.' (Nhi)

'I just arrived NYC 3 months ago. I don't want to go back to Vietnam now and raise the red flag to the US Immigration Officers… I need to finish the first semester of my program …I am planning to wait until the summer to go back…' (Khanh)

'I am on OPT (working permission after graduation) now. If I go back, it may be difficult to reapply for the visa to come since I do not have any reason.' (Vy)

'I am graduating next year. I am looking for an internship so that I can apply for my OPT. If I fly out

of the USA now, I think that the USA embassy in Vietnam will not grant me the entry visa after this pandemic.' (Phuong, Berkeley College).

These students show concern that when the pandemic is over and when they can travel to see their loved ones again.

'I miss my Mom. I have not seen her since last year. We have been on the phone every day, but it is not the same you know…The sad thing is we don't know when we can see each other…' (Phuong)

'I really hope I can travel again in the summer. But it really depends on the pandemic situation…' (Khanh)

4.6. CAUSE 6: ISOLATION AT HOME, UNABLE TO ACCESS TO PUBLIC FACILITY (E.G. GROCERIES AND LAUNDRY ROOM)

Isolation is an issue that these international students are facing in COVID-19. Phuong did not go out since March 18. All activities are around the apartment she rents with a friend from the same country.

'I order all groceries delivered to my door…I did not even talk to my roommate…I cook and then text her to get the food in the kitchen when she is hungry. We do not eat together like before. I close my room door and she closes her door…This is safe…We text each other to communicate when we need.' (Phuong)

'We have not gone out since March… We have not done laundry in 4 weeks.' (Trang and Thang)

'The only two times I had to go out were to do laundry…My girlfriend is staying with me since quarantine, so I am not too lonely. We are just cooking and eating different dishes…' (Anh)

Khanh and five other friends can only narrow their life around the vacant lot in front of their building.

'Sometimes I really need to just get out of the apartment…I wear a mask and walk around the down stairs area of my apartment complex…I was walking alone and try to avoid all possible contacts with others…They avoid me too…' (Khanh)

4.7. CAUSE 7: UNSTABLE FUTURE ON CAREER AFTER GRADUATION AND RACISM

A major concern of international students is whether they should stick to their original plans of staying back in the USA after graduation or they should return to their home country.

Vy, was hoping for a job with a visa sponsorship, said,

'I used to believe very much in my chosen career because I am now working full time for a big financial company. But now we are unsure of the future of the New York's financial industry.' (Vy)

'I was unable to find an internship. I was applying in January this year, right before the shutdown. But I have not heard anything from the companies that I applied…I am worried since the OPT application deadline is approaching…' (Phuong)

These students as well agree on the racism wave toward Asians since the pandemic outbreak due to the terms of 'Chinese virus' or 'Wuhan virus' which associate the Asian ethnicity with this deadly pandemic.

'Back in February, when I entered a subway cart, two women covered their noses with their shirt collars immediately…They think all Asians carry COVID-19.' (Nam, Baruch College)

'When I was running in the park near my house, some men and women tried to approach me and yell racial slurs to me… It was in March…' (Thanh, College)

'As early as February, sometimes when I walked to the nearby grocery stores or convenient stores, the local people attempted to stay away from where I stood as far as possible… They even gave me strange look…' (Thu, KCC)

'They screamed at me, cursed me, and called me 'Viru' one night when I walked home from the subway station.' (Anh)

'A cashier of the grocery store near my home specifically requested me and my husband to wear masks and stay 6 feet away from him when we at the check-out counter. He did not ask the customers in front of us to do so…' (Trang)

4.8. CAUSE 8: CULTURAL FACTORS

Vietnamese people, who appreciate the close-knit neighborhood and community, are inclined to keep close relationships with their neighbors. The neighbors are often visiting and chatting with each other, sharing ideas, and talking about daily life. They believe that these people are whom they can count on in the time of need. The proverbs 'Ban anh em xa mua lang gieng gan' (i.e., your siblings who are living far away cannot help you as much as the next-door neighbor can) or 'Hang xom toi lua tat den co nhau' (i.e., You have your neighbor when it is dark) reflect the strong believes of Vietnamese people's reliance on their close community.

Thus, living isolated in their own shelters is stressful for these Vietnamese students.

> *'I have not seen any of my neighbors since the shutdown…' (Thanh)*

> *'Everyone is trying to avoid others…People walk fast on the street… They keep their faces down…They avoid any form of communications at all cost…' (Nam)*

> *'I have been on the phone with my parents 24/7 since March. I am living in NYC but now I feel like I am living in a lonely planet…The streets are too quiet…I hardly can see anyone on the street from my windows here.' (Phuong)*

5. DISCUSSION

Based on the detailed transcripts of the in-depth interviews conducted in Section 4, we have identified eight major causes for the mental distress among the Vietnamese students during the COVID-19 outbreak, concerns ranging from unsafe living condition, interruptions of school and work, unable to visit the home country, limited access to healthcare services and facilities, high healthcare cost for the virus, feeling isolated, uncertain career prospects, to cultural differences and prejudice.

Firstly, limited choice of an affordable and comfortable shelter in NYC makes the living situation quite challenging and dangerous for one of the most vulnerable populations in the USA—international students. Research showed that rental housing unaffordability is one of the significant causes for mental distress among immigrants. [25] NYC has one of the highest rental rates in the world. [26] These international students, who mostly live on the financial support from the family back home, are struggling with the high rental cost in the City.

Secondly, unconventional learning environment such as online or remote is unfamiliar to the traditional students, disrupting the conventional studying habits thus creating anxiety and uncomfortableness among the students. Previous studies indicated that college and university students are anxious about dormitory evacuation and cancellation of anticipated events such as exchange studies and graduation ceremonies. [27] Remote learning also diminishes personal interaction and communication, reducing the hands-on opportunity for the international students to practice English and experience the Western culture. [8, 9]

Thirdly, work is disrupted due to technical difficulties (e.g., high internet usage low bandwidth) and longer working hours per day and per week. A recent article showed that being forced to stay home, working from home, reducing social interaction, and working many hours under stressful circumstances have a major negative impact on worker's daily functioning and night-time sleep, which subsequently lead to the rising in stress level. [28]

Fourthly, the students are distressed because they are in fear of the restricted travel to their home country during the pandemic while not knowing how long this travel restriction is going to last. Homesickness is one of the challenges that international students may encounter when they leave home. [29] And the self-quarantine and shut-down orders in COVID 19 in NYC are worsening the homesickness. Since the pandemic, Vietnamese students in NYC have been staying home in a foreign country for an uncertain amount of time, which lead to potential trouble in social interactions and sociocultural adjustment. [30]

Fifthly, due to the overwhelmed healthcare system in NYC, some students are unable to get timely diagnosis and treatment of the virus. Numerous interviews with doctors, hospital administrators, and health officials revealed a confusing and often troublesome virus testing system in New York City that left many people who suspected that they had been exposed to the coronavirus deeply frustrated. [31] Until the end of April 2020, NYC still was not able to provide COVID 19 testing services in many hot spots in the city, especially in communities of colour. [32] This suggests that during the peak of this pandemic there had

been many areas in the city struggling with providing COVID-19 testing and treatments for the residents. In addition, these students show concerns about the possible high cost of treatment and inadequate health insurance coverage. As of the end of March, it was unclear whether student insurance is adequately and timely equipped for this pandemic, thus causing lots of students to be worried. [8, 9]

Sixthly, depression among the students is an unavoidable side effect created by the isolation for human contact necessary and essential during the COVID-19 epidemic. These traumas caused by COVID-19 significantly and negatively affect the amount of optimism, self-esteem, and social support, leading to increased levels of mental distress among college students. [10]

Seventhly, the students are worried about the future career prospects and their so-called "American dream". [7, 8, 9] Study of Han and Appelbaum [33] revealed that 77% of the STEM international PhD graduates by 2020 in the United States want to remain in the U.S.A. Anti-Asian phenomenon in America during this pandemic is also a critical issue and a big concern for these Vietnamese students. There are many reports on the racism against the Asian community in America. [34, 35].

Eighthly and lastly, the collectivism and uncertainty avoidance of the Vietnamese students intensify their worrisome and isolated feelings because of the lack of human interaction and uncertain virus situation. The uncertainty avoidance dimension of culture captures the 'extent to which a society, organization, or group relies on social norms, rules, and procedures to alleviate the unpredictability of future events.' [36] People in high uncertainty avoidance cultures focus on stability and security are less likely to take risks, whereas those in low uncertainty avoidance cultures tend to demonstrate more tolerance toward unstructured and ambiguous situations are more likely to take risks. [37] Members in uncertainty avoidance societies appreciate confirmation and prefer predictability in their lives. [38, 39] Vietnamese college students' high tendency to avoid uncertainty is likely to influence their behaviors during the COVID 19 pandemic. When the COVID 19 situation is unclear, these Vietnamese students (with higher uncertainty avoidance) turn out to be more distressed and worried compared to their American counterparts (with lower uncertainty avoidance).

This cultural factor may compound the mental distress among these students. Currently, many Vietnamese students in New York are facing all kinds of worries: losing their jobs if they are working in a restaurant, milk tea shop, beauty facilities, nail salon; or uncertain future if they are practicing or having an internship at American corporations. The devastating consequences of the virus is substantial not only physically and financially but also mentally and psychologically as we see in Section 4.

6. MANAGERIAL IMPLICATIONS

The interviews we conducted in this study reveal the eight root causes for potential mental illness (i.e., depression, PTSD—Post Traumatic Stress Disorder) pre- and post-COVID-19 outbreak in NYC. They provide mental health professionals with important insights to diagnose and treat the patients affected by the COVID-19. We believe that the densely populated city area and usual busy city life pose great challenges for those who are used to the bustle and hustle of the big city during this pandemic. The compounded stress from both the city and the virus could take a tremendous negative toll on the city people. We suggest that the mental health professionals implement special tailored diagnosis procedures and treatments for those staying in the city during the pandemic. The treatment should focus on finding the root cause of the mental health issue rather than masking the symptom. The treatment should also be distinguished depending on demographics, occupation, cultural background, previous mental history, family relationship, financial situation, employment status, and education.

For the international students like those from Vietnam in NYC, independent living away from home, the difficulties in daily life such as shopping and waiting in line, grocery shortage, online ordering service for an extra charge, washing day-to-day clothes to avoid infection, being hindered by remote learning, uncertainty about school opening and future career aspects, and cultural barrier and prejudice intensify their anxiety of arriving, studying, and staying in the "big apple." In addition to the assistance from mental health professionals, the schools hosting these students should find ways to alleviate the negative effect of COVID 19 by creating a family feeling culture in the school, providing necessary free mental consultation to the students and keeping track of their mental status, and

keeping students informed of the changes in job market and daily life.

Moreover, in addition to the interview transcripts we collected in Section 4, there are also very interesting stories of Vietnamese students in New York that many students hesitate to share. Consistent with previous studies on mental health among students, [10, 11, 12, 18, 19, 20] this research finds that college-student group is very sensitive with dramatic life changing events and more easily to be distressed. This study contributes to the extant mental health literature by utilizing a unique narrative textual analysis of the personal interviews conducted among the Vietnamese students living in NYC during the COVID-19 epidemic.

Lastly, similar studies among other groups of international students in the US such as Chinese, S. Korean, Thais, or even to European groups and African groups are necessary. The international students in the USA are already stressed due to being away from their home country and the loved one, now facing life changing occurrences caused by COVID-19. The American healthcare system may need to find a way to approach the international students in order to help them with the mental distress caused by COVID-19. Vietnamese government as well as these students' American universities also thinks of solutions to provide professional mental health services for their students in this critical time. In Asian culture, people enjoy the city activities (e.g., night life, dining out, group gathering). Thus, the shutdown in COVID-19 is a big cultural shock for these students.

Although the sample is interesting and relevant to the aim of this study, its size is limited due to the nature of the interview method we implemented and the sample group who were present and willing to provide detailed answers, especially during the COVID-19 era. Nonetheless, the small sample size of this study may make it difficult to generalize the findings and replicate the results. Therefore, it is imperative for researchers to use other methodology and a larger sample size to compare with our findings. For example, regression analysis, such as basic Ordinary Least Squares (OLS), more advanced Simultaneous Equations Systems (SES) [40] and Seemingly Unrelated Regressions (SUR), [41] can be used to find the causality and the significance of the factors that influence mental distress. Factor analysis is also useful for developing new measures for the eight sources of students' mental distress which we have identified in this study or for discovering additional sources. In addition, we suggest collecting a panel dataset to explore the long-term effect of COVID-19 on students' mental condition as well as periodically checking how the mental health status of these students change after the pandemic is fully over. The panel dataset, in our opinion, is more dynamic and a step closer to the real-world situation. Econometrics time-series models such as advanced Vector ARIMA or a simple version Vector AR (VAR) can be undertaken to study the cause-and-effect relationship between the students' mental distress and the impact of COVID-19 both short-term and long-term. Moreover, future studies can examine the mental distress on different groups of students from different ethnicities and backgrounds for comparison.

7. CONCLUSIONS

This study provides a unique set of empirical evidence for understanding the root causes of mental distress among the Vietnamese students staying and living in US during the COVID-19 pandemic. Based on the in-depth interviews, we have identified eight sources for mental distress. We find that the mental distress is caused by both physical attributes (e.g., living condition, internet difficulty, overwhelmed healthcare system, restricted traveling, lack of personal interaction, limited access to public services) and psychological factors (e.g., anxiety of unfamiliar teaching modality, fear of infection, uncertain career aspects, cultural barrier and prejudice).

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APPENDIX

TABLE A1: DEMOGRAPHICS OF THE INTERVIEW PARTICIPANTS

PARTICIPANT	AGE	GENDER
Yen Trinh	26	Female
Nhi	23	Female
Anh	21	Male
Nguyen	24	Male
Khanh	24	Male
Quynh	19	Female
Trang	29	Female
Thang	33	Male
Minh	23	Male
Kim	22	Female
Vy	24	Female
Minh Hieu	27	Female
Lan	25	Female
My	21	Female
Trung	22	Male
Lam	21	Male
Nam	22	Male
Thanh	25	Female
Phuong	25	Female
Thu	23	Female

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RESEARCH ARTICLE

UNDERSTANDING MENTAL HEALTH SERVICES AND HELP-SEEKING BEHAVIOURS AMONG COLLEGE STUDENTS IN VIETNAM

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ABSTRACT

OBJECTIVE

Mental health is a significant topic, especially in the context of the COVID-19 pandemic. While there is higher prevalence, there is less attention, to mental health problems among Asian college students, so the authors decided to investigate the effectiveness and efficiency of mental health services and help-seeking behaviors in Vietnamese universities. By conducting this study, the authors hoped to contribute to current literature on the factors that contribute to professional mental health help-seeking behavior of college students in Vietnam and to suggest strategies to reduce possible barriers that prevent them from looking for professional medical help.

DESIGN

For this cross-sectional research, we first conducted a pilot study to test the reliability and validity of our measurements. We then made necessary adjustments and distributed the final questionnaires to a university in Ho Chi Minh City, Vietnam. Collected data was analyzed through exploratory factor analysis

RESULTS

Results indicate that between psychological openness and help-seeking propensity, in our model, help-seeking propensity more significantly explains students' help-seeking behavioral intentions than the other two.

CONCLUSIONS

Using the Theory of Planned Behavior, this study examined predictors of professional mental health-seeking behavior among college students in Vietnam. Our findings indicated that help-seeking propensity significantly influences Vietnamese students' intention to obtain professional healthcare. Through this study, we suggested some guidance to the school administrators on the factors that encourage students to seek professional mental care.

KEYWORDS

mental health services, help-seeking, college students, Vietnam, COVID-19

INTRODUCTION

Studies on healthcare topics in underserved populations in general and mental health in particular are calling for more attention. [1, 2, 3] Mental health services are becoming increasingly important since mental disorders contribute a large portion of the illness burdens for all countries. [4] Such a burden of mental illness is a significant global public health issue. [5] Based on the influence of policy, legislation, and cultural backgrounds, Vietnam's mental health services remain highly demanding and challenging. The limited access to health care services caused by the economic and social reform program in Vietnam, the lack of mental health legislation, and shortage of mental health services, create more problems for those suffering from mental disorders. [4]

Among vulnerable groups of people who suffer from this situation, college students require particular attention. Mental disorders are common among college students, [6] a segment of the population that many consider as a privileged group which is immune to mental related illnesses [7]. Compared to the considerable attention and treatment of mental disorders among elementary and secondary school students, there is an insignificant amount of information about the situation and treatment of college students' mental illness. [6, 8]

As college life could be a stressful time for many, mental disorders are increasing in occurrence and severity among college students. [7] They are under much pressure from academic courses, homesickness, as well as work and family responsibilities. [9] A meta-analysis of twenty-four articles regarding mental illness worldwide (1990-2010) reveals that the prevalence of depression among college students is dramatically higher than the general population. [10] Since college years are a challenging transition to adulthood and essential development stages, untreated mental illness could easily impact the students' academic success, productivity, [7] occupation, health, and social outcomes. [11]

The novel coronavirus disease 2019 (COVID-19) forced many universities to close their doors, and migrate their classes to an online format, causing distress among students and academic staff. [12] Recent studies show that social distancing, including its extreme forms of isolation and quarantine required due to the COVID-19 pandemic public policies, triggered cases of depression and anxiety. [13] Another study found that more than 50% of their sample view that psychological impact as moderate-to-severe. [14] Students from Chinese origin, facing the risk of hate crimes due to stereotypes and prejudices rooted in the origins of the pandemic, developed additional stress, anxiety, and other mental health ailments. [15]

Despite this situation, most of the adults with mental disorders (especially students) do not receive proper mental health attention. [16] Compared to Western countries, Asian countries suffer more of this problem due to their tendency to stigmatize and discriminate persons with mental disorders. Individuals suffering from mental disorders are usually socially isolated because they are considered dangerous and aggressive. [17] Based on those reasons, mental service seeking was less common among Asian college students with lower socioeconomic backgrounds. [7] More importantly, male Asian students from lower socioeconomic backgrounds showed a significantly higher frequency of mental health problems and higher risk of depressive and anxiety symptoms compared to other ethnic groups. [7, 8]

Given the unique characteristic of college encompassed residents and social networks, mental health services among college students is not only a growing concern but also an opportunity to identify, prevent, or treat mental disorders. [7, 18] Based on the unique needs of college students, reducing the barriers to help-seeking behaviors [18] and effective treatment of mental disorders, may recover and improve their educational and psychosocial functioning, resulting in substantial long-term benefits. [6, 18]

Consequently, this study aims at examining the antecedents of professional mental health help-seeking behaviors among Vietnamese college students. This paper attempts to assist healthcare providers in Vietnam to understand the motivation behind consumers' seeking professional mental help. By conducting this study, we hope to contribute to mental disorders treatments among Vietnamese college students and reduce the possible barriers to help-seeking behaviors.

Note: Throughout this paper we will follow the United States Department of Health and Human Services [19] definitions of Mental Health as "the successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity."; Mental Illness as "the

term that refers collectively to all mental disorders, which are health conditions characterized by alterations in thinking, mood, or behavior (or some combination thereof) associated with distress and/or impaired functioning"; and Mental Health Problems as "signs and symptoms of insufficient intensity or duration to meet the criteria for any mental disorder."

LITERATURE REVIEW ON MENTAL HEALTH IN VIETNAM

Only a few studies have been published about the prevalence of mental health problems in Vietnam. [20] An incidence of mental distress was found in a rural area of Vietnam, with only 5% of the patients receiving formal treatments from mental health facilities. [21] Mental health services in Vietnam are unable to meet the high demand for such care. More attention is required to increase the number of mental health caretakers and mental health services capacity. [4]

CULTURAL AND SOCIAL BACKGROUNDS

Mental health services in Vietnam are under much criticism for its ambiguous policy, lack of health insurance and hospital coverage of treatments, and increased stigmatizing forms of service provision. [22] There is a lack of information on the perceptions of mental health and help-seeking behavior in Vietnam. [5] Misunderstanding of mental illness and the treatment preference of combining medical therapy and family care are the two main characteristics of Vietnam mental health services. [20]

Based on different cultural backgrounds, Vietnamese and US college students show different viewpoints towards mental health issues. US participants view mental illness problems as a chemical imbalance, while Vietnamese students believe people with mental illness are dangerous and disabled. [5]

STIGMA

A study conducted among Vietnamese Americans and Vietnamese nationals showed that both groups displayed a more definite stigma toward those with mental illnesses. [23] For the Vietnamese individual, the stigma is not just towards mental illness but also mental health problems and psychological symptoms. [24] Urban residents in Vietnam have more perceived stigma and discrimination toward people with mental health problems than rural residents. [24] Moreover, Vietnamese students tend to have stronger stigmas towards individuals with mental illness than U.S. college students. [5] Stigma toward mental illness results in reducing help-seeking behaviors from mental health professionals. [25] Hence, it is critical to reduce and control the issue of stigmatization. Thus, those affected in Asia will be willing to seek appropriate help. [17]

HELP-SEEKING

Perceptions of mental health and help-seeking behaviors of the Vietnamese are affected by Vietnamese concepts of mental health, which are based on a mix of traditional and modern views. [20, 26] Vietnamese's views of mental health help-seeking may be related to their alternative help resources such as family and friends, their level of knowledge about mental illness and potential stigma. [20, 27] 20% of Vietnamese college students who understand the nature of depression and the importance of professional mental health treatments expressed their hesitation of seeking mental help. [28]

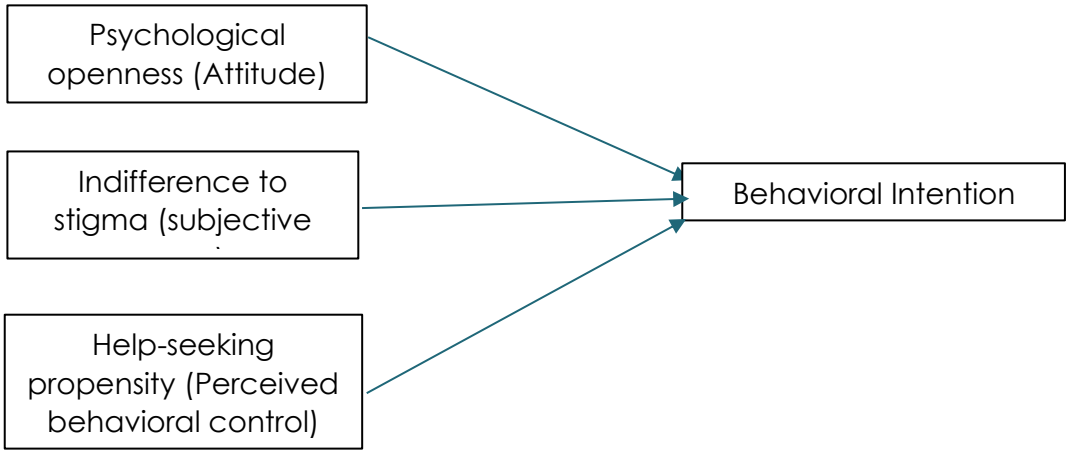
Among the literature reviews on Vietnamese individuals' mental health, there is little information about mental health services and perceptions of treatments among college students in Vietnam. [5] By far, we have found six articles exploring mental health issues among Vietnamese students. Only half of them mainly focus on college students' mental health situations in Vietnam. The following Table 1 summarizes the information and main findings of those articles.

TABLE 1 REVIEW OF LITERATURE ON MENTAL HEALTH IN VIETNAM STUDENTS

YEAR	AUTHORS	MAIN VARIABLES	APPROACH	SAMPLE	KEY FINDINGS
2015	Pham, T	Study burden, academic stress and mental health	In-depth interviews and cross-sectional survey	1,609 school students from three regions in the north (Hanoi city), centre (Thua Thien–Hue province) and south (Can Tho province) of Vietnam in the survey	Compared to other factors that may cause academic stress and depression, study burden was found to be the most significant one. However, besides truancy, study burden is not related with most of the adolescent risk behaviors of students.
2015	Tran, Q. A.	Mental health indicators and Medical students	Surveys	2099 medical college students from eight state medical universities in Vietnam	Our finding suggests that medical students in Vietnam may be a group with a high prevalence of suicidal ideation. Every one out of twenty students reported both depressive symptoms and suicidal ideation.
2017	Dang, H. M., et al.	School based Mental health services efficacy	Three time-points project data	443 students in the Vietnamese cities of Hanoi and Danang	Mental health services (emotional and behavioral mental health problems) were significant for both low and high-risk status students, while social skills programs are only significant for low risk status ones.
2017	Peltzer, K., Yi, S., & Pengpid, S.	Suicidal behaviors among college students	Cross-sectional survey	4675 undergraduate university students in the Association of Southeast Asian Nations (ASEAN) countries, including Vietnam	The suicidal ideation rate among college students in Southeast Asia are much higher (11.7%) than that rate in the U.S. (8.8%). Suicide prevention should pay special attention on students with a history of adverse childhood experiences, poor academic performance and mental health problems.
2018	Kamimura , A. et al.	Mental health service and	Surveys	533 Vietnam undergraduate	Vietnamese and US college students have a different view

		College student		students and 419 U.S. undergraduate students	towards the causes and perceptions of mental health. Vietnamese students turned to have stronger stigmas towards individuals with mental illness. While US participants rate mental illness as normal illness like others, Vietnamese participants consider people with mental illness as dangerous and should be isolated.
2018	Thai, Q. C. N., & Nguyen, T. H.	Mental health literacy (MHL) of depression and undergraduate students	Cross-sectional survey	350 undergraduate students in Hanoi, Vietnam (213 public health majors; 137 sociology majors)	Symptoms of depression, appropriate help-seeking intentions, and first-aid support should be paid special attention to under the Vietnamese context.

FIGURE 1 RESEARCH MODEL



According to the above literature review, we could conclude that research on mental health in Vietnam, with an emphasis on students, is limited in scope and numbers. Only five recent published articles explored the mental health problems among students in the country. Only three of them focused on college students. Given the high demand for mental health services in Vietnam, current research is insufficient to provide guidance in handling mental problems in Vietnamese colleges.

Many scholars are motivated to discover the possible reasons and circumstances which influence people's decision in seeking mental health services. Extrinsic and intrinsic factors can affect their behavioral intent. For example, help-seeking attitudes, diverse cultural, social, environmental, and economic conditions, as well as beliefs, language, religion, and other cultural aspects of people in both developing and developed countries. [29, 30]

Our literature review did not reveal a comprehensive article exploring the reasons and factors that influence Vietnamese college students' professional mental health help-seeking behavior. Most of the extant literature refers to psychological openness, help-seeking propensity, and

indifference to stigma as the main factors affecting people's intention of seeking mental health treatments.

The Theory of Reasoned Action (TRA) analyzes individuals' beliefs, attitudes, intentions, and behaviors, the relationships between those constructs, and how an individual may be influenced by beliefs and attitudes. [31] The Theory of Planned Behavior (TPB) is an extension of the TRA, where a dimension of Behavioral Control was added. [32-35] In the context of the TPB, the intention to seek professional mental help is affected by an attitude, i.e., psychological openness, a subjective norm, i.e., indifference to stigma, and perceived control, i.e., help-seeking propensity.

RESEARCH METHODOLOGY

SAMPLE

A snowball sample was used to collect information. Students from two randomly selected business courses from a major university in Ho Chi Minh City, Vietnam, were the seeds of the snowball sampling process. With the help of the course faculty, a printed survey was distributed among students of those classes. Respondents were informed beforehand that the research's goal was to understand the students' attitudes and intentions toward seeking professional mental health services. Furthermore, they were advised in advance that the purpose of the study was strictly academic and that the results of the study would not be used for any other purposes.

Participation in the survey was voluntary. Students received extra credit for filling the survey. They did not receive any financial incentive for their contribution.

112 responses were collected within two weeks. From those, four questioners were found incomplete. 108 responses were used for analysis. Table 2 shows the sample characteristics.

TABLE2 SAMPLE CHARACTERISTICS

ITEM	FREQUENCY	PERCENTAGE
Gender:		
Male	38	35.2%
Female	70	64.8%
Age:		
18-25	33	30.6%
26-45	56	51.9%
45+	19	17.6%
Occupation		
Employee	34	31.5%
Manager	17	15.8%
Business & other	57	52.7%
Religion		
Buddhism	39	36.3%
Catholicism	20	18.3%
Others	49	45.4%

MEASUREMENTS

The measurements of the following constructs were developed from the literature: psychological openness, help-seeking propensity, indifference to stigma, and behavioral intention toward seeking professional mental health services. We also included four demographic traits: age, gender, education, and religion.

PSYCHOLOGICAL OPENNESS, HELP-SEEKING PROPENSITY, AND INDIFFERENCE TO STIGMA

Following Mackenzie, Knox [36] Inventory of Attitudes toward Seeking Mental Health Services (IASMHS), 24 items, and three internally consistent factors, i.e., Psychological Openness, Help-seeking propensity, and Indifference to stigma, were employed in this study.

Combining the notions of TPB and IASMHS, we identify the measurements in this study which include Psychological openness (IASMHS) equals to Attitude (TPB), Help-seeking propensity (IASMHS) equals to Perceived behavioral control (TPB), Indifference to stigma (IASMHS) equals to subjective norms (TPB). The ASMHS within the TPB framework was already used in extant research. [37-40] A 5-point Likert scale measured the three variables with 1 – strongly disagree and 5 – strongly agree.

INTENTION TO SEEK PROFESSIONAL MENTAL HEALTHCARE

Following Baker and Churchill Jr [41] and Pham, Vasquez [42], two questions were modified from the original questionnaires on purchase to investigate participants' intentions toward seeking professional mental care. This intention variable is measured by the 5-point Likert scale with 1 –very unlikely and 5 – very likely.

EMPIRICAL RESULTS

DATA ANALYSES

We conducted exploratory factor analysis with principal component analysis and varimax rotation technique. Altogether four factors are derived from the analysis (see table 3), as expected. Eigenvalue of each factor was maintained greater than one, and the total cumulative percentage of variation was kept at more than 60 percent. The items each factor load into the predetermined factors, as expected.

RELIABILITY CHECK

Cronbach alpha measured the reliability of each of the multi-item constructs. Cronbach alpha value maintained a value higher than .70, as Hair, Money [43] suggests. Statistical analysis indicated that Cronbach alpha value is more than .70 in the three constructs (See Table 4). Hence, the items of each construct are internally consistent. [44]

VALIDITY TEST

Convergent validity and discriminant validity were both considered for the analysis. Both of them were assessed through a correlation matrix. [45] The high correlation among the construct items indicates that convergent validity was achieved. [43] Correlation results show that the scales of one variable to another is lower than each scale's squared root of the average variance extracted (AVE) in Tables 4. The findings confirmed the discriminant validity of the variables.

RESULTS

Multiple regression was used to test the effect of three factors as independent variables on the dependent variable. The full model is statistically significant ($p < .10$), as F-statistic shows. Results indicated that the three independent variables explained 6.8% of the variation of the dependent variable. Regression coefficient shows that only one independent variable, Help-Seeking Propensity, is statistically significant ($\beta = .290$; $p < .01$). The other two variables, indifference to stigma and psychological openness, are not statistically significant ($\beta = .024$; $p > .1$ and $\beta = .089$; $p > .1$ respectively). Overall, results indicate that the model explains students' help-seeking intention reasonably well. The regression results are shown in Table 5.

TABLE 3: FACTOR ANALYSIS OF VARIABLES WITH VARIMAX ROTATION (EXTRACTION METHOD: PRINCIPAL COMPONENT ANALYSIS)

VARIABLES	INDIFFERENCE OF STIGMA	HELP-SEEKING	ATTITUDE	INTENTION
Cronbach alpha (a)	(.88)	(.86)	(.76)	(.87)
Stigma 1	.705			
Stigma 2	.721			
Stigma 3	.626			
Stigma 4	.765			
Stigma 5	.832			
Stigma 6	.815			
Help-Seeking 1		.790		
Help-Seeking 2		.816		
Help-Seeking 3		.836		
Psy_Openness 1			.541	
Psy_Openness 2			.862	
Psy_Openness 3			.718	
Intention 1				.862
Intention 2				.888
	Eigenvalue	% of Variation	Cumulative %	
Factor 1	3.601	25.73	25.73	
Factor 2	2.370	16.93	42.65	
Factor 3	1.684	12.03	54.68	
Factor 4	1.301	9.29	63.97	

TABLE 4 CORRELATIONS AND AVERAGE VARIANCE EXTRACTED (AVE)

VARIABLES	INDIFFERENCE OF STIGMA	HELP-SEEKING	PSYCHOOPENNESS	INTENTION
Stigma (6)	*.72*			
Help-Seeking (3)	.056	*.81*		
PsychoOpenness(3)	.178	.026	*.74*	
Intention (2)	.115	.263**	.069	*.79*

Notes: Figures in italics (diagonal) are squared root of average variance extracted (AVE); figures in parentheses include the number of items measuring each construct; p≤0.01.

TABLE 5 MULTIPLE REGRESSION RESULTS WITH THE DEPENDENT VARIABLE INTENTION

VARIABLES	UNSTANDARDIZED COEFFICIENTS	STANDARD ERROR	STANDARDIZED COEFFICIENTS	T-VALUE	SIGNIFICANCE (P<.05)
Vietnam					
Constant	2.401	.484		4.957	.000
Stigma	.021	.089	.024	.238	.813
Help-Seeking	.313	.103	.290	3.032	.003
Psy_Opennes	.097	.108	.089	.900	.370
Notes: $F_{3,108}$=3.48; P≤.10; Adj. R^2 = .068					

DISCUSSION

Little is known about the mental health services and factors affecting college students' perceptions of mental disorders treatments in Vietnam. [5] They comprise a segment of the population that has a high risk of mental health issues. This study tested a model of college student's mental health seeking behavior. Regression results indicated that the model explains very well the behavioral intention to obtain professional mental health and should take these three key variables seriously: psychological openness, help-seeking propensity, and indifference to stigma. Hence, these three variables need to be treated as a strategic variable so that administrators in school make their strategic decisions about professional mental health care properly.

Statistical results show that the "help-seeking propensity" construct is the most significant one between the three. This help-seeking dimension includes seeking professional help when having a mental breakdown, worried or upset for a long time, taking psychotherapy if the need arises, and recommending friends for professional psychological help (see appendix). Remarkably, recommending friends to seek professional help can be arguably considered a help-seeking item since a student can share his/her mental health problem with his/her friends and seek help. Likewise, seeking professional psychological help when having a mental breakdown, worried or upset, and resourcing to psychotherapy while having psychological problems indicates its resonance to explain help-seeking behavior. Hammer and Vogel [46] and Hammer, Parent [37] support the above findings.

Indifference to stigma was found to be the next most important variable and had a positive relationship in students' mental help-seeking behavior in Vietnam. This variable encompasses shame to be mentally ill, feeling embarrassed if friends see him/her to go to psychologists, friends will avoid it if they find that she/he has psychological problems, may feel uneasy to seek help for the fear of his/her friends, not liking to let friends know about psychological problems. We found the relationship between indifference to stigma and attitude toward seeking professional help statistically insignificant. Though this variable was significant in other studies in different cultural contexts [47], our study did not support this construct effect. Our study did not show a significant effect of the construct Psychological Openness either.

THEORETICAL IMPLICATIONS

This research analyzes the predictors of obtaining mental health help behavior. This study improves the academic literature in different ways. First, this study provides new insight regarding the students' mental health help-seeking behavior. In other words, using the mental health help-seeking behavior, the findings of the study contribute to the theory of planned behavior by offering three similar but new constructs. Second, the results also confirm the model of the Theory of Planned Behavior and increase the explanatory power of the Theory of Planned Behavior. Finally, the results show the predictors that help to provide the propensity to obtain professional mental help.

PRACTICAL IMPLICATIONS

The findings of the study provide significant implications for mental health professionals. Firstly, the study provides a pragmatic managerial framework that helps to assess the students' mental help-seeking behavior. Administrators in schools can provide due consideration to the students' preparedness to seek and use professional psychological help. They can identify the reasons for the reluctance to obtain professional help and try to overcome those problems since some students may have negative perceptions about psychological problems. Giving due consideration to use professional psychological help may prompt students to adopt professional mental help. Additionally, educators may teach students to break the social stigma by discussing with them that taking mental health help is not a problem; rather, it is the right path when necessary.

Looking into how to attract students to obtain professional mental health care, help-seeking propensity directly and positively affects students' adoption of professional mental help. When students understand that seeking psychological help improves their psychological well-being, they might be more likely to use it. This is of particular importance considering the psychological effects of social distancing and other life disruptions during the COVID-19 pandemic. [48, 49]

LIMITATIONS AND FUTURE RESEARCH OPPORTUNITIES

While many studies use the ASMHS within the TPB framework, our study did not find a significant effect on two of the primary constructs. In regard to the Indifference to Stigma, one can assume that students in Vietnam have already become accustomed to stigma so much that they do not think this concept is critical any longer. That will require further research.

Next, Psychological Openness was also found statistically insignificant. We assume that students take psychological openness for granted. Future studies may require resolving this contention. Moreover, our results show that psychological openness positively correlated with students' intention to take mental help. The finding of the study contradicted David, [50] which finds that negative associations with mental health seeking behavior among Filipino Americans. Probably, psychological openness is a culture-specific variable and might change in different cultural contexts, a fact that could not be tested here. Furthermore, the data in this study was collected before the COVID-19 pandemic; Thus, it would be interesting to conduct a similare study on the similar population in the COVID-19 period and then comparing the results.

This study also tries to discover the impact of students' mental help seeking propensity on students' intention to seek professional health. Results indicated that some of these variables might culture-specific. Therefore, conducting similar studies in different cultural contexts may add new insights. Another potential limitation of this study is the model's possible limited explanatory power. Hence, we encourage future researchers to add more variables. Third, future researchers may run non-linear regression and examine the potential interactions among the independent and dependent variables. Perhaps non-linear regression may capture more variances in the dependent variable. Finally, yet importantly, our sample size is limited; hence, we encourage future researchers to collect a larger sample while conducting a study of this nature.

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APPENDIX

Appendix A: Final version of the survey used in this study

I. Factor 1: Psychological openness (Attitude) (1 strongly disagree to 5 strongly agree)
Note: *professional refers to doctors, nurses, counselors, or any healthcare staff.*

1. Psychological problems, like many things, tend to work out by themselves……..1 2 3 4 5
2. People with strong characters can get over psychological problems by themselves with little need for professional help.....1 2 3 4 5
3. People should work out their own problems; getting professional help should be a last resort. 1 2 3 4 5
4. Keeping yourself busy is a good solution to stay away from personal worries.....1 2 3 4 5

II. Factor 2: Help-seeking propensity (Perceived behavioral control) (1 strongly disagree to 5 strongly agree)

1. If I believe I was having a mental breakdown, I would seek professional help.....1 2 3 4 5
2. I would get professional help if I were worried or upset for a long period of time.1 2 3 4 5
3. If I were experiencing a serious psychological problem at this point in my life, I believe psychotherapy could work for me.....1 2 3 4 5
4. If my close friends seek my advice about a psychological problem, I might recommend that they see a professional.....1 2 3 4 5

II. Factor 3: Indifference to stigma (=subjective norms) (1 strongly disagree to 5 strongly agree)

1. It is a shame to be mentally ill.....1 2 3 4 5
2. I would be embarrassed if being seen at the office of a psychiatrist going into the office of a professional who deals with psychological problems. 1 2 3 4 5
3. Important people in my life would keep away from me if they were to find out my psychological problems. 1 2 3 4 5
4. Being diagnosed with a mental disorder is a blot in a person's life……....1 2 3 4 5
5. I would feel reluctant to seek help from a psychiatrist for fear my friends or partners might know about it.....1 2 3 4 5
6. I would feel uneasy to seek help from a psychiatrist for fear of what people might think about me 1 2 3 4 5
7. I would not like my closest people to know about my psychological problems.....1 2 3 4 5
8. Even if my psychological problems had been treated I do not feel I could have "covered it up."".....1 2 3 4 5

IV. Intentions 1 (very unlikely) to 5 (very likely)

1. If you were to experience serious psychological problems would you consider talking to a family physician? 1 2 3 4 5
2. How likely is it that you would consider talking to a mental health professional (e.g., psychiatrist, psychologist, social worker)? 1 2 3 4 5

V. Demographic

1. Age

2. Gender
   - o Male
   - o Female

3. Occupation

4. Education
   - o High-school graduate or lower
   - o College student/graduate
   - o Post-graduation degree

5. Religion
   - o Buddhism
   - o Catholicism
   - o Christianity
   - o Others (which one?)……..

6. How religious are you? (1 not at all and 5 very much)…….....1 2 3 4 5

*Have you ever employed any professional help for mental issues (i.e. stress, depression)?
   - o Yes
   - o No

*Which country are you from? ……..

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VIEWPOINT ARTICLE

CAN DEVELOPING COUNTRIES HANDLE THE MENTAL BURDEN DUE TO THE LOCKDOWN SITUATION? UNDERSTANDING THE UNCERTAINTY AND MANAGEMENT OF COVID-19 PANDEMIC

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ABSTRACT

BACKGROUND

Coronavirus (Covid-19) pandemic can be referred to as a life-threatening war where every country is fighting with an invisible untold enemy. Realizing the disease severity and managing the prevention is crucial in current situations. Hence, it is time to follow the lockdown protocol until the situation improves worldwide.

METHOD

We have searched all the possible validated resources such as WHO, governmental data-sharing portal, news media, blogs, and existing empirical studies. We identified the significant inputs from social media platforms provided by healthcare entrepreneurs, clinicians, and interrelated different domain experts. Here we qualitatively narrated an in-depth understanding of the phenomena and proposed a few steps to deal with the mental burden in developing country context.

RESULT

There must be some effective strategy to reduce the mental burden and availability of the health consultancy services continuously to deal with such vulnerable situations. Telehealth is one such solution in a developed country where the healthcare system is well equipped to offer such services.

CONCLUSIONS

Here, we have presented a few proposed steps that can be adapted/practiced dealing with a similar situation in developing and densely populated nation like India. This approach may help to deal with such emergencies and challenges for healthcare management in lockdown conditions.

KEYWORDS

coronavirus, Covid-19, pandemic, lockdown, mental health

1. CRISP UNDERSTANDING AND MANAGEMENT OF COVID-1

This study briefly explains the coronavirus and specifically Covid-19, possible precautions, and preventive measures. The study proceeds with a genomic structure and infection mechanism of SARS-COV-2, disease outbreak, its etiology, epidemiology, transmission phenomenon, and crucial

steps in disease management to tackle mental burden during the complete lock-down situation.

1.1 GENOMIC STRUCTURE AND INFECTION MECHANISM OF SARS-COV-2

Coronaviruses are single-stranded RNA viruses containing 80–120 nm in diameter. Coronaviruses mainly recognize their corresponding receptors on target B cells because SARS-CoV2 uses angiotensin-converting enzyme 2 (ACE2) as its receptor through S proteins on their surface and after that virus entry to the cells and results in infection. Four types of coronavirus have been found, such as α-coronavirus, β-coronavirus, δ-coronavirus, and γ-coronavirus. [1] The whole-genome sequence of SARS-CoV2 and SARS is approximately 79% similar. So that SARS-CoV2 is closer to the SARS-like bat coronaviruses (MG772933) than SARS-CoV. [2]The whole mechanism of SARS-CoV2 firstly infects humans via S-protein bind to the ACE2 receptor, the strength of this interaction for risk of human transmission, and how SARS-CoV-2 causes organ damage to remain unknown still today. Present research explains that this SARS-CoV-2 virus has a very fast capacity to transmission in humans as compared with SARS-CoV.[3,4] Because of the higher affinity of SARS-CoV-2 binding to ACE2, so that ACE2 may be a potential candidate for the treatment of COVID-19.

1.2 OUTBREAK

The viral disease is generally caused when an infectious viral particle (virion) invades a host body or cell. Scientist rigorously works and develop vaccines against it. The virus keeps on changing its genome continuously, and later, the same particle is proved to be life-threatening. Similarly, the Coronavirus was initially discovered in the late 1960s. [5,6] It was first recognized as an infectious bronchitis virus. The first outbreak of SARS CoV had begun in Asia in 2003, in which more than 8000 people suffered from the deadly disease. [7] The next identified situation was Middle East Respiratory Syndrome, which was reported repeatedly in 2012, 2015, and 2018. [8,9]

In December 2019, a coronavirus outbreak was accounted for in Wuhan, China. Based on the research, the International Committee on Taxonomy of Viruses has denoted this virulent virus as SARS-CoV-2[w 56-60]. Tentatively, as of 23rd July 2020, more than 15,415,727 people have been reported fighting with this disease, and 631,164 lives are lost. [10]

1.3 ETIOLOGY

Etiology [11] is the elucidation of the causation of any disease. In medicine, etiology explains the ground behind any disease. It also describes the factors causing illness. Coronavirus is a large, spherical particle with a diameter of 120 nm having surface projections. [10,12] The envelope of the virus comprises a lipid bilayer in which spike structural protein is grounded. Beta coronavirus subgroup A, a subset of the coronavirus also has a spike-like protein referred to as hemagglutinin esterase. [13] Coronavirus has a single-stranded RNA genome, approximately 27-34 kilobase pairs in size. [14] The nucleocapsid is a protein-bound in the RNA genome along with an envelope of the lipid bilayer, and membrane protein protects the virus outside the host cell. [15]

Infection initiates when the virus attaches to a host cell, and the genetic material is transferred into the host cell. Replication, transcription, and translation of viral genetic material (i.e., RNA) and essential proteins (i.e., nucleocapsid, spike protein), respectively takes place inside the host cell. Afterward, the progeny viruses assemble and get released from the host cell by exocytosis and proceed to infect new host cells. In this way, a single virus particle spreads the infection throughout the body. [16,17]

1.4 EPIDEMIOLOGY

Epidemiology is the field of study that depicts the distribution patterns and the disease and health conditions for a population. Approximately15.4 million cases of COVID-19 have been reported globally from December 2019 to 23rd July 2020. Since the first report in Wuhan China, globally, more than 630,781 patients have lost their lives due to the deadly coronavirus. [10] Initially, positive cases were reported from Hubei and its surrounding provinces, but gradually, it reflected in other areas throughout China. [18]

Gradually, the spread of COVID-19 rolled out in other countries around the globe. Positive cases were initially found mainly among the travellers from China or who had been coming in contact with them. However, In July 2020, COVID-19 broke out in the following countries outside of China, i.e., Italy, Spain, the USA, Germany, Iran, France, South Korea, Switzerland, the UK, Netherland, India and many more. Positive cases are also detected and increasing day by day in developing countries, for instance, India, Pakistan, Bangladesh, Sri Lanka, and Russia,

etc. COVID-19 has become a life-threatening pandemic situation globally [9,10].

1.5 TRANSMISSION

Existing research revealed that mainly three types of the transmission process, such as symptomatic, pre-symptomatic, and asymptomatic. It has been accounted that the COVID-19 virus can survive for hours to a few days on surfaces such as door handle and electric switches. Notably, this virus remains infectious on plastic and stainless steel for three days, on copper for four days, and on cardboard for at least one day. Limited research has shown that the effectiveness of this phenomenon varies with temperature and humidity. Previous researchers had confirmed that this deadly enemy spread only via respiratory droplets, not through the air, water, or food. [19] Recent research has noted that this viral infection may be spread by air in a confined place. Airborne transmission is different from droplet transmission. Virus droplet nuclei <5 µm in diameter can remain in the air for a prolonged time. It can also travel over 1m of distance and transmit to other individuals.

Symptomatic transmission

Symptomatic transmissionoccurs from a person who has developed signs and symptoms of COVID-19 virus infections. This virus is transmitted via respiratory droplets when an infected person sneezes and coughs without following proper hygiene. Any kind of direct or indirect contact of that droplet to a healthy person causes the transmission of this contagious disease. It is also spread by touching any contaminated surface, followed by touching of face, mouth, nose, and eyes. [22]

Pre-symptomatic transmission

COVID-19 virus incubation period is five to six days on average, which is the period of viral exposure (becoming infected) and symptom onset. But in some cases, this incubation time may be up to 14 days. In maximum cases, people can test positive for COVID-19 from 1-3 days before they develop symptoms. [23] This period is also known as the pre-symptomatic period when an infected individual can be contagious. Hence, transmission from a pre-symptomatic case can occur before symptom onset. [24-29] So there was a chance that people infected with COVID-19 could transmit the virus before significant symptoms develop.

Asymptomatic transmission

In asymptomatic transmission, the virus transmission takes place from an infected person who does not have any viable symptoms. However, new evidence is emerging in this type of transmission, to understand the phenomena profoundly. [29]

1.6 DISEASE MANAGEMENT

The strain of the Covid-19 virus is unique; as we know, there are no well-established management procedures to curb this epidemic. Prevention is the only effective method to deal with such situations. WHO has published the RNA testing protocol to check whether a person is infected with this virus or not? But as the number is increasing globally, it is quite impossible to test individuals with RNA testing methods. [30] For a developing & populous country, it seems impossible to avail diagnosis to all in the current scenario. Radiology and other imaging technology can play a role in the diagnosis, but its use is not completely confirmed to detect positive cases so far. [31]

WHO has suggested self-preventive measures to combat COVID-19 and protect oneself. [32] These are as follows:

- Respiratory hygiene- Use of mask, covering the mouth while coughing and sneezing. [33]
- Frequent Hand washes- Proper washing and sanitization of hands. [32]
- Refraining from touching the face- Touching eyes, nose, and mouth is strictly prohibited without washing the hand. [34]
- Avoid touching any surfaces-Preferably avoid touching any unknown surface and, if required, then sanitize or wash the hands effectively. [32]
- Social distancing- Maintain distance from everyone to maintain individual and social safety. [35]
- Self-quarantine- avoid unnecessary social gatherings and try to stay indoors. [36]

2. CHALLENGES IN UNCERTAINTY AND PANDEMIC MANAGEMENT

Almost every country around the world faces various challenges in disease management, as well as in implementing its preventive measures. [37] Influenced by the precautions taken by China [38] and South Korea, [39] other countries are attempting to follow similar kinds of models to deal with such dangerous, life-threatening

situations. Initial exposure (first stage) of a country to the development of the epidemic situation led to the implementation of various preventive measures and protocols to protect the population. But the transition from second to the third stage of the pandemic caused the declaration of complete lockdown from every level [40] in affected countries. People find it very difficult to handle such a lockdown situation for more than a few days. One class of people don't understand the actual meaning of lockdown. [41] Another class of people focuses on hoarding unnecessary foodstuffs. Thus, it creates a scarcity of resources and initial social gatherings in the market and public places. [42] People from different financial capacities face several mental burdens, and it increases gradually as the period of complete lockdown is extended. [43]

Developed countries such as Australia have implemented the telehealth facility to reduce the mental stress in Covid-19. Australia has a well-established telemental health service network that provides online mental health services in remote locations to provide essential information and deal with the mental burden of the suffering people. [44-47] Developing countries such as India, Bangladesh, Pakistan, Sri Lanka, and many others have no such facility to deliver mental health services, and such countries might face huge mental burden in the future. [48] Vietnam has relatively fewer COVID-19 cases per 1 million population. Successful strategies include accurate health information [49], establishment grassroots health care system [50], and the deployment of health collaborators to work with villagers in rural areas. [51] China has implemented a careful precaution system to protect workers (e.g., proper ventilation, wear of face mask), and it was associated with better mental health. [52]

3. POSSIBLE STEPS TO CURB THE MENTAL STRESS OF PEOPLE FROM A DEVELOPING COUNTRY, INDIA

As researchers, here we have tried to propose a few measures to deal with these situations. These measures can aid in reducing the mental burden to some extent among the people from India. These offerings are:

Firstly- Provide free internet services to engage the common and mainly rural people who can use the internet so that they can keep themselves engaged and reduce any mental stress. Previous studies found that obtaining health information from the Internet was associated with better mental health during the COVID-19 pandemic. [53,54]

Secondly-A huge number of people in India watch family serials and series. Due to lockdown, no new episode is aired which is making the routine quite mundane for millions of peoples. They do not even know how to stay indoor throughout the day. To tackle such situations, authorities can provide various entertainment services on television free of cost until the pandemic situation reduces. Many people use different paid subscription services such as Amazon Prime, Netflix, Voot.[55] If the authority will provide free services or cut down the subscription cost to lowest at least for a month, then more people can be indulged in such subscriptions. These shall reduce or divert the mental burden of millions of people.

Thirdly- Primary and secondary level healthcare centres should provide cost-free online consultation in regional language to every corner of the country to spread awareness and reduce anxiety among the public through online cognitive behaviour therapy. [56] This informative consultation may induce awareness towards the fake social media posts and reduce the panic and mental burden of people. Specific measures may help the old age population who do not entirely understand the pandemic situation and encourage them to stay safe.

Fourthly-Several mental and physical health boost-up programs can be started online to engage many people. This can be efficacious by spreading its potency though famous faces, for instance, politicians, commercial stars, and motivational speakers. The online platform and social media have a huge potential to employ such engaging events among the common people.

4. OPTIMISTIC VIEWPOINT

There is a rapidly increasing number of positive cases and a sharp leap in the mortality rates associated with Covid-19. We must be aware of the mental stress and burden caused by this pandemic. A recent publication has shown that telehealth is adequately suitable for mental health management in a pandemic situation. Free internet services with engaging entertainment programs along with the teleconsultancy services might help the public to tackle the mental stress in the national emergency like situation due to the Covid-19 pandemic. Awareness and mental

health enhancement can be a quite effective step to reduce the monotony and panic situation among the common mass of the nation. Such a strategic lockdown will reduce the risk of infection along with balancing the mental health care of the population.

Additionally, another critical dimension, socioeconomic wellbeing needs to address to curb mental stress of the mass populace of the developing countries. Learning new skills and self-reliance are the primary factor in surviving in the job recession time. For instance, in a developing country like India, the government has announced three lakh core collateral-free loan scheme for small and medium enterprises (SMEs). In developing countries, state and central governing authorities have been distributing free staple food through the public distribution system among all the population, according to their socioeconomic status and needs. However, as rapidly growing cases of COVID-19, there is a need to extend the free food distribution scheme for the next couple of months or until the pandemic over. We must be aware of the mental stress and burden caused due to this pandemic. [57]

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CONFLICTS OF INTEREST

The authors have declared that there is no conflict of interest.

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RESEARCH ARTICLE

YOGIC INTERVENTIONS FOR PSYCHO-PHYSICAL WELL-BEING UNDER COVID-19 TIMES & AFTER

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ABSTRACT

Health indeed is Wealth. The Corona Virus Pandemic has impacted the best health-care systems world-wide; even as the world grapples with the massive loss of human life causing pain to millions. The Pandemic is no more just a medical health challenge; it has thrown up spiritual and emotional challenges as it is affecting our belief system.

"Prevention is Better than Cure is the mantra". Since there is no allopathic medicine solution available; people are adopting various measures like social distancing and personal sanitization. There is an urgent need to assist the individuals to take all the preventive measures possible to boost their immunity, improve the respiratory system, and lessen the anxiety, stress, and depression. It can be difficult to not feel anxiety and sometimes panic over the coronavirus outbreak, with the onslaught of updates on news and social media.

Yoga has emerged as the perfect tool that an individual can follow to establish physical, mental, and spiritual balance to develop robust health and combat physical and emotional challenges. Yoga offers another path, a fresh perspective with which to deal with events that are beyond our control. The different *asanas* of yoga can help us to prevent COVID-19 by boosting our immune system and managing the stress that one is going through in this time of uncertainty.

This study tries to specifically evaluate the impact of the preventive measures undertaken through Yoga practice. 126 respondents from different states of India were requested to perform yoga daily for 30 days. Significant changes were observed and are mentioned in detail.

KEYWORDS

Yoga, COVID-19, Social distancing, Pranayama, Asana.

INTRODUCTION

The Corona Virus pandemic has engulfed the whole world in a matter of days and months. It has taken the fear and anxiety to every door-step world-wide. It has foisted fear on – developed, developing and poor nations. It has impacted the healthcare systems without sparing anyone. A large number of casualties are those who are working on the frontlines. Thus, the pandemic has unleashed a reign of terror and horror without a single bullet being fired. It has destroyed the global economic systems that were created after the Second World War. The pandemic is now more than just a physical health problem or a respiratory disease. It's a catastrophe that has forced every individual to respond to the crisis.

Since there is no cure the focus has been prevention. It is up to the individual to take measures to protect themselves and the whole society. People have had to dig deep into their beliefs and faith, spiritual and traditional solutions, healthcare systems, food, and diet to build immunity to prevent the disease from taking a heavy- toll. Every country is trying to investigate and learn more about this disease

and the manner of its development. [1, 2] Not everyone exposed to this virus is getting infected and not every infected sufferer develops a serious respiratory illness. This infectious disease has caused an intense global health crisis. No one is safe until everyone is safe. On a personal level it has created a virtual battlefield within each one of us. The battle between our fears and desires is raging within everyone. The response must be strengthened via actions on the physical, emotional, and spiritual scale.

Everyone is worried about their survival. Seeing the fact that it has impacted the world very badly but still, we are all waiting for the vaccine to be invented. Social distancing and other measures are followed by everyone but still, people are looking for an urgently needed course of action which can make them fight this virus. Out of every five infected patients, around one is prone to become seriously ill and suffer from breathing problems. Anyone can get infected by this virus and it can get transmitted to others even if the host has mild symptoms. [3] This virus mainly gets transferred from one person to another through small droplets from the infected host's nose or mouth while sneezing, coughing, or speaking. It has been found that people with weak immunity are getting more infected by this virus. Most of the infected patients (80 %) can recover from the attack of this virus without treatment at hospitals if they have a strong immune system.

Yoga is one such practice that can help in boosting the immune system. [4,5] Moreover, yoga is a practice that is appreciated around the world for promoting health and wellness. [6] For the last three decades research has been conducted to study the impact and efficacy of yoga practices in improving wellness, physical performance, body flexibility, and mental health. [7, 8] Even the Indian Government invite different proposal to evaluate the impact of yoga on improving the respiratory system, immunity, and other issues such as depression, anxiety, stress, and disruption of normal life.

This study tries to present a few preventive measures that should be adopted by everyone to improve their respiratory reserve, immunity, cardiovascular function, and in the management of psychological stress (which includes - tension, anger, fatigue, depression, esteem-related effect, vigor, confusion). Yoga guru Baba Ramdev suggests that by practicing yoga, anyone can fight this virus in a better way.

LITERATURE REVIEW

This virus normally has three dimensions – related to immunity, respiratory system, and stress (as everyone is worried and this gets increased, with everyone being at home all the time). All the practitioners, scientists, and clinicians around the world are working very hard to utilize all the modern tools of bio-sciences and life science to find out solutions to the existing pandemic. [1]

Strong immunity of the host is essential to fight this infection. It has been observed that most of the infected cases have been found to have a disturbed immune system. These coronaviruses are biggest among the other viruses while we humans have much bigger white blood cells (WBC), which constitute our (defense) system which fights from different foreign bodies invading our system. Moreover, every human body has more than millions of WBCs, whereas the number of SARS-CoV-2 are very less in number. WBCs being the first one to serve against any attacking viruses helps in controlling the spread of the virus and consequently the tissue damage. So, we have good chances to combat and win from this virus attacking if our immune system is strong. Thus, people with a weak immune system will not able to fight with this virus and they may get infected very easily.

Previous research has shown that some *pranayamas* (breathing techniques), meditation, and specific *asana* practices help in building the immune system in the body, which sub-sequential helps in fighting with viral infections. [9, 10, 11] One of the research studies conducted on yoga suggests a complementary role in the management of pulmonary tuberculosis. [12] According to another study, one month of integrated yoga can improve immunity and lower the depression in HIV-1 infected adults. [13] Practicing yoga helps in lowering blood pressure [14] and in improving the perception of anxiety and mood. [12, 13] According to different authors yoga improves the immune system. [15, 16, 17]

The upper part of the respiratory tract is the doorway for the entrance of this virus, therefore is it important to have a healthy respiratory system. Many clinical trials have reported the positive impact of yoga on pulmonary function in individuals who are infected with chronic obstructive pulmonary disease. [18, 19] While maintaining all the norms such as social distancing, isolation of the infected person and their contacts, frequent handwashing, etc., we should try to boost the immunity in both bodies as

well as minds of the individuals. As suggested by researchers, yoga can help us in building the immune system. Yoga guru Ramdev, also recommended doing yoga regularly, as this will boost the immune system and hence can act as a preventive measure for Covid-19. Yoga is the practice of mind and body having a history of more than 5,000 years in ancient Indian philosophy. In the last two decades, it has become a very popular form of physical practice/exercise which helps in enhancing the control of body and mind and improves mental well-being of an individual.

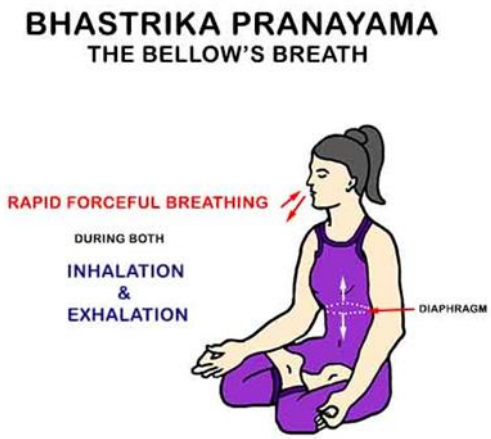
To help everyone to fight this virus swami Ramdev started sharing and performing various yoga *asanas* (specific yoga posture) on India TV, which is a national news channel of India. These yoga *asanas* can help individuals to strengthen their immunity to fight COVID-19. These *asanas* can be performed from anywhere even being at home to safeguard one from the Coronavirus. According to him, Ayurveda has a solution to every disease and by taking precautionary measures like yoga *asanas* and *pranayama* everyone can protect themselves from the infections easily. He has advised everyone to not sit idle at home but to imbibe the yogic practices exercise to boost their immunity. Individuals with strong immunity and good health are less prone to get affected by diseases and infections. Swamiji had been teaching yoga on the national channel every day for about 45 minutes both morning and evening since April 4, 2020.

He has advised five yoga *asanas* and *pranayama* which will help to boost the immune system. Following are the pranayamas as suggested by him-

1. BHASTRIKA PRANAYAMA

This is a breathing technique that produces heat in the body. This is very helpful for the individuals who have *Kapha* body composition or are water dominated, as per the *Ayurveda*. *Bhastrika* is done through the chest and engages the lungs. In this *pranayama*, both inhalation and exhalation are forced. It is very beneficial for the lungs and especially for the individuals who suffer from repetitive flu, allergies, cough, respiratory issues, or breathlessness. [20] This *pranayama* helps in boosting the immunity of the lungs. [21]

FIGURE 1- BHASTRIKA PRANAYAMA



2.KAPALABHATI PRANAYAMA

The word *Kapalabhati* is made up of Sanskrit word '*Kapal*' & '*Bhati*'. *Kapal* means 'Skull or Frontal head' & Bhati means 'Shinning'. [22] *Kapalabhati* is a yoga technique in which belly intentionally draws in to produce forced & sharp (active) exhalations through nostrils followed by automatic passive inhalations. When *pranayama* added in *Kapalabhati,* it becomes a practice to consciously watch your breath and movements of inner organs. Baba Ramdev suggested that doing this regularly will help to strengthen the internal organs. It helps to release toxins from the body and thus boosting the immune system. [23]

FIGURE 2- KAPALABHATI PRANAYAMA

3. ANULOM-VILOM PRANAYAMA

Another form of yoga (*pranayama*) which is highly recommended is *Anulom–Vilom*. This *pranayama* is a simple breathing exercise that should be performed regularly as it helps to balance the *tridoshas* (three *doshas*) in the body namely '*Vata', 'Pitta', and 'Kapha'*. Most of the disorders in our body are only because of an imbalance in these three doshas in the body. Practice of this *pranayama* is the most effective, comfortable, and easiest way to stay healthy and fit. By doing anulom-vilom regularly, it will build stamina in the lungs which will help to prevent coronavirus from infecting. It also helps to remove toxins from the body and helps to balance and relax the nervous system. [24]

FIGURE 3- ANULOM-VILOM PRANAYAMA

4. BHRAMARI PRANAYAMS

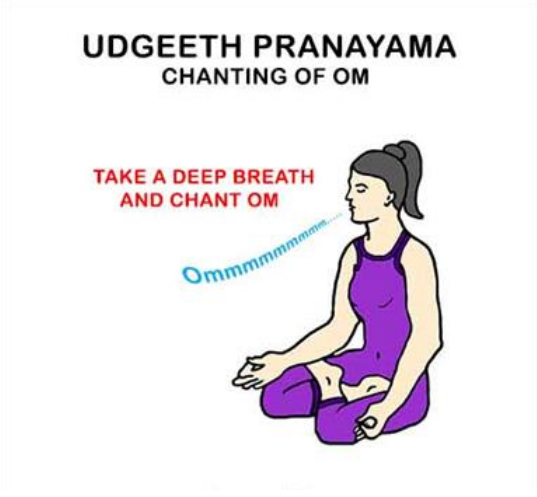
This *pranayama* is another breathing technique that has got a name from an Indian black bee called *Bhramari*. This exercise is very effective in calming down the mind of an individual instantly. This *pranayama* is one of the best breathing technique which helps the minds to get relaxed and make it free from anxiety, anger, frustration, and agitation to a great extent. It helps to lower the stress level. This exercise helps in smoothening the nerves and calming them down especially near the forehead and brain. The exhalation in this *pranayama* resembles the humming sound of a bee. Since this sound has a natural calming effect on the mind. [25]

FIGURE 4- BHRAMARI PRANAYAMA

5. UDGEETH PRANAYAMA

"It is an art of conscious breathing. It entails primal sound reverberations to resonate and awaken the mind to its inherent, immense potential. Mind, woke up and attentive to its potential, and is capable of realizing no matter it focuses on." This *Pranayama* helps to heal insomnia, lack of concentration, depression, and other brain-related problems. It involves chanting of AUM (OM) with every exhalation, which should last for at least twenty seconds as this calm and relaxes the mind. [26]

FIGURE 5- UDGEETH PRANAYAMA



In addition to *pranayama*, he also suggested doing Surya Namaskar at least 10 times a day, as this is very useful in boosting immunity and preventing individuals from different infections. [27] This is an ancient technique, where gratitude is expressed to the almighty sun. It includes 12 postures which made the body flexible and light.

Apart from *pranayama* and *asanas*, Baba Ramdev has shared home remedies that are very useful in preventing infections and building immunity. He claims that (*tulsi*) Ocimum tenuiflorum, commonly known as holy basil, Ti'nospora cordifolia (*giloy*), Guduchi, ginger, black pepper, and Indian gooseberry is the most useful things you can find at your home that can help keep you safe from coronavirus. He insists that one should add vitamin C and protein in their diet to build immunity as a good immune system is the biggest shield for everyone at this time. [28]

Yoga is a skill in action. Beyond flexibility, balance, and strength; Yoga can help quieten mental chatter [29] and deepen spiritual awareness. It enables breath manipulation and balancing of the nervous systems that help quell fears and anxieties thus reducing stress and its impact on the mind, body, and soul. It enables us to take actions where we use our intelligence and discernment to find the best course of action – without being distracted by fears and anxieties.

Modern-day science helps us to understand the workings of some yoga techniques that have stood the test of time. The key to finding peace and tranquility can be found within our Autonomic Nervous Systems (ANS), which acts largely unconsciously and regulates our respiratory system, among other things. [30] Two key branches of this system are the Sympathetic Nervous System (SNS) – responsible for the fight or flight reflex, and the Parasympathetic Nervous System (PNS) – responsible for the rest and digestive reflex. [31]

To stimulate the PNS to reduce anxiety and relax, we can use yoga techniques that act on the Vague Nerve that runs from the brain to the abdomen. Research has shown that different forms of "*Pranayama*" or breath work, lead to greater vagal tone, to balance ANS. As you breathe your heart rate generally speeds up and slows down when you exhale. The greater the difference between the inhalation and exhalation heart rates, the higher the vagal tone, and the more readily your body can relax. One of the simplest breathing techniques is deep conscious diaphragmatic breathing – or belly breathing – while slightly constricting the opening of the throat.

While inhaling, the breath first fills the lower belly, rises to the lower rib cage, and moves into the upper chest and throat. Called "ujjayi", or victorious breathing, it is typically performed with an inhale-exhale ratio of 1:2. The inhale is through both nostrils with the exhale through the left nostril only, by closing the right nostril with the thumb. Begin by inhaling for four seconds and then exhaling for eight seconds, ensuring that the breathing is smooth and even. You may want to practice for five minutes to start and build up gradually. Done correctly, this technique can both energize and relax the body, as you begin to meditate.

In recent years there has been significant progress made in understanding the benefits of meditation, especially the forms that focus on loving-kindness and compassion. Through yoga nidra you can experience healthier emotional states and even deeper spiritual awareness. A form of meditation that is particularly helpful for calming the nervous system is "yoga nidra" (yogic sleep), a mindfulness practice performed lying down, in which the body is completely relaxed. [32]

Studies have shown its benefits in US army veterans suffering from post-traumatic stress disorder, in health care workers suffering from physical and mental exhaustion, in stressed-out college students, and seniors with depression, among others. [33] Techniques that encourage breath manipulation and help to balance the nervous system can help us overcome fears and anxieties, whether they relate to the current coronavirus outbreak or indeed any challenging situation. Keep calm and breathe on.

In the book *Altered Traits*, psychology and psychiatry professor at the University of Wisconsin-Madison Richard Davidson offers a compelling overview of meditation's benefits – including greater control over our emotions, developing goodwill and understanding, boosting our immune system and our physical and mental health. [34] Even novice meditators can experience significant benefits, though it requires an enormous commitment over many years to develop long-term sustained changes to brain activity.

RESEARCH METHODS

This research utilized tele-yoga-based intervention. A request was made to 126 participants across India to practice yoga with Baba Ramdev (on the virtual platform) daily at their place by watching yoga guru performing live on India TV. This method was adopted considering all the limitations during this period. Participants were requested to give their consent for being a part of this research and after receiving their consent, they were requested to perform the practice for thirty days without giving any break in between and were also requested to keep a record of their blood pressure. Consent for all the participants below 18 years, was taken from their parents and legal guardians. Also, while selecting these participants randomly, the selection was done for those who have not been practicing yoga earlier.

After the completion of 30 days' period, a telephonic interview was conducted for all the participants asking about their experience. Questionnaire was prepared by using items from a standardized tool which measure's the psychological distress of the respondents. [35] All the respondents were asked about the change in their blood pressure.

TABLE 1. RESPONDENTS' PROFILE

RESPONDENTS' PROFILE		
GENDER	**FREQUENCY(S)**	**%**
Female	56	44.44
Male	70	55.56
Age		
5-10 years	3	2.38
11-20 years	13	10.32
21-30 years	42	33.33
31-40 years	36	28.57
41-50 years	21	16.67
51-60 years	11	8.73

TABLE 2. MEASUREMENT OF CHANGE IN STRESS LEVEL, ENERGY LEVEL AND SLEEPING DURATION

S.NO	VARIABLES	INCREASED		DECREASED		NEUTRAL	
		N	(%)	n	(%)	n	(%)
1	Stress Level	1	0.79	120	95.24	5	3.97
2	Energy Level	116	92.06	1	0.79	9	7.14
3	Sleeping duration	122	96.83	0	0	4	3.17

RESULTS

The research was conducted for a sample where respondents participated were of the age group from 5 years to 60 years. Most of the yoga practices involve deep relaxation which helps in minimizing the stress and tensions thereby making our immune system stronger to fight with the viruses. And the same was observed after conducting this research. About 95.24 % of the participants reported that their stress level has decreased during this tenure of 30 days. Around 92.06 % of respondents mentioned that they feel more energetic after performing yoga regularly for these 30 days. 96.83 % of participants reported that during this tenure they could sleep better and were at ease. All of them reported that their flexibility has increased. Some of the participants mentioned that they attained peace of mind. Many of them reported that their digestion problems were resolved. Many reported that their problem of constipation is resolved. They have started living a better life, where they feel themselves to be very active the entire day. One of the participants reported that performing these *pranayamas* his urge for alcohol and cigarette has come down and he even mentioned that he will try to leave consuming alcohol daily. Which suggests that yoga can help you to leave the drugs, one is addicted to. People having high blood pressure reported that after performing these *asanas* their blood pressure got controlled. Before starting these yoga practices, we requested all the respondents to measure their weight. Surprisingly many of them reported that they have lost about 4 to 5 kg of weight one of the respondents reported that he could lose 9 kg within 30 days. This is commendable, as because of lockdown everyone is at home for 24*7, and people have got involved more into eating. Most of the respondents reported that they are less tensed now. Most of the participants reported that their immunity has improved, and they have become less prone to getting infected from flu, common cold, and fever, etc. All participants were happy and want to continue this practice lifelong. Many of them reported that their family members and friends have also started performing yoga after visualizing the changes in them. One of the respondents reported that his relationships with his wife have improved to a great extent. Both males and female members reported that their anger level has come down. They now remain calm in any situation and all the participants are sure that they can fight this virus in all situations.

DISCUSSION

One of the most popularly quoted verses in the Gita is "yoga is a skill in action", but some may wonder how to achieve this calm, selfless state of being in which our emotion of fear does not overwhelm our thinking. One of India's most celebrated texts, the centuries-old Bhagavad Gita ("The Song of God"), is the story of a discussion between the warrior Arjuna and his charioteer Krishna. While the scene in the story is an actual battlefield, the importance of the story is how it can be interpreted to mean the battlefield within each of us – the constant battle between our fears and desires. This text covers several different, but overlapping, types of yoga, but here this study wants to put the spotlight on "karma yoga", the yoga of action.

The Gita calls us to act without focusing on the fruits of our actions, merely to act without selfishness and with detachment from the results. The medical personnel on the front line of the coronavirus battle, who put aside their fears for their personal safety to help others, exemplify karma yoga. Like theirs, our actions should come from a place of centredness where we use our intelligence and discernment to find the best course of action – without being distracted by fears and anxieties.

We are all living in a world that is full of uncertainty, where everyone is facing a new set of challenges. Ayurveda always acknowledges the importance of Yoga. It becomes a popular form of exercise and meditation. It is a practice of mind and body having a 5,000-year history in ancient Indian philosophy. In more recent years, it has become a popular form of physical exercise which has improved control of the mind and body and enhances well-being and also helped in boosting the immune system which can act as a preventive measure to COVID-19. The different *pranayama* and *asana* of Yoga boost our immune system. With this, a healthy diet strengthens the immune system and makes our organs fight against the coronavirus. So, every one of us should perform yoga practices to keep our immune system stronger to fight against all such viruses existing around us. Let us become warriors against these viruses.

FUTURE SCOPE AND LIMITATIONS

Future clinical trials are needed to examine the impact of yoga on boosting the immune system and see how yoga help in fighting COVID-19 and other viruses can. Additional studies using rigorous methodologies are needed to examine the health benefits of the various types of yoga. Due to Lockdown in the country the researchers were not able to perform a quasi-experimental study where the results could have been more useful. This became one of the reasons for not including a control group in this study. Since there was a wide range of participants between the age group of 5 years to 60 years, it is difficult to generalize results.

COMPETING INTERESTS

The authors declare they have no competing interests.

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REVIEW ARTICLE

PSYCHOLOGICAL RISK FACTORS FOR HEALTHCARE PROFESSIONALS IN THE EPIDEMIC PROCESS

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ABSTRACT

In this study, it is aimed to describe the increased psychological risk factors for healthcare professionals who perform their duties with great devotion during the epidemic process. This article, was prepared by making use of the studies in the literature, aimed to examine the factors that prepare healthcare professionals to address increased stress and burnout during the epidemic process. It describes the factors that cause burnout and depersonalization among healthcare workers in the process of providing health services, that increased in the epidemic process and perhaps, gain new dimensions. Risk factors faced by emergency personnel are always present in daily operations but can increase in the epidemic process. In this context, the importance of increasing the psychological resilience of healthcare professionals and providing them with psycho-social support is emphasised as is the importance of maintaining quality in health care. It is considered that the provision of mental health professionals who will provide continuous support for healthcare professionals in the institution should be among the mandatory occupational health and safety measures.

KEYWORDS

COVID-19, health service, health workers, psychological risk factors

Health workers are exposed to the highest physical and mental risks during the epidemic. For this reason, the process related to health professionals needs seperate evaluation. [1] The nature of health services (especially emergency health services), increases mental and physical problems such as lassitude and fatigue to occur in the pre and post the epidemic process. Healthcare professionals are struggling not only with the care, treatment, and spiritual support of patients, but also because they are responsible for taking an approach that will provide ease to patients' relatives.

This article reviews the available literature in respect of psychological risk factors in the context of the current Covid-19 pandemic to give some insights of the likely impacts and potential outcomes based on that available literature.

In the process of delivering health services, employees may not be able to manage the effects of the situations they are exposed to and feel emotions such as helplessness, guilt, anger, fear, and social isolation. [2] Conditions such as lack of job descriptions, economic insufficiency, a lack of in-service training, problems in management processes and exposure to violence can be remarkably challenging. [3] Kebapçı and Akyolcu conducted a study with 132 healthcare professionals who work in the training and research hospitals that belong to the eight public institutions in Turkey, the emotional burnout and depersonalization levels of the participants were evaluated from various perspectives. [4]

[1]A state of emotional exhaustion and energy depletion.

[2].Employee's indifference to the people served, and indifferent, insensitive and cynical responses to those served

In the study, it was observed that emotional burnout and depersonalization levels of those who did not spare time for hobby or social activities outside work, who were not satisfied with their socio-economic status and who worked overtime, were higher. In the same study, the effect of in-team conflict and mismatch on the same variables was also revealed. [5] While having a hobby, being satisfied with the profession, getting social support, and income level satisfaction decrease the level of emotional exhaustion; being attacked, increasing workload and alienation to work increase emotional exhaustion.

There is also evidence that as age, job satisfaction and social support increase, desensitization decreases. [6] There is also evidence that the increase in income situation reduces the perceived stress in healthcare professionals. [7] At this point, it is necessary to conduct studies both to reduce perceived stress and to improve ways of coping with stress and to increase psychological resilience. It is important that these methods, should not be limited to the epidemic process. Because health services, especially emergency health services, are vital services that must always be maintained to a certain standard. Rather than the approach that leads employees to short-term solutions, they need to create and implement more effective and permanent solutions that will provide individuals and organizations with more positive outcomes. For this purpose, it is thought that solutions such as increasing personal awareness about burnout, being aware of the individual's own situation and individual's beginning for conscious struggle, support of colleagues, family and friends, tolerant, fair, flexible and participatory management approach, legal regulations, and improving personal rights, will play an effective role. [5]

There are many factors that change the perception of stress of healthcare professionals. Physicians are exposed to more stress than nurses [7], Tam et al reveal in their studies that they have more contact with the patient during the epidemic, nurses experience more stress and higher rates of psychological morbidity. [8] Aşkıns work with emergency staff, can be considered as an expected situation that physicians experience more stress because of taking more responsibility. [7] In the epidemic process, the fact that nurses experienced more anxiety due to contact also shows that the findings obtained in the study are consistent.

Burnout and depersonalization during and after the epidemic process can be an important barrier in maintaining quality in health care. Therefore, steps should be taken to avoid depersonalization and burnout. Research on this subject provides important clues about what the variables that can reduce these factors can be. For example, it is stated that the positive social atmosphere reduces burnout and desensitization, and making arrangements about working hours within the framework of a certain flexibility and taking the opinions of the employees and making psycho-social arrangements in the working environment will have positive effects. [4, 8] At the point of reducing these negativities experienced by healthcare professionals, increasing their psychological resilience is also remarkably important. There is evidence that occupational burnout in emergency department employees is moderately and negatively connected with psychological resilience. In addition, it is seen that the increase in income status reduces perceived stress. [7] It is also stated that the existance of the regulations related to the personal rights of employees, reduces the level of stress they experience in the epidemic process. [7, 8]

While healthcare professionals continue to provide psychological support to patients, they delay the need of psychological support for themselves and / or tend to produce solutions themselves. [9] At this point, psychological resilience also becomes important. There is evidence that psychological resilience relates to using free time effectively. It is remarkably important that especially the employees, who work in the service sectors where employees are facing a lot of stressors even outside of the epidemic process are guided to use the free time effectively. [7] In the process of combating COVID-19 in Wuhan, healthcare professionals used various methods to deal with the psychological situation. The findings obtained from the study show that 36.3% of them obtained resources related to books on topics such as psychology, 50.4% of them tried to reach related resources through the media, and the 17.5% received psychological counselling or therapy services. These results suggest that having publications on the subject in the rest rooms or in the areas where employees spend time outside of work will make a positive contribution. The social climate of the employees also enables the process to be managed more easily for the employees. For example; It is stated that the positive social atmosphere, which was stated to be pre-existing among psychiatrists, managers, nurses and social workers during an epidemic in an education and research hospital in Canada, was very helpful in producing flexible and sensitive solutions to changing demands and stresses on staff, patients and families. [10]

Some studies conducted during the epidemic process show that the level of stress experienced by healthcare workers does not differ from the control group but increases in both groups. This situation is explained by the fact that health professionals are more educated about infection prevention. [11] It is difficult to say that this result is compatible with other results in the literature. Variables such as finding different assessment criteria related to stress and timing of the study can be counted among the reasons for the differentiation of this result. At the same time, when it is considered the evidence that stress perception may decrease at the time of performance [12] and the long-term effects of stress [13, 14, 15], it is possible to say that health professionals have been damaged in terms of mental health in this process.

There is a lot of evidence in the literature that the stress experienced by healthcare workers is much more than other individuals in the society. In the results of the study that was carried out with 506 participants in total at the time when COVID-19 started to spread in Wuhan, and in which health workers and citizens were compared, healthcare professionals who are in contact with patients experience higher psychological problems despite the positive contribution of friends and family support. This result can be considered as an important evidence for providing professional mental health support that should be created for the healthcare worker during the epidemic process. [16] Another study conducted in the UK during the SARS epidemic reveals that 68% of healthcare professionals experience high levels of stress. In addition, it is seen that health workers with worse general health status experience higher levels of anxiety. [8] In the study conducted during the SARS epidemic in Singapore in 2003 with the participation of 1049 healthcare professionals, the answers given to the question about what is the most frightening factor for healthcare workers are as follows; the fear of the transmission of the disease to self, family and other loved ones (37.5%), uncontrolled spread in society (27.5%), and economic concerns (16%). [17] The results of the study conducted by Tam et al., show that 70% of healthcare professionals experience stress related to being infected. [8] When it is considered that being infected also involves the anxiety about infecting the family, it becomes clear how challenging the process is. In this process, it will be beneficial to distribute visual materials and brochures that will guide the healthcare professionals psychologically about the situation they face. [9]

Healthcare professionals also need to be supported to reduce the mental harm they experienced during the process. Probable future epidemics or other public health crises will multiply this negative impact. When it comes to such possibilities, it is thought that it is important to strengthen health workers to maintain their altruism attitudes. [18] In the results obtained from the studies, it is seen that healthcare professionals are anxious primarily about their families and their environment and postponed their concerns about themselves. [8, 13, 17, 19, 20] There is evidence that heavy stress, which healthcare professionals experience about becoming infected themselves or their relatives, negatively also affects their physical health.[9] It should not be forgotten that healthcare workers roles always give sacrifice and compassion, but not always being supported in this process, may increase burnout and insensitivity.

In Wuhan, where COVID-19 first appeared, findings from 994 participants reveal evidence that can be regarded as substantial. It is stated that 36.9% of healthcare professionals who made evaluations about themselves have more sub-threshold mental health disorders than before the epidemic, 34.4% of them have mild mental illnesses, 22.4% of them have moderate disorders, and 6.2% of them have a mental health disorder that can be considered serious immediately after viral epidemic. [9] In the results of a study conducted with 2299 participants in Fujian city of China, it is seen that health workers struggling with intense epidemics have two times higher levels of anxiety and depression than administrative staff working in the same hospital. [16] In this context, it becomes important that healthcare managers empathize more to understand the level of anxiety and depression felt by employees who provide healthcare services to patients in the same period.

It is stated that 17.5% of healthcare workers received psychological support during the epidemic process [9] and 25% of them who have had an infection during their return to work demand psychological support in the process of adaptation to work. [18] In this process, the stress factor experienced by healthcare professionals is not limited to the fear of getting sick. Staying away from the family because of the social isolation and the desire to be present for the family in a possible disease process should also be considered among the stress factors for health workers. [19] During the epidemic process, health professionals are not only facing stressors related to the treatment processes of patients. The study conducted in Canada states that the emotional burden of implementing the treatment protocol

for the colleagues who were infected during the SARS epidemic and who were treated in the hospitals where they work is quite high. [8,10]

Stress experienced in the healthcare process can trigger new behaviours that employees are not aware of and that may be considered harmful. In the results obtained in the study conducted with 259 participants consisting of physicians and nurses working in public hospitals in Turkey, it is seen that hedonic consumption tendency emerges among the employees who experience burnout and depersonalization in order to socialize. [5] These results provide important evidence of the extent of the negative attitudes that people may unwittingly show when the process is not intervened and show that healthcare professionals should be supported psychologically.

Activities that can support the mental state of healthcare workers during and after the epidemic and reduce the sense of burnout that may arise are as follows; rest, exercise, staying away from technology, regular sleep, healthy eating, engaging in enjoyable hobbies and activities, socializing, dealing with volunteer help. These activities can reduce the sense of burnout by relieving the individual. [5] Emphasis is also placed on the importance of enabling and expanding hobby courses within the framework of the study results which demonstrate the positive effects of attending hobby courses on many psychological diseases are revealed. [21] Drama and art activities should also need to be evaluated in terms of supporting mental health for health professionals. [22] It is remarkably important to continue the psychological and social support, which must be provided during the epidemic process for healthcare professionals, after the epidemic process. [14]

DISCUSSION

The factors that cause burnout and depersonalization among healthcare workers in the process of providing health services, increase in the epidemic process and gain new dimensions. Together with the anxiety of being infected due to the epidemic and of infecting relatives, the challenging factors such as losing people and applying the treatment to colleagues make this process much more difficult for healthcare professionals. There is a great deal of evidence in the literature about the level and extent of anxiety experienced. In this context, the importance of increasing the psychological resilience of healthcare professionals and supporting them psycho-socially is increasing. Providing these supports during and after the epidemic is also important in terms of maintaining quality in health care. There is evidence that realizing projects to ensure healthcare professionals acquire hobbies and ensuring the continuity of these projects will make it easier to deal with these processes. These emergent gains will not only heal the wounds caused by the epidemic but will also provide significant benefits to improve the quality of life of healthcare professionals. It is considered that the provision of mental health professionals who will provide continuous support for healthcare professionals in the institution should be among the mandatory occupational health and safety measures.

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RESEARCH ARTICLE

EXIT STRATEGIES FOR COVID 19: AN ISM AND MICMAC APPROACH

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ABSTRACT

COVID 19 pandemic is the worst crisis that mankind has seen since World War-II. It has exposed glaring loopholes in the healthcare system and led to a global health crisis. In absence of any specific treatment or vaccine, countries began to enforce strict lockdown measures leading to a complete shutdown of economic activities. The purpose of this study is to identify key exit strategies that can be implemented to mitigate the impacts of COVID 19. Identification and categorisation of parameters have been achieved using multi criterion decision making techniques of Interpretive Structural Modelling (ISM) and Cross-impact matrix multiplication applied to classification MICMAC analysis.

The study highlights a classification of key strategies based on their driving power and dependence which may enable Government to strengthen the disease surveillance system and effectively reduce the impact of the disease. The findings of the study suggest that Environmental Sustainability and Human Well-being; Online Awareness and Capacity Building Programme; Graded Surveillance-Targeted Restrictions and Stricter norms for Inter-State Mobility; and Harmonization between Centre, State and Local Authorities are the most important strategies that needs to be factored in while planning for the post lockdown economic recovery. With countries eager to resume economic activities, the strategies identified in our study can assist the governments and policymakers across the world in devising their exit plans while giving due consideration to each of the strategies to counter the disruptions brought about by the COVID 19 pandemic.

KEYWORDS

COVID 19, Exit Strategy, Interpretive Structural Modelling (ISM), Cross-impact matrix multiplication applied to classification MICMAC

1. INTRODUCTION

COVID 19 is an infectious respiratory disease caused by severe acute respiratory syndrome coronavirus (SARS-COV 2). The disease initially came to light in Wuhan in December 2019 and since then has spread to all continents except Antarctica. SARS-CoV-2 pandemic has affected more than 3 million people worldwide (3,517,345 confirmed cases and 243,401 reported deaths. [1] Countries worldwide have struggled to break the chain of transmission leading to exponential growth of confirmed cases and deaths. The rapid spread of COVID-19 has forced countries worldwide to limit travel, quarantine citizens, implement emergency lockdown plans and apply social distancing norms. This has resulted in a near shutdown of almost all economic activities which has the potential to drive economies towards the recessionary trap.

Ramifications of this pandemic is multi-faceted. With no breakthrough of any vaccine or effective anti-viral

treatment, countries have relied on modern molecular diagnostics and electronic surveillance, contact tracing through artificial intelligence for identification of people at potential risk. Several countries are working hard to counter the effect of this viral disease by experimenting with several traditionally practised medical techniques and methods. Thus, to avoid any further escalation of the disease, most governments worldwide have resorted to stringent norms of practising social distancing which include quarantine and travel restrictions. This method of social distancing and restricted mobility is a desperate attempt made by countries to flatten the slope of the curve and to buy time for preparing the health care systems to respond to the pandemic. However complete shut-down strategy has resulted in supply chain disruptions and liquidity shocks. This has been particularly harmful for developing economies with limited resources to absorb prolonged national 'lockdowns' and can further escalate the recessionary strain due to the negligible economic productivity.

Thus, it is important to have a plan for reactivating the society and to devise exit strategies to tackle the economic downturn, resume work and production, open up all the sectors of the economy with targeted travel restrictions and policy resolutions. A strategy or 'roadmap' is required to be framed for deescalating the lockdown measures based on epidemiological indicators to minimise the impacts of this pandemic. This research highlights potential exit strategies which are likely to be influential in reducing the catastrophic effect of COVID-19. The main objectives of this paper are to provide a conceptual framework using Interpretive Structural Modelling (ISM) approach and to identify the key strategic intervention that could be implemented by the Government in the post-lockdown period. In this study the following strategies have been suggested to counter the pandemic that has led to severe global socioeconomic disruption—

1. Financial emergency response plan (S1)
2. Harmonization between centre, state and local authorities (S2)
3. Social cooperation and trust (S3)
4. Environmental sustainability and human well-being (S4)
5. Resumption of economic activities and trade facilitation (S5)
6. Graded surveillance: Targeted restrictions and stricter norms for inter-state mobility (S6)
7. Reducing community transmission through universal masking policy and optimal social distancing (S7)
8. Economic recovery (S8)
9. Research and development in healthcare sector (S9)
10. Augmenting healthcare infrastructure (S10)
11. Online awareness and capacity building program (S11)

These exit strategies can be the guiding light towards economic revival. Through interpretive structural modelling (ISM) and cross-impact matrix multiplication applied to classification (MICMAC) approach we analyse the interrelationship between these potential strategic interventions that can be factored in by the government in their post lockdown planning. The following research objectives are proposed that needs to be evaluated in detail to understand the effectiveness of the suggested strategies that can reduce the COVID 19 distress.

Proposition 1: Identification of the major exit strategies that can be devised to combat COVID 19 pandemic.
Proposition 2: Evaluate the inter-relationships among these strategic interventions by the Government for an effective action plan to combat the crisis.
Proposition 3: Segmenting the exit strategies based on their driving power and degree of dependence and evaluating the relative importance of the strategies to enable policymakers to frame the pandemic response plan.

2. LITERATURE REVIEW

The universal policy of "Global-Lockdown" has been effective in deaccelerating the rate at which the worldwide statistics of COVID 19 cases have beenreported, but it cannot be sustainable in the long-run as it has already crippled our economy towards recession. Thus, to revive the economy more inclusive and sustainable exit strategies have to be framed which requires comprehensive analysis to find out the interrelationship among them in order to identify the key or triggering strategies that can be prioritized for a steady economic growth. These strategies are listed below with definitions and references.

2.1 FINANCIAL EMERGENCY RESPONSE PLAN

Almost 30% of countries are believed to have no COVID-19 national preparedness and response plans. [1] The COVID-19 Solidarity Response Fund for WHO has been initiated

which is managed by the UN Foundation and the Swiss Philanthropy Foundation.This crowdfunding initiative has been started to raise money for the vulnerable and developing economies to provide support to the individuals and business in response to the outbreak of the novel coronavirus disease 2019 (COVID-19) pandemic. [2]

Another landmark bill that was passed as a law by the Federal Reserve of USA which aims to provide fiscal relief to the states and to stabilize the economy, Coronavirus Aid, Relief, and Economic Security Act ('CARES Act') by providing direct payments and fiscal benefits to individuals suffering hardship due to the pandemic and the subsequent economic disruption. [3]

Thus, with the rapid escalation of the COVID 19 crisis, nations worldwide need to expedite a financial emergency plan to strengthen national and state health systems, to provide livelihood security and implement strategic preparedness initiatives to safeguard the economy.

2.2 HARMONIZATION BETWEEN CENTRE, STATE AND LOCAL AUTHORITIES

Harmonization of fiscal relations between centre, state and local bodies is considered to be one of the most integral part of any democracy, but with the spread of the novel virus and increasing degree of financial and economic volatility it has led to a situation of intra-governmental conflicts. Federations are increasingly facing complex policy challenges, from managing funds to limiting the catastrophic effect of this contagious disease. With the inception of COVID 19, this intra-governmental conflict is further aggravated in major economies around the world. [4, 5]

This network of overlapping local governments with varied levels of hierarchical setup can be harmonized through mutual cooperation and collaboration. The local government authority which directly deals with the management of the front line government personnel (hospital, fire, police, essential service providers) responsible for pandemic management in the special districts should implement the directives set up by the state and federal government. Even the state and the central government should be devoid of any opportunistic political motivations and authoritarianism, they should work in harmony with voluntary cooperation and compliance from the citizens. [6] Thus, the COVID-19 pandemic can be tackled through efficient public finance management and intra-governmental cohesion.

2.3 SOCIAL COOPERATION AND TRUST

Every contagious disease is associated with a degree of stigma and considerable discrimination within the society. Similarly, the level of stigma associated with COVID-19 hinders the mitigation of the disease and creates a sense of anxiety, and fear among the public. To safeguard the frontline workers and public health care support staff several measures are suggested by the UNICEF. [7]

The social stigma undermines the social cohesion and can lead to psychological distress among people and health problems. Tensions between stigma mitigation can be eliminated through online awareness of the chronic disease through varied multimedia sources and engaging with affected communities, build empathy and social justice among people. [8] Social harmony builds trust which further increases the degree of participation and community engagement. This amplified positivity reinforced in the attitude of the local community may prove to be highly beneficial to the successful containment of the COVID-19 pandemic. [9]

2.4 ENVIRONMENTAL SUSTAINABILITY AND HUMAN WELL-BEING

To combat the spread of COVID 19, the global lockdown implemented by major economies across the globe resulted in drastic effects on social and economic fronts. The shutdown of major industries not only crippled the economic productivity and aggravated the financial crisis but it also led to negative psychological effects on individuals. The severity of psychological distress across population during the lockdown period could be attributed to depression, post-traumatic stress, confusion and boredom, frustration and anxiety which were mostly stimulated due to social isolation, fear of infection and low immunity, inadequate food supplies, misinformation on social media, financial loss, and stigma. [10-12] However, this lockdown also led to some positive effect with respect to the ecological sustainability and environmental conditions. The data released by NASA (National Aeronautics and Space Administration) [13] indicated that the pollution level in some of the major economies affected by COVID-19 such as Wuhan, Italy, Spain and USA have reduced up to 30%.

Thus, the fatality and threat associated with global pandemic have a serious consequence on the human

health as well as causing economic downturn but has also led to a considerable positive impact on the environmental sustainability.

2.5 RESUMPTION OF ECONOMIC ACTIVITIES AND TRADE FACILITATION

The current public health emergency has not only disrupted the domestic economic activity but also led to cross-border trade disturbances. International trade is one of the integral parts of economic growth, the COVID 19 outbreak has led to disruption to world trade, affecting both the supply and demand side of the global economy. The global lockdown has further imposed restrictions on labour mobility, further leading to stoppage in non-essential manufacturing activities.

With the growing uncertainty of pandemic's severity and the protectionist trade policy of high tariffs and non-tariff barriers to impede foreign exports, the countries pose the risk of further worsening the global healthcare systems. With the spread of the disease there is sharp increase in the demand for medical supplies beyond the competencies of domestic production level, the nations are even exposed to the problem of food crisis without any support of the international supply chains in the agricultural and food industries, the international tourism and hospitality sector has also suffered massively with restrictions on air travel and sealing of international borders. [14-17]

Hence, to safeguard food security and strengthen international trade relations resumption of cross-border economic activities and mutual cooperation is required to break the economic barriers in the times of crisis. A greater harmony in international relations and national integration can help economies evolve from the crisis of the COVID-19 pandemic.

2.6 GRADED SURVEILLANCE: TARGETED RESTRICTIONS AND STRICTER NORMS FOR INTER - STATE MOBILITY

As a precautionary measure to prevent further spread of Coronavirus, most economies restricted the inter-state and inter-country mobility by imposing travel bans, lockdowns, and movement restrictions of any good or services by sealing the domestic and international borders. The policy intervention to implement travel quarantine, restriction on labour migration and sealing all the human mobility corridors were imitated from the Wuhan crisis to contain the spread of COVID-19 and to mitigate the epidemic from further spreading to vulnerable sections of the society. These approaches were legally enforced to help with COVID-19 containment to avoid further national and international spread of the epidemic. [18-20]

Therefore, to mitigate the epidemic it is important to take into account the stringent travel restrictions on any mobility with the government provision to relax certain guidelines for resumption of essential services after periodic review by the State.

2.7 REDUCING COMMUNITY TRANSMISSION THROUGH UNIVERSAL MASK POLICY AND OPTIMAL SOCIAL DISTANCING

With the COVID-19 pandemic exponentially growing worldwide, the policy of universal face mask and optimal social distance have been mandated byWorld Health Organization (WHO) to be critically important to prevent the virus from further spreading in the social network.

Social distancing is the practice of increasing the physical space between two or more individuals in order to decrease the chance of spreading illness. According to the Centre for Disease Control and Prevention (CDC) of USA, the spacing guideline of 6 feet or 1.5 metres have been suggested to decrease the spread of COVID-19. [21] Besides this, the updated guidelines of CDC have also strongly endorsed universal public masking in crowded public spaces and enclosed workplaces. [22-24]

In the spread of virus largely due to the close community gathering and social network contamination, these strategic interventions by the Government will prove to be beneficial from spreading the virus in the densely populated areas around the world.

2.8 ECONOMIC RECOVERY

COVID-19 pandemic has led to a devastating global shock that has drastically reduced the demand globally and also resulted in a supply shock. Such shocks have drifted the economies to a recessionary trajectory which require immediate bailout reforms through fiscal and monetary stimulus. With this massive international financial crisis that has wiped off share markets value globally and the global GDP prediction of 2.4 percent; massive unemployment and widespread income inequality; decreasing purchasing power of the consumers; major sectoral stagnation and bankruptcy, and the threat of escalating mortality rates due to the pandemic. This financial crash has downgraded the entire economy and scaled down to a lowest point. The health crisis has not only increased the death rate but also further created a recessionary pressure. Thus, the repercussions of the COVID-19 outbreak for businesses, workers and supply chains could be severe. [25-28]

Thus, to safeguard the economy from the social and economic risks of epidemic the Government needs to devise a balanced strategic intervention.

2.9 RESEARCH AND DEVELOPMENT IN THE HEALTHCARE SECTOR

As confirmed by WHO, there exists no traditional vaccines that has potential to protect against the novel coronavirus. The SARS-CoV-2 virus is a unique virus which requires rapid research and development initiatives worldwide and clinical trials to invent a new vaccine that resolves this widespread impact of COVID 19. Therefore, researchers all over the world are required to capitalize on their previous experience and knowledge of dealing with similar pandemic outbreaks such as Ebola virus disease, SARS-CoV and MERS-CoV and develop a R&D plan to develop the vaccine against 2019-nCoV.

More than 100 organisations worldwide have published genomes to develop the vaccine against SARS-CoV-2 and more than 500 clinical trials have been conducted on all COVID 19 patients who were registered by the World Health Organisation in the Clinical Trial Registry. [29, 30] Thus, there is an urgent need to facilitate these research organizations and institutions with substantial research funds and infrastructure.

2.10 AUGMENTING HEALTHCARE INFRASTRUCTURE

With the escalated number of cases each day, every country is faced with the dilemma of surge capacity for intensive critical units and other integral medical services. Thus, government interventions are required to estimate the number of critically ill patients and adapt surge capacity by establishing more isolation and containment centres for treatment before the healthcare system is overwhelmed. [31]

There is a growing need to develop an advanced digitized surveillance system through AI-powered temperature screening method, using drones for surveillance instead of deploying personnel, peer-to-peer contact tracing methods of patient tracking, provision of telemedicine services and virtual medical diagnosis for an efficient management of the healthcare system. [32]

2.11 ONLINE AWARENESS AND CAPACITY BUILDING PROGRAM

Social media and other platforms have significantly helped in public dissemination of information and raise awareness related to COVID-19 infection with respect to personal hygiene practices, social norms and guidance to limit the spread of disease on a large scale, busting several myths and misinformation floated through the online portals and also helped raising citizen engagement and participation with the Government to tackle the disease. Social media has been helpful in easing the psychological distress due to isolation and enabled connectivity among communities during this uncertain time of crisis.

With respect to capacity building program, all face-to-face interactions have been transformed into virtual meetings and the curriculum delivery from the traditional classroom environment has been replaced with distance/online programs. Thus, the massive disruption in teaching-learning process due to the COVID-19 pandemic should not hinder the institutions and it should explore digital platforms to encourage off-site knowledge sharing through extensive training programs, collaborative research, and web-based education technologies using Massive Open Online Courses (MOOCs). [33-35]

3. METHODOLOGY AND RESULTS

In this study interpretative structural modelling (ISM) methodology has been used to develop a structural model of the government's strategic interventions which are used as a proxy for the critical success factors of the analysis and determination of relationship between the dependent strategies and driving strategies.

3.1. INTERPRETIVE STRUCTURAL MODELLING (ISM)

The concept of interpretative structural modelling is used for analysis of complex socio-economic problems. In this model a set of questions (parameters) which define the scope of the problem are presented to the participants. [36]

The multi-faceted nature of COVID 19 raises the need to devise a mix of strategies rather than adopting a single policy in isolation for safeguarding human well-being and long-term sustainability. Thus, it is critically important to evaluate the effectiveness of each strategy and analyse the direct and indirect influence of these strategies for smooth switch over to the post lockdown period. For a holistic view of the crisis the need of the hour is to investigate the situation in a much more inclusive way by taking into consideration all possible parameters collectively rather than relying on one individual parameter. Therefore, ISM develops insights into collective understandings of these relationships.

The total interpretive structural modelling has been applied to evaluate the factors that affects the epidemiological characteristics of pandemic COVID-19. [37] Besides the need to understand the factors leading to the spread of the virus, at this juncture when all economies around the globe are contemplating on the possible measures to minimize the economic loss, it is of critical importance to understand varied exit strategies that can be devised to safeguard the economy from slipping further into recession. Through the application of ISM, in our study we have evaluated varied policy measures and strategic interventions that can be implemented to improve the widespread economic distress and understand the linkages among these strategies and prioritize them based on their effectiveness.

The various steps involved in the ISM technique are:

- Step 1: Identification of elements

Identification of relevant strategies to combat the impact of COVID 19 have been achieved through extensive literature review and expert opinions that were collected through brainstorming sessions and group discussions.

- Step 2: Establishing a contextual relationship

The inter-relationship between various strategies were determined for all the strategies based on responses received from academicians, researchers, and policymakers.

- Step 3: Developing a structural self-interaction matrix (SSIM) of elements

A pair-wise relationship between these strategies were established and the correlation matrix was constructed based on the expert judgement.

- Step 4: Development of a reachability matrix from self-interaction matrix (SSIM) and transitivity check

An initial reachability matrix is constructed based on using 0 and 1 based on responses received in steps 1 and 2. After checking the matrix for transitivity, a final reachability matrix was constructed that summarizes all the possible combination of the strategies.

- Step 5: Level partitioning of reachability matrix

The parameters are placed level wise and the reachability and antecedent sets are prepared for all parameters.

- Step 6: Development of diagraph

A directed graph or diagraph is drawn after placing the parameters in their respective levels. The direct links are drawn based on relationship as per the reachability matrix. Only those transitive links whose interpretation is crucial are retained.

- Step 7: ISM hierarchical graph

The resultant digraph was converted into an ISM graph, by replacing element nodes with statements. This flowchart provides the summary of all the iterations based on the relative weightage and importance of the strategies proposed to be implemented by the Government post the lockdown period. This ISM model was further checked for any conceptual inconsistency and validity.

The steps used to develop ISM model have been highlighted and discussed in detail below:

3.2. STRUCTURAL SELF-INTERACTION MATRIX (SSIM)

To analyse appropriate inter-relationship between strategies a contextual relationship of "leads to" is taken. For developing these contextual relationships among variables, expert opinions based on detailed online group discussion and focus group interviews have been undertaken.

Based on their responses, the relationship between different strategies and for expressing their association with one-another, four symbols have been used to denote the direction of relationship between the parameters i and j (here i< j):

- V: Strategy i leads to Strategy j;
- A: Strategy j leads to Strategy i;
- X: Strategy i and j leads to each other;
- O: Strategy i and j are unrelated.

3.3. REACHABILITY MATRIX

The entries of structural self interaction matrix (SSIM) are replaced by 0 and 1 to form an initial reachability matrix. V, O, A, X entries of SSIM are mapped as per the following rules:

- If the (i, j) entry in the SSIM is V, then (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry becomes 0.
- If the (i, j) entry in the SSIM is A, then (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry becomes 1.
- If the (i, j) entry in the SSIM is X, then (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry also becomes 1.

- If the (i, j) entry in the SSIM is O, then (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry also becomes 0. [Do not delete section break]

Based on contextual relationships the SSIM is developed in Table 1:

TABLE 1: STRUCTURAL SELF INTERACTION MATRIX (SSIM)

STRATEGY	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
S1	X	A	V	O	O	A	O	O	O	O	O
S2		X	V	A	O	V	O	O	O	O	X
S3			X	O	O	O	V	O	O	O	O
S4				X	O	O	O	O	O	O	O
S5					X	O	A	V	O	O	O
S6						X	O	O	V	O	A
S7							X	O	O	A	O
S8								X	O	O	O
S9									X	V	O
S10										X	O
S11											X

Following above rules, the initial reachability matrix for the identified strategies is highlighted in Table 2:

TABLE 2: INITIAL REACHABILITY MATRIX

STRATEGY	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
S1	1	0	1	0	0	0	0	0	0	0	0
S2	1	1	1	0	0	1	0	0	0	0	1
S3	0	0	1	0	0	0	1	0	0	0	0
S4	0	1	0	1	0	0	0	0	0	0	0
S5	0	0	0	0	1	0	0	1	0	0	0
S6	1	0	0	0	0	1	0	0	1	0	0
S7	0	0	0	0	1	0	1	0	0	0	0
S8	0	0	0	0	0	0	0	1	0	0	0
S9	0	0	0	0	0	0	0	0	1	1	0
S10	0	0	0	0	0	0	1	0	0	1	0
S11	0	1	0	0	0	1	0	0	0	0	1

3.4. FINAL REACHABILITY MATRIX

The initial reachability matrix is checked for transitivity and then the final reachability matrix is constructed as shown in Table 3. Transitivity check is one of the crucial factors that determines the final structure of the ISM.It is done on all entries with zero (0) in initial reachability matrix. Whenever there is a transitive relationship between strategies 0 is replaced by 1*.

This matrix summarizes the driving power and dependency of each strategy. Driving power for each strategy tested is the total number of strategies (including itself) that it may assist to achieve and is calculated by horizontal summation of the effect of one strategy on other strategy. On the other hand, the dependence highlights the total number of strategies (including itself) that it is dependent on and that helps in achieving it. It is calculated using vertical summation of the strategies.

TABLE 3: FINAL REACHABILITY MATRIX

STRATEGY	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	DRIVING POWER
S1	1	0	1	0	1*	0	1*	1*	0	0	0	5
S2	1	1	1	0	1*	1	1*	1*	1*	1*	1	10
S3	0	0	1	0	1*	0	1	1*	0	0	0	4
S4	1*	1	1*	1	1*	1*	1*	1*	1*	1*	1*	11
S5	0	0	0	0	1	0	0	1	0	0	0	2
S6	1	0	1*	0	1*	1	1*	1*	1	1*	0	8
S7	0	0	0	0	1	0	1	1*	0	0	0	3
S8	0	0	0	0	0	0	0	1	0	0	0	1
S9	0	0	0	0	1*	0	1*	1*	1	1	0	5
S10	0	0	0	0	1*	0	1	1*	0	1	0	4
S11	1*	1	1*	0	1*	1	1*	1*	1*	1*	1	10
Dependence	5	3	6	1	10	4	9	11	5	6	3	63

3.5. LEVEL PARTITIONING

The reachability and antecedent sets for each strategy are determined from the final reachability matrix. The reachability set consists of the strategy itself and other strategies to which it may help achieve while the antecedent set consists of the strategy itself and other strategies that may help achieving it. The intersection set of the antecedent and reachability sets for all strategies are calculated. The strategies for which the reachability and intersection sets are same becomes the top-level strategy in the ISM hierarchy. This strategy is then eliminated from other strategies. Then by the same iterative process, the next level of strategy is found and eliminated. This iteration is repeated till the levels of each strategy is determined which is used to frame the final model of ISM hierarchy. These iterations are shown from Table 4 to Table 11.

TABLE 4: FIRST ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S1	1,3,5,7,8	1,2,4,6,11	1	
S2	1,2,3,5,6,7,8,9,10,11	2,4,11	2,11	
S3	3,5,7,8	1,2,3,4,6,11	3	
S4	1,2,3,4,5,6,7,8,9,10,11	4	4	
S5	5,8	1,2,3,4,5,6,7,9,10,11	5	
S6	1,3,5,6,7,8,9,10	2,4,6,11	6	
S7	5,7,8	1,2,3,4,6,7,9,10,11	7	
S8	8	1,2,3,4,5,6,7,8,9,10,11	8	Level 1
S9	5,7,8,9,10	2,4,6,9,11	9	
S10	5,7,8,10	2,4,6,9,10,11	10	
S11	1,2,3,5,6,7,8,9,10,11	2,4,11	2,11	

TABLE 5: SECOND ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S1	1,3,5,7	1,2,4,6,11	1	
S2	1,2,3,5,6,7,9,10,11	2,4,11	2,11	
S3	3,5,7	1,2,3,4,6,11	3	
S4	1,2,3,4,5,6,7,9,10,11	4	4	
S5	5	1,2,3,4,5,6,7,9,10,11	5	Level 2
S6	1,3,5,6,7,9,10	2,4,6,11	6	
S7	5,7	1,2,3,4,6,7,9,10,11	7	
S9	5,7,9,10	2,4,6,9,11	9	
S10	5,7,10	2,4,6,9,10,11	10	
S11	1,2,3,5,6,7,9,10,11	2,4,11	2,11	

TABLE 6: THIRD ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S1	1,3,7	1,2,4,6,11	1	
S2	1,2,3,6,7,9,10,11	2,4,11	2,11	
S3	3,7	1,2,3,4,6,11	3	
S4	1,2,3,4,6,7,9,10,11	4	4	
S6	1,3,6,7,9,10	2,4,6,11	6	
S7	7	1,2,3,4,6,7,9,10,11	7	Level 3
S9	7,9,10	2,4,6,9,11	9	
S10	7,10	2,4,6,9,10,11	10	
S11	1,2,3,5,6,9,10,11	2,4,11	2,11	

TABLE 7: FOURTH ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S1	1,3	1,2,4,6,11	1	
S2	1,2,3,6,9,10,11	2,4,11	2,11	
S3	3	1,2,3,4,6,11	3	Level 4
S4	1,2,3,4,6,9,10,11	4	4	
S6	1,3,6,9,10	2,4,6,11	6	
S9	9,10	2,4,6,9,11	9	
S10	10	2,4,6,9,10,11	10	Level 4
S11	1,2,3,5,6,9,10,11	2,4,11	2,11	

TABLE 8: FIFTH ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S1	1	1,2,4,6,11	1	Level 5
S2	1,2,6,9,11	2,4,11	2,11	
S4	1,2,4,6,9,11	4	4	
S6	1,6,9	2,4,6,11	6	
S9	9	2,4,6,9,11	9	Level 5
S11	1,2,5,6,9,11	2,4,11	2,11	

TABLE 9: SIXTH ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S2	2,6,11	2,4,11	2,11	
S4	2,4,6,11	4	4	
S6	6	2,4,6,11	6	Level 6
S11	2,5,6,11	2,4,11	2,11	

TABLE 10: SEVENTH ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S2	2,11	2,4,11	2,11	Level 7
S4	2,4,11	4	4	
S11	2,5,11	2,4,11	2,11	Level 7

TABLE 11: EIGHTH ITERATION

STRATEGY	REACHABILITY SET	ANTECEDENT SET	INTERSECTION SET	LEVEL
S4	4	4	4	Level 8

From Table 4, it can be observed that the strategy 'Economic Recovery' (S8) is at level 1. Thus, it will be positioned at the top of the ISM hierarchy. The strategy S8 does not lead to any other strategy and is subsequently removed in the next iteration leading to the next table. The Table 5 shows the strategy of 'resumption of economic activities and trade facilitation' (S5) does not lead to any other variable and is marked at level 2. Following that in Table 6 we will observe that the strategy of 'reducing community transmission through universal masking policy and optimal social distancing' (S7) does not lead to any other variable and is marked at level 3. Similarly, with the iteration in Table7, the strategy of 'social cooperation and trust' (S3) and 'augmenting healthcare infrastructure' (S10) do not lead to any other variable and so placed at level 4 while the strategies of 'financial emergency response plan (S1) and 'research and development in healthcare sector' (S9) in Table 8 forms the level 5 of the hierarchy. The strategy in Table 9 of 'graded surveillance - targeted restrictions and stricter norms for inter-state mobility'(S6) is marked at level 6. The strategy of 'harmonization between centre, state and local authorities'(S2) and 'online awareness and capacity building programme' (S11) in Table 10 are marked at level 7 of the hierarchy. From the Table 11 the final level 8 is determined as the strategy of 'environmental sustainability and human well-being' (S4). This strategy is therefore the most dominant strategy.

3.6. MICMAC ANALYSIS: CLASSIFICATION OF STRATEGIES

Cross-impact matrix multiplication applied to classification (MICMAC) was developed to estimate the driving and dependence power of various inter-dependent variables. [38] The variables are plotted on a graph with dependence on x-axis and driving power on y-axis. Based on the dependence and driving powers of the strategies that have been calculated in the final reachability matrix, it is classified into four categories:

- Autonomous strategy (quadrant I)

  The strategies with weak dependence power and weak driving power. In this study the strategy of 'financial

emergency response plan' (S1), 'social cooperation and trust' (S3), 'research and development in healthcare sector' (S9) and 'Augmenting healthcare infrastructure' (S10) are observed to be autonomous. These strategies are relatively disconnected from the overall policy framework and tend to have no significant impact on other strategic interventions devised by the government.

- Dependent strategy (quadrant-II)

  The strategies that have higher dependence on other variables but low driving power. In our analysis, the strategy of 'resumption of economic activities and trade facilitation' (S5), 'reducing community transmission through universal masking policy and optimal social distancing'(S7) and 'economic recovery' (S8) are identified as dependent strategies. These variables get influenced when there is change in the other variables.

- Linkage strategy (quadrant-III)

  The strategies that have a high dependence power and high driving power. In our study there are no linkage strategies.

- Driving or independent strategy (quadrant-IV)

  Those strategies that have a high driving power, but low dependence power. Our analysis identifies strategy of 'harmonization between centre, state and local authorities' (S2), 'environmental sustainability and human well-being' (S4), 'graded surveillance- targeted restrictions and stricter norms for inter- state mobility'(S6) and 'online awareness and capacity building programme'(S11) as the driving strategies. The driver power-dependence diagram with four-segmented quadrants is depicted in Figure 1.

FIGURE 1: MICMAC ANALYSIS

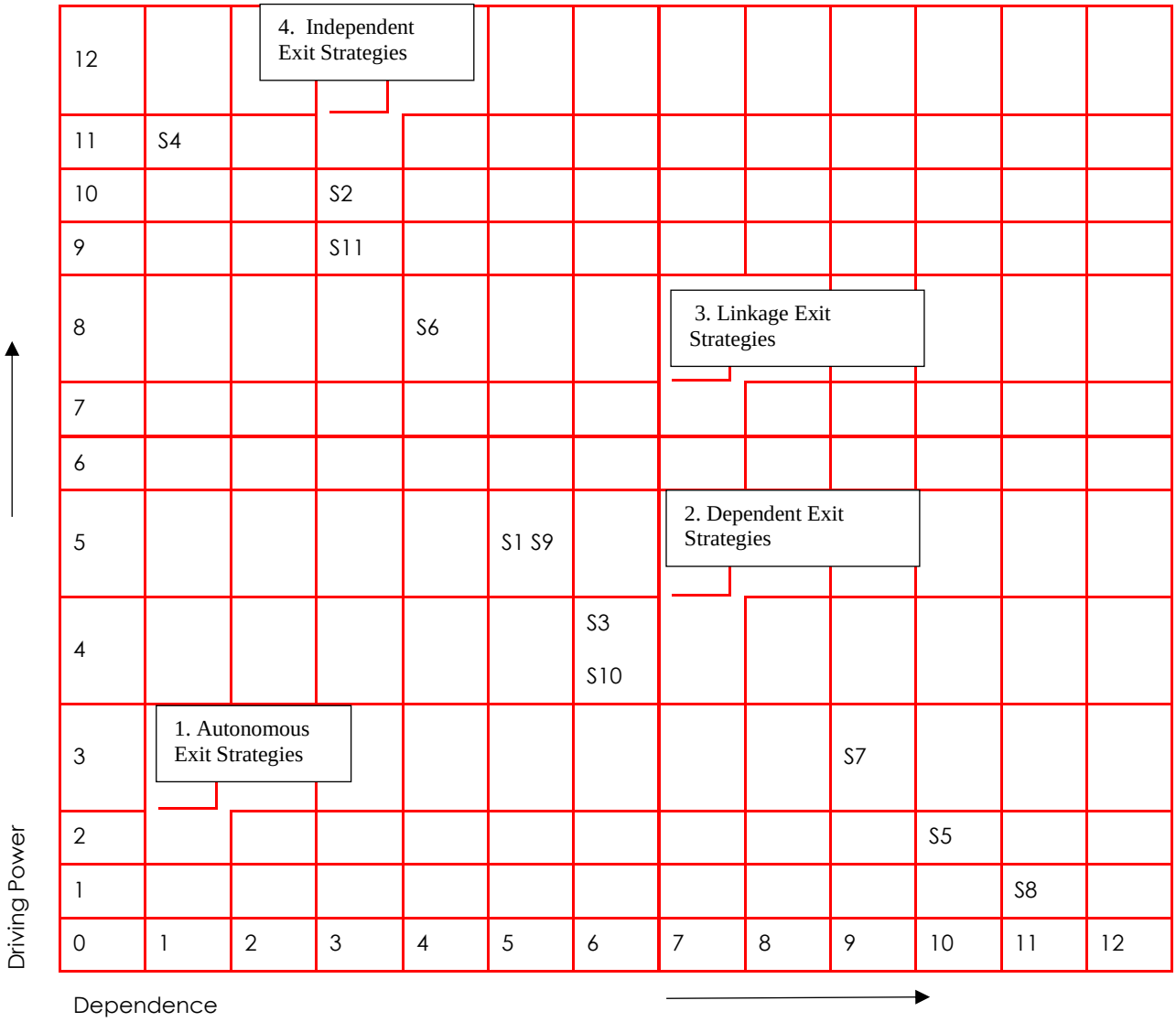


FIGURE 2: ISM HIERARCHY

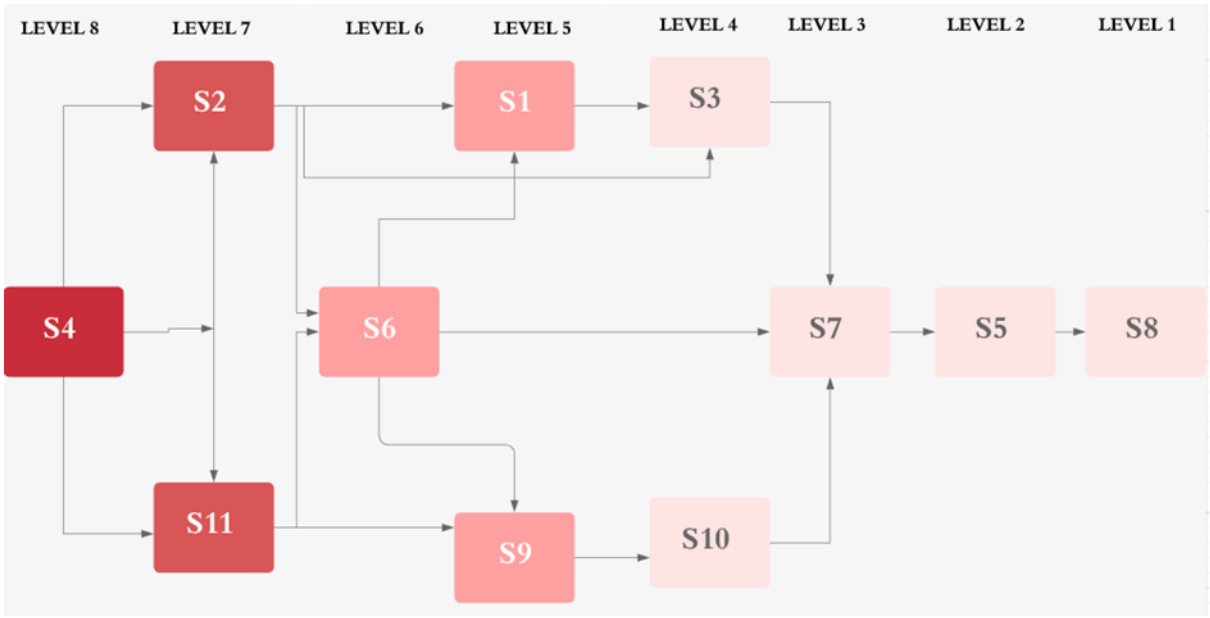
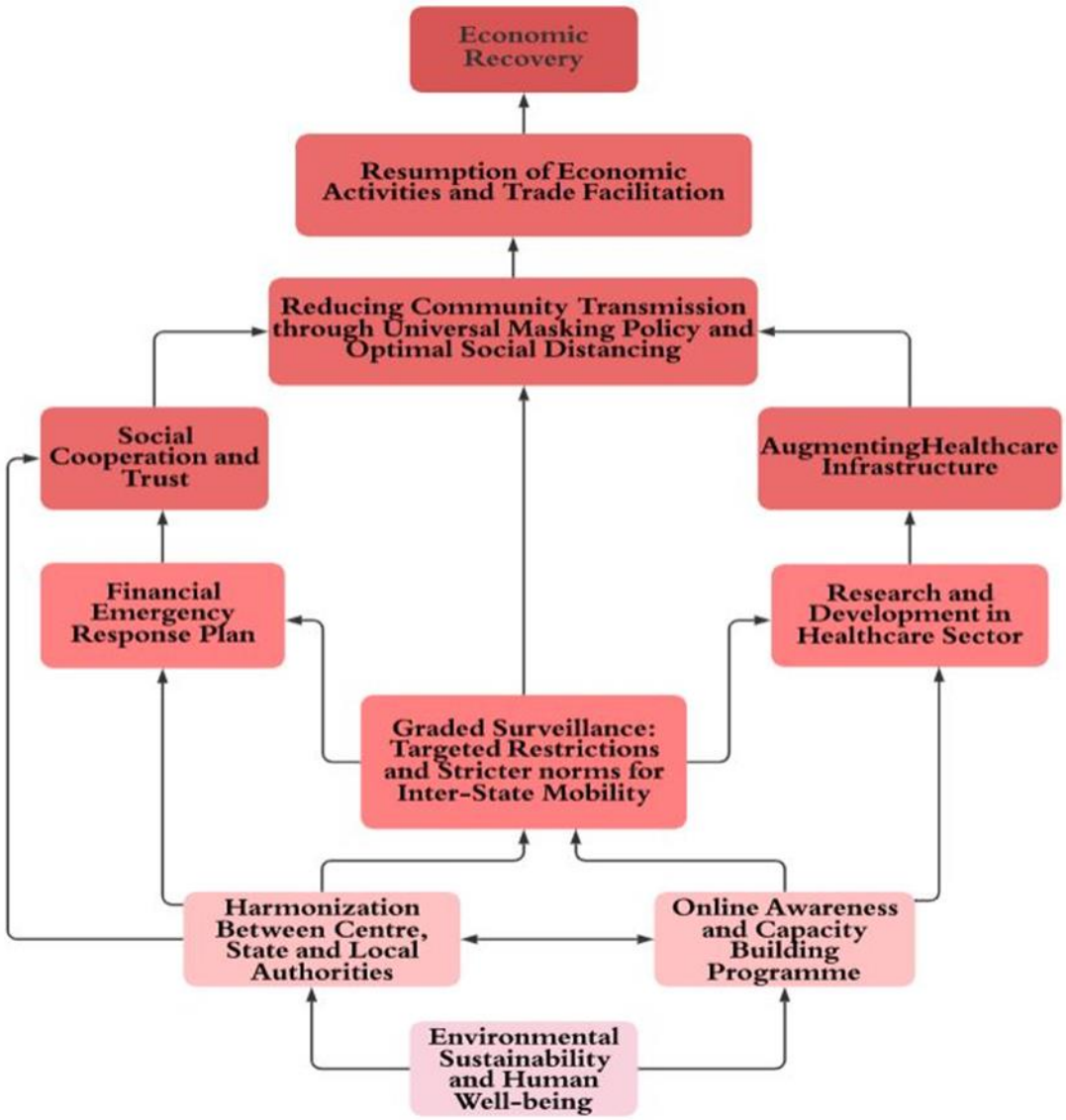


FIGURE 3: FINAL ISM HIERARCHY



3.7. FORMATION OF ISM HIERARCHY

From the final reachability matrix, the diagraph of the varied strategy is evaluated and their inter-relationship with other strategies are depicted through the flowchart representation of the ISM hierarchy (Figure 2). If there is a relationship between the strategies i and j then it is depicted directional arrow which points from i to j.

The ISM hierarchy developed is finally transformed into figure 3 which incorporates all the strategies and their inter-dependencies with other strategies based on their degree of effectiveness in the process of economic revival post the global lockdown period. It can be observed from the figure that four strategies namely 'environmental sustainability and human well-being' (S4), 'online awareness and capacity building programme (S11), graded surveillance -targeted restrictions and stricter norms for inter- state mobility' (S6) and 'harmonization between centre, state and local authorities' (S2) are the most important strategies with high driving powers. The remaining variables are dependent on these key strategies for minimising the economic downturn due to COVID 19.

4.DISCUSSION AND CONCLUSION

The COVID19 induced lockdown has severely impacted the economy primarily due to supply chain disruption, closure of industries and liquidity shocks. This has led policymakers to search for exit strategies to kick-start the economy and at the same time secure human well-being from falling prey to COVID 19. Keeping in mind the uncertainty of the present crisis and the need for an immediate exit plan, we have formulated a roadmap which can act as a guiding tool for policymakers.

Through our study, we have identified 11 key exit strategies through extensive literature review and expert opinion. The inter-relationships between various strategies based on their respective driving power and dependency were established using ISM and MICMAC approach. The levels of the ISM hierarchy were then evaluated through multiple iterations, the strategies which are placed at the bottom of the ISM diagraph have high driving powers while those at the top have higher dependencies.The results from the study suggest that strategy of 'environmental sustainability and human well-being' (S4) placed at level 8, has the highest driving power and is the most dominant strategy. Other significant strategies include— 'online awareness and capacity building program' (S11), 'harmonization between centre, state and local authorities' (S2) which were placed level 7 and 'graded surveillance - targeted restrictions and stricter norms for inter-state mobility' (S6) placed at level 6.

ISM diagraph is supported by MICMAC analysis in which these strategies have been placed in quadrant IV of MICMAC graph indicating the driving ability or economic significance of these strategies in mitigating the impact of COVID 19. The study can assist the government and policymakers in framing exit strategies evaluated in our model for devising an effective pandemic response plan.

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REVIEW ARTICLE

EXPLORING THE BACKYARD OF nCOVID: DETERMINANTS OF DEATH TOLL IN PANDEMICS

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ABSTRACT

Heterogeneity in number of deaths in different countries during the ongoing nCOVID crisis challenged us to look for determinants of pandemic death toll across the world. Using the past two decades data of pandemic deaths in the world, this study considered if engagement in international trade, health care expenditure and population density have any impact on the pandemic death toll. Using linear regression model controlled for types of disease, we not only found trade significantly impacting death toll, but also surprisingly found positive correlation between share of healthcare expenditure in GDP and fatalities in pandemics. Our findings suggest that policy intervention is required for mitigating health impacts of trade and 'tweaking' the health expenditure towards pandemic prevention.

KEYWORDS

pandemic, global trade, healthcare

JEL Classification: F10, F13, I18, Q18

INTRODUCTION

The recent eruption of nCOVID pandemic has seen 2,379,975 nCOVID-19 cases and 163,921 deaths as on the 19th April2020 [1] is not the first pandemic in human history. Death toll in pandemics have been more horrific than nCOVID so far. To count a few of them, Black Death of 1347 killed 75 million, Spanish Flu of 1918 killed 100 million and Asian Flu of 1957 killed 2 million people world over.[2] Unfortunately, nCOVID may not be the last pandemic, as virus strains continue to evolve. [3] Since history throws light on the factors affecting pandemic spread [4], there was no greater need for studies on the subject than now. Pandemics are occurring more frequently with the passage of time, and this increase is observed to be concomitant with the increase in economic activity such as trade and travelling.[5] While mode of transmission of such disease outbreaks remains ambiguous, [6] studies are attempting to bring some clarity on the channel which increased economic activities might be correlated with disease outbreaks.

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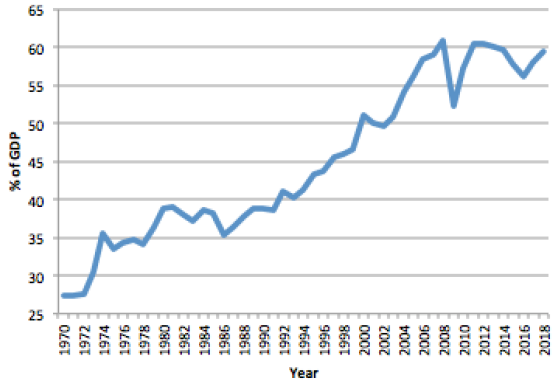
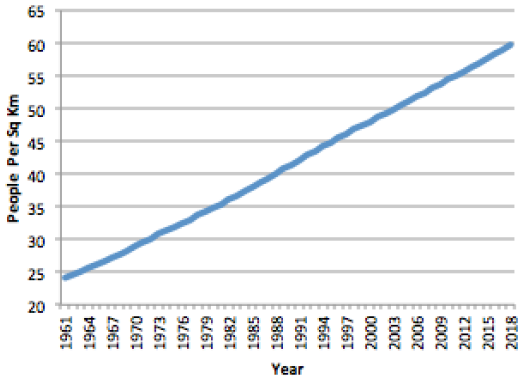
International trade, which means integration of domestic economy with the world economy is unavoidable as it is quintessential to growth. [7] Apart from impact on economic conditions such as growth, poverty and financial development, trade has been studied for impact on biodiversity, [8] environment [9] and health. [10] Overall impact of population density was dealt with comprehensively by Ehrlich and Holdren [11] and environment impact of the same was also taken up. [12] Health expenditure has been found to be impacting inequality, [13] economic growth [14] and of course health outcomes.[15] Trend of trade, population density and healthcare expenditure globally is explained in following panels:

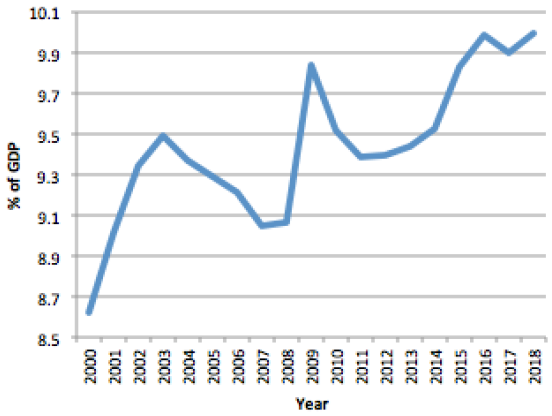
PANEL 1. TRADE AS % OF GLOBAL GDP



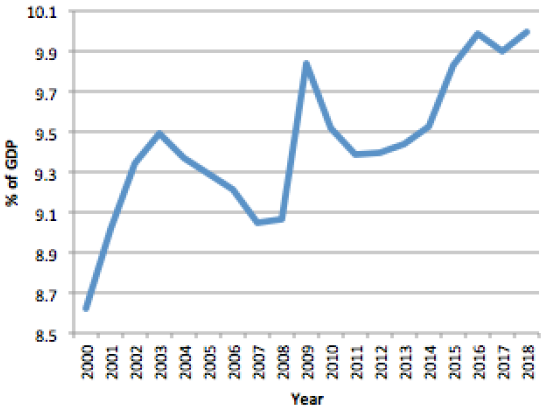
PANEL 2. GLOBAL POPULATION DENSITY (PEOPLE/SQ KM)



PANEL 3. GLOBAL HEALTH EXPENDITURE (% OF GDP)



PANEL 4. GLOBAL HEALTH EXPENDITURE (US$ /CAPITA)



It is apparent that trade, population density and healthcare expenditure, all have increasing trends. The question is how these factors impact fatalities in pandemics. Surprisingly, studies on pandemic impact on either trade, population density or health-expenditure are conspicuous by absence. This question is important since response to pandemics has to be decided with global cooperation in the wake of capacity imbalance.[16] We study impact of global trade, health care expenditure and population density upon virus-borne and bacteria-borne pandemic deaths of the last two decades. We contribute by doing this first such study, to the best of our knowledge.

Our findings suggest that two key policy interventions are required: one for mitigating health impacts of trade and second for 'tweaking' the health expenditure towards pandemic prevention. Results of our model indicate a positive correlation of trade and (surprisingly) negative correlation between share of healthcare expenditure with death toll in pandemics.

The structure of the paper is the following: Section 2 reviews the existing literature on nexus between disease outbreaks and global trade integration. Section 3 entails the need of such analysis. Section 4 describes the methodology including data sources, model specification and

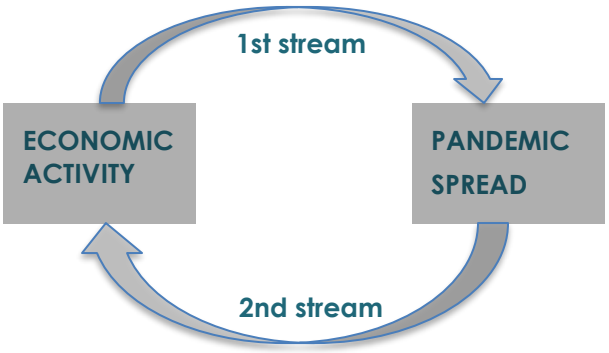
econometric methods. Section 5 discusses the findings; followed by the concluding remarks in Section 6.

LITERATURE REVIEW:

Literature on pandemics is profound in the natural sciences. Emergence and re-emergence of zoonotic infections by different influenza virus has been discussed for genetic evolution by Taubenberger and Kash. [17] Influenza pandemics like Spanish (H1N1), Asian (H2N2) and Hongkong (H3N2) have been discussed for genetic patterns by Kilbourne. [18] Natural science studies like these have immense value since vaccination is the final saviour in such pandemics. [19]

Since disease outbreaks have become globalised [20] and frequent, [21] literature in social science has also become populated in the recent past. The literature on pandemics spread and economic activity nexus can be divided into two broad streams as depicted in the Figure 1 below:

FIGURE 1. TWO STREAMS OF LITERATURE ON ECONOMIC ACTIVITY AND PANDEMICS



Literature on first stream (impact of economic activity on pandemics spread) is scarce compared to the second stream (impact of pandemics spread on economic activity). Our study belongs to the first stream. The 1918 influenza epidemic motivated much research on determinants of pandemics spread and Taubenberger & Morens [17] can be termed as the seminal paper in this field. Around the same time, the question of impact of trade on child health has been discussed for many countries. [23] The role of administration in bioterrorism has been discussed for many countries. [24] The risk analysis for China has been done in relation to Nipah virus outbreak.[25] Most of the studies have been lacking in either control variables or the number pandemics included like diarrhoea, chicken pox and flu were included in a study examining impact of economic activity upon disease spread.[26] We found that determinants of HIV spread have been abundantly discussed in Hunt, [27] Altman [28] and Kieh & Jr, [29] but other diseases have had less attention in the literature. The literature is not profound on the determinant side also, like Hosseini et al [30] found air travel and livestock export positively correlated with pandemic spread, but did not examine factors like healthcare expenditure in the study.

While there are many studies on the impact of disease outbreaks on the economy, especially after NCOVID, [31] literature on determinants of pandemics is scarce, to best of knowledge of the authors', and this paper attempts to fill this gap.

We should not leave this literature review without mentioning the important stream of response towards pandemics. The prescription paper [32] highlighted weaknesses and strengths of approaches for drug-makers, Osterholm [33] highlighted that the world is under-prepared for dealing with pandemics. Enemark [34] argued that every country needs to consider virus borne outbreaks in other countries as "their own". Thus, literature on determinants of pandemic spread, a stream to which our study belongs, is very relevant in the present context of nCOVID crisis.

METHODOLOGY

DATA AND METHOD:

To investigate the question what determines the mortality rate due to pandemics, the candidates for capturing the damage are: number of lives lost due to disease (death toll)

and number of people infected (caseload). In our study, the death toll was chosen as the dependent variable instead of caseload because of two reasons: one, there could be misreporting in caseload data and second, death toll captures the effect of healthcare expenditure.
We use panel data for 50 pandemics that raged the world during 1990 to 2019. There were pandemics before this period also, but this period was found suitable for study as frequency of pandemics was higher during this period indicating increased vulnerability.[35] Also, since the world became more and more open for trade during this period, [36] we were motivated to probe if there is any impact of trade on pandemic death toll during the period. Data and source are as in Table 1.

As multiple linear regression models are widely used in healthcare literature, [43-45] we also use the multivariate linear regression model in our study.

Our model specification is as follows:

$$DPCPY = \alpha + \beta 1\ TGDPs + \beta 2HCPC + \beta 3\ PDEN + \beta 4\ HCGDP + \beta cXc + \mu 1 \ldots\ldots\ldots (1)$$

Where TGDP, HCPC, PDEN and HCGPD are main variables and Xc are control variable for diseases. Trade is one of the main explanatory variables, which we want to study. Population density is the obvious choice for explanatory variable as disease spread and fatality rate will be impacted by how closely people are settled.[46] Per-capita healthcare expenditure and percentage share of GDP in healthcare capture the granularity of healthcare expenditure. Since fatality rates vary for types of diseases, [47] we control for the type of disease using dummy variables for different diseases in our model. Variables studied are summarized as Table 2.

TABLE 1. VARIABLES AND DATA SOURCES

VARIABLE	DEFINITION	SOURCE	REFERENCES
DT	Death toll in disease outbreaks per capita per year	World Health Organization (WHO) database	Floret et al. (2006)
TGDP	Trade as percentage of GDP	World Integrated Trade Solutions (WB) database	Constantinescu et al.(2020)
HCPC	Healthcare expenditure in $ per capita	World bank database	Reeves et al. (2014)
PDEN	Population density in people per sq. km of land area	World bank database	Hathi et al. (2014)
HCGDP	Healthcare expenditure as percentage of GDP	World bank database	Davoodi et al. (2010)

TABLE 2. DESCRIPTIVE STATISTICS

VARIABLE	MEAN	MIN	MAX	STD. DEV.
DT	10.85	0.001	262.4	42.39
TGDP	61.29	20.08	209.49	39.68
HCPC	1233.36	24.62	8335.87	2043.64
PDEN	126.82	2.82	454.93	140.64
HCGDP	6.92	2.56	20.4	3.71

We observe from the above table the heterogeneity in country variables and the disease death toll as well. We have run the linear regression duly including the disease control variables.

RESULTS

Regression results are presented in the Table 3 and our explantory variables could explain 43% of the variation in the dependent variable. Though coefficients of healthcare expenditure per capita and population density are having signs as expected (negative and positive respectively), they are not found significant in our study. We find significant impact of share of GDP spent upon healthcare. Interestingly, each additional % of GDP spend upon healthcare results into about 7 more death per capita in a year due to pandemics in a country.

TABLE 3: RESULTS OF REGRESSION

	DT	
	Coeff	**p value**
intercept	-67.73	0.003
TGDP	0.428	0.017
HCPC	-0.006	0.143
PDEN	0.053	0.261
HCGDP	6.97	0.01
R Square	0.639	
Adj R Square	0.435	
F Statistic	3.13 (**)	

IMPACT OF TRADE:

We found the coefficient of trade as a percentage of GDP significant and positive. This means countries with higher dependence of their economy on trade are likely to be more vulnerable to pandemics. This empirical finding is first ever in the literature (to the best of our knowledge) and thus our contribution to the literature. This also means that with increasing trade opennes in the world, perhaps the necessary guard against the danger of pandemics has been missed by countries.

IMPACT OF HEALTHCARE EXPENDITURE:

It is worthwhile to underscore here that coefficient for healthcare expenditure per capita is negative (which means more per capita expenditure results into less deaths in pandemics) but the coefficient of healthcare expenditure as a percentage of GDP is positive (which means countries spending more of their GDP on health goes against pandemic death prevention). The former is in agreement with the findings that argue for universal coverage for primary healthcare. [48] But the latter should lead to much needed further research on prioritisation of healthcare expenditure. These findings are important for developing countries as they have low income elasticities of health expenditure.[49] As the 2020 nCOVID crisis has highlighted healthcare expenditure needs re-design so as to deal with pandemics.

IMPACT OF POPULATION DENSITY:

We find that densely populated countries are singificantly more impacted by pandemics. As seen from Panel 4 of the Section-I, global population density has more than doubled in last few decades, this finding is on the expected lines, but empirical statement of relationship with pandemics is brought out in our study. This calls for re-design of urban clusters for saving lives from pandemics. This is a huge challenge as incease in poulation density is concomitant with economic growth.[50] Since healthcare reform with community engagement [51] has the potential to address such challenges, more study in this direction will be of great value. It is time that research for pandemic-resistant urban spaces stems from the literature.

Infectious disease outbreak happens due to human-to-human contacts across geographies [52] and if we go by the argument that such contacts are random, [53] we can assume pandemics as random experiments of disease-causing virus. Though our regression results only mean correlation and more research is required to establish causality, with the randomness assumption, our results qualify as causal enough to at least draw the attention of policymakers in the economic growth-chasing world.

CONCLUDING REMARKS

Our findings indicate positive correlation between international trade and pandemic death toll. For every additional 1% contribution of trade in GDP of the country, per capita death toll goes up by 0.428. This finding has serious repercussions in the era of globalization.

Our findings are in agreement with findings of recent nCOVID death toll across the world. Top 5 countries (as on 15th April2020) by death toll are USA, Italy, Spain, France and UK and their healthcare expenditure as percentage of

GDP is 17%, 9%, 9%, 11% and 10 % respectively. While countries with less than 10 deaths (as on 15th April.2020) like Singapore, Sri Lanka, Qatar and Venezuela have relatively lower healthcare expenditure as percentage of GDP (4%, 4%, 3% and 1 % respectively).

We draw two policy implications:

1. Countries, which have their economies heavily reliant upon trade, need to take special safeguards against pandemic outbreaks.
2. Countries need to redesign their health care expenditure so as to cope with the pandemics. Apart from primary secondary and tertiary healthcare, fourth dimension of pandemic healthcare need to be institutionalized.

It has been recognised that response to pandemics has to be globalised [54] as characterised by the concept of 'One Health' .[55] Thus our findings need appreciation by both academics and policy makers while long term strategies are being formulated in the wake of the nCOVID crisis. There is a procedurally established system of 'health inquiries' the importance of which was highlighted by [56] and empirical evidence like the one brought out in this study will help in taking the inquiry further.

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