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INFORMATION:

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EDITORIAL:**COVID-19 PANDEMIC: THAT SHOOK THE WORLD!****PHILLIP KIGODI**

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Since its outbreak in December 2019 in Wuhan, China, the COVID-19 pandemic caused by SARS-CoV-2 virus spread quickly across China and then to other parts of the world, leading to the World Health Organization (WHO) to declare it a pandemic on March 11, 2020. Three years later, as of April 19, 2023, there have been more than 764 million confirmed cases of COVID-19, including 6,908,554 deaths, reported to WHO and as of 15 April 2023, a total of over 13.3 billion vaccine doses have been administered globally [1]. This makes COVID – 19 the most contagious outbreak disease since records started and equally the most closely fought disease to largely contain it within three years. However, there are several issues that ensued during the pandemic which cry out for our comments if we are to be more effective in containing future pandemic outbreaks.

Several factors played a role in the rapid spread of COVID-19. Firstly, the virus is highly contagious being transmitted through respiratory droplets

from infected individuals, even before symptoms appear in them. This made it difficult to control the spread of the virus, particularly in densely populated areas and settings where people gather in large numbers, such as workplaces, public transportation, and social events.

Secondly, the lack of early detection and surveillance systems in many countries meant that the virus was able to spread undetected for some time before measures were put in place to contain it. This allowed the virus to spread globally and become a pandemic before it was recognized as a serious threat.

Thirdly, misinformation and a lack of clear communication about the virus and how it spreads contributed to confusion and complacency among the public, leading to behaviors that increased the risk of transmission. Misinformation spread quickly through social media and other channels, leading to confusion and skepticism about public health measures, vaccines, and other

interventions. As a result, some people continued to go to work or attend social gatherings despite feeling unwell or ignored public health guidance on wearing masks or practicing physical distancing. Finally, underlying social and economic factors, such as poverty, inequality, and inadequate healthcare systems, contributed to the disproportionate impact of the pandemic on marginalized communities and countries. These factors made it more difficult to implement effective public health measures and exacerbated the consequences of the pandemic, including illness, death, and economic disruption [2 – 4].

There have been many controversies surrounding the COVID-19 pandemic. First and foremost, of the controversies, included the ineffectiveness of public health measures such as mask mandates and social distancing due to difficulty of enforcing them. Some individuals and groups even pushed back against public health guidelines thus leading to further debates and conflicts. What is more the safety and efficacy of vaccines when they became available, were also doubted there by putting at risk more people. The pandemic has also highlighted existing disparities in access to healthcare and economic resources where marginalized communities were disproportionately affected. Debates about the origins of the virus have been polarized by politicization of otherwise scientific inquiry.

When vaccines became available, the vaccination efforts have varied across different countries and regions, with the richer countries having vaccinated a higher proportion of their populations while developing countries lagged behind. The Delta variant of the virus caused significant surges of cases in many countries, leading to additional waves of infections and deaths [5].

The COVID-19 pandemic though, has taught us several important lessons, including global cooperation, public health measures, science, and research as well as the importance of pandemic preparedness and addressing social determinants of health. Future preparedness efforts should focus on strengthening global health security, accelerating research and development, improving supply chain resilience as well as investing in public health infrastructure and promoting health equity [6, 7].

Future preparedness efforts should include additionally focus on investing in public health infrastructure, strengthening global health security, accelerating research and development, improving supply chain resilience, and promoting health equity. Other important measures include increasing the capacity for early detection and rapid response to emerging infectious diseases, developing, and maintaining a robust and flexible healthcare workforce, and improving communication and coordination between

different stakeholders, including governments, international organizations, and the private sector. These efforts require sustained funding and political commitment, and should be guided by principles of transparency, accountability, and inclusivity [6, 7].

The role of misinformation and communication in the COVID-19 pandemic has been a topic of extensive research and discussion. Misinformation can spread quickly through social media and other channels, leading to confusion and skepticism about public health measures, vaccines, and other interventions.

A few published studies highlight the impact of misinformation. A study published in the Journal of Medical Internet Research found that social media was a significant source of COVID-19-related misinformation, with false information and conspiracy theories spreading quickly and widely on platforms such as Twitter and Facebook [8]. Another study, published in The Lancet Digital Health, found that individuals who were exposed to COVID-19-related misinformation were more likely to engage in risky behaviors, such as not wearing a mask or attending large gatherings [9]. Clear and accurate communication is critical in preventing the spread of COVID-19 and promoting public health measures. WHO has emphasized the importance of transparent and timely communication in its COVID-19 communication

strategy, which includes providing accurate information to the public, engaging with communities and stakeholders, and addressing misinformation and rumors [10].

Globally, the trend of the pandemic is decreasing. Thus over 2.8 million new cases and almost 18 000 deaths were reported in 28 days (20 March to 16 April 2023), showing a decrease of 27% and 32%, respectively, compared to the previous 28 days [11].

The pandemic is ongoing, and the situation continues to evolve, with new variants of the virus emerging and countries facing different levels of transmission and response. Some countries have made significant progress in controlling the spread of the virus through vaccination campaigns, public health measures, and other interventions, while others continue to face challenges in managing outbreaks and preventing the spread of the virus. The WHO and other global health organizations continue to emphasize the importance of a coordinated global response to the pandemic, including equitable access to vaccines and other medical resources, strengthening health systems, and addressing the social and economic impacts of the pandemic.

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COVID19 IN PAPUA NEW GUINEA 2020 – 2023 GLEN MOLA

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[This article is based upon a presentation I was asked by the PM to make to the PNG-Australian Business Council meeting in Brisbane in 2022: and updated herewith.]

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INTRODUCTION AND HISTORICAL SKETCH:

The first recorded case of COVID-19 in PNG was in March 2020. He was an Australian “Fly in fly out” (FIFO) mine worker who had been holidaying in Spain and came to PNG via Singapore; landed in Port Moresby and transferred to domestic flight to Lae, and then bus pick up to the Mine site. He became ill the next day and tested positive in the Mine site clinic. Hundreds of contacts were tracked down and one (a female on the same flight from POM to Lae) tested positive. Some people deliberately avoided testing, (including the bus driver from the airport to the mine site).

From this first case (to the end of 2020), active case detection and detection of COVID-19 in contacts of cases was the PNG policy and strategy of the PNG government and National Control Centre. However, by the end of 2020 it was clear that there was extensive community transmission and a policy of individual case surveillance and quarantining, and contact tracing was no longer appropriate.

Since 2020 we have had a number of waves of infections – December 2020, April 2021 (alpha or UK variant), June 2021 (Beta or South African variant), and November 2021 (Delta) and now with Omicron – since February 2022.

The Changing Epidemic and the beginning of ‘way-out’ community views:

By lockdowns and case surveillance, contact tracing and quarantining cases and contacts, PNG was able to avoid community transmission for quite a long time – 8 months from March to November 2020. The purpose of the lockdown strategy was to give time for the health system and the community (awareness, availability of vaccines and ramping up a vaccination program) to make adequate preparations for the local epidemic – so that the health system can cope, and that as many people in the community as possible can get vaccinated.

Looking back (wisdom in retrospect!), we should have scaled back lockdowns and started opening up the country again – for a return to

more normal economic activity – in about August 2021 when it became clear that lockdowns were causing very serious harm to the PNG economy, vaccine uptake was not progressing apace and the health system was as prepared as it was going to be for the circumstances we were in. But as has been the case in many countries around the world, it took PNG several more months to become aware that we needed to move from the ‘zero cases strategy’, to managing the epidemic. And by taking rather extreme lockdown measures (when there was very little transmission, cases and deaths) the community developed the view that COVID-19 was not a problem for PNG, that Papua New Guineans were probably inherently immune to COVID-19, that vaccination was not necessary, and that the government did not know what it was doing.

I can remember taking part in some extraordinary meetings of the Senate of University of PNG (in April and May of 2020) where many non-medical members of the Senate wanted to close down the whole university – either for the remainder of the first semester (that is to open again in July), or for the whole of the rest of 2020 academic session. Members from the School of Medicine and Health Sciences (SMHS) tried to get the message across that “things are going to be worse in July (so it is not sensible to think of closing now and re-opening in the second semester in July 2020). And, as for next year (2021), it would not be sensible either, as we

would probably have a full blown community transmission epidemic on our hands by that time”.

We were saved by our ‘poverty’ at the time – we did not have sufficient funds to send the students home and bring them back again: so we just limped on from week to week – with the opportunity to review things at frequent intervals. This was the first time I became aware of one of the extraordinary things about the COVID-19 pandemic – and that is, that lay people (those with no training, qualifications or experience in medical matters, public health or epidemiology) think they know as much as, or more than (or the very least, their opinion has equal weight to that of experts), the health experts. And, if there is a COVID-19 issue, then lay people think that if they can find one opinion (usually on the internet) that agrees with their opinion, then this trumps the 99% consensus of medical and public health views in the country and the world. Between November 2020 and October 2021 we had small surges of new variants (Alpha in February/March, and Beta in June/July). These variants were a little more infectious, but they had the same demographic morbidity profile – that is, that young people were only seriously affected (or had the risk of COVID-19 disease death) at the rate of only about 1/1000 infections. Then, in October 2021, the Delta variant reached PNG, and in the month of November, we experienced between 30 to 50 deaths per day at Port Moresby General Hospital (PMGH), 8 young women died in the

labor ward, and there were 250 recorded COVID deaths in Goroka, Eastern Highlands Province (EHP) – including 27 school teachers.

There were, of course, many more deaths in the community. In fact, PNG has only recorded about 700 deaths in total, whereas there have probably been thousands of COVID-19 related deaths. This is because, to have a death recorded as COVID -19 related in PNG, there are a number of statutory requirements:

- The death must occur in a hospital – because only hospital deaths are death certified in PNG; deaths in the community are not registered.
- The person must have had an illness which clinically was considered to be typical of COVID-19 disease – that is, a clinical viral pneumonia scenario, and
- The patient must have had a positive PCR test for COVID.

Even if all the above are the case, many relatives ask the doctor certifying the death NOT to mention COVID-19 on the death certificate because of stigma issues, and also a COVID-19 death is much more expensive to transport to the home area for burial.

The actual number of COVID-19 deaths in PNG is anyone's guess – but it is probably in the tens of thousands. There was an excess of about 10,000 of adult 'pneumonia' deaths in 2021. I have recently sought some assistance from WHO for the Public Health division of the School of Medicine and Health Sciences to conduct community verbal autopsies of community

deaths in 2021 in selected sites: let's see what this reveals.

Misinformation, Conspiracy Theories and Community Myths:

Misinformation and Conspiracy theories have hampered the government's effective response to the epidemic and produced massive community hesitancy and COVID-19 anti-vax views throughout the country. Examples of such community views are:

1. If the COVID-19 pandemic is real and a threat to PNG too, why are so few people dying from it? [The Wild strain, and the Alpha and Beta variants only produced serious morbidity (that is, disease) in very few young people: 75% of PNG's population is below 30 years of age.]
2. COVID-19 is just like a common cold or mild 'flu' – so what is the big deal? [No, it is not. When influenza viruses go down into the lungs, they cause an inflammatory response in the air-sacs, where gaseous exchange takes place; the inflammatory response can lead to an exudate of fluid which, if it fills up the air-sacs, can lead to lung dysfunction (Shortness of Breath: SOB; breathlessness), and serious disease or death. COVID-19 causes damage to the walls of the little blood vessels that form a basket around the air-sacs so that they cannot perform their function of taking oxygen into the blood stream and

releasing CO₂ - and this is why other parts of the body can be affected by COVID-19, because the little blood vessels in many other parts of the body can be similarly affected (leading to loss of smell, heart failure etc.) – and this damage can be permanent or long term. This is why people die or have symptoms lasting for months to years afterwards, a.k.a. 'Long COVID'].

3. Taking home remedies like ginger, garlic, betel nut, herbal treatments or some prescription drugs (like Hydroxychloroquine or Ivermectin), or "steaming" is all that is required to prevent or treat COVID-19. [Nothing wrong with home treatments, if they make you 'feel' better. But none of these treatments has any proven efficacy in scientific trials; and be careful of steaming, which can burn your airways and actually make your viral infection worse].
4. God will protect me/you, so just relax and keep praying. [This, of course, is just spiritual arrogance – we are not God's supervisors, and prayer is not giving orders or directives to God. And, Jesus gave very direct admonition to the Devil when he came to tempt Jesus that we are not to test or give orders to God – the Gospel story of Jesus being tempted in the wilderness by the Devil – go up to the highest pinnacle of the

temple and jump down, because as you are the son of God He will direct his angels to carry you down without even leading to a scratch of your feet on the stones below. Jesus dismissed Satan with the admonition that God says that no one has the right to test God; not even the Son of God.]

5. COVID-19 vaccines are not safe, because they have not been properly tested and they are causing lots more deaths than COVID-19 disease itself. [This, of course, is not true – it is true that testing and safety trials have been done with great speed, but they have been done properly and there is no truth in the rumour that the COVID-19 vaccines cause lots of serious side-effects.]
6. COVID-19 vaccines are being brought to PNG to use on us as guinea pigs, and can alter our DNA so that we can be controlled from outside and be programmed to die in 6 months to 5 years. [Vaccines do not cause coins to stick on your arm, you cannot charge your mobile phone on the vaccination site, light bulbs do not light up when applied touched to the vaccination site – in spite of the hoax videos that one can see on U tube. There is no way the vaccine can alter your DNA, and it is just 'bullshit' that people who have been vaccinated can be controlled by Bill

Gates, the Devil or anyone else, or are programmed to die at some specified time in the future by the vaccine. And there are actually some White Supremacist bloggers who are deliberately spreading rumours – ‘so that black people will believe these ridiculous rumours, not get vaccinated and, therefore, will have a higher chance of dying in the epidemic.’]

7. COVID vaccines are not effective, because vaccinated people are still getting COVID-19 infections and some are dying? [COVID-19 vaccines are not designed to completely stop infections – they actually have no way of stopping the virus of getting into your nose and mouth – but your chance of getting seriously ill (or dying) after vaccination is reduced by more than 100 fold.]
8. Vaccination can cause infertility, miscarriage, stillbirth and period problems. None of these rumours are true, and it is very much recommended by all international professional bodies that all pregnant women should get vaccinated. [This is because pregnant women are more likely to suffer fatal morbidity in late pregnancy with COVID-19 infection.]

My view is that the Government of PNG should have stomped on misinformation and conspiracy theories early on. However, this did not happen,

and the conspiracy theories spread around the whole country, so that rural people in some of the remotest parts of the country are now not willing to get vaccinated because they have been influenced by them.

The other (related) issue is that there has never been a trusted and knowledgeable health/medical ‘face’ on the Pandemic and vaccination issues who was there to give regular information bulletins and Q&A sessions on various media channels and platforms. This person must be expert in communication, be able to explain complicated medical and scientific issues in simple and understandable language and have back up from expert public relations and media operatives.

Financing of the COVID-19 epidemic, vaccination and audit-acquittals:

There has clearly been a lot of money brought into PNG to assist the government continue its routine work and to finance the additional expenses of the COVID-19 epidemic and vaccination of the PNG population.

Over the past year, there has also been a lot of talk in the community about the misuse of ‘COVID-19 money’. And indeed, the amount of money involved is huge. The COVID-19 funding situation in PNG is very complex, but it is clear where most of the K4 billion that people have been talking about derives from, and has been allocated to. Most of the money is concessional loans and grants to the Government of PNG for budgetary support to offset the financial

downturn of our economy due to the COVID-19 pandemic: these allocations have been made through the Department of Treasury. Example: 2 allocations of K520m and K865m, respectively, from the Asia Development Bank, K960m from the Government of Japan, K1.2 billion from the International Monetary Fund, K346m from the World Bank, and about K300m from DFAT (Australia). This all adds up to K4.1 billion. Much of this money will need to be paid back (albeit over a very long period of time and attracting very low interest rates.) Some is gift/grant money, like the K300m from DFAT. In addition, DFAT allocated about K220m to the Parliament of PNG, so that all MPs got K2m each, 'so that they could assist the COVID-19 epidemic response in their districts'. Everyone should consider how much of this K2m per MP has been seen to benefit the health district health services and, in particular, the district health response to stop the COVID-19 epidemic. The K4.1 billion that has gone into budget support (mostly in 2020 when we hardly had any COVID-19 in PNG), so that PNG would not suffer too much economically because of the shut downs and travel restrictions, can only be accounted for by the Departments of Treasury and Finance. The K240m that was gifted to the MPs for the COVID-19 district health response is up to the audit mechanisms of parliament to account for. The remaining K50-60 million that has come to various NGOs, UN agencies, etc. (from DFAT, UN agencies central HQs, European Union, USAID, NZ aid) are recorded

in the "UN donor tracker" mechanism – that information is available to the public.

There has been some ill feeling between some organizations which have been the recipients of some of these 'donor funds' and the Controller (Police Commissioner Mr. David Manning), who is answerable to the parliament for COVID-19 expenditures. The Controller has asked various agencies who are known to have received COVID-19 funds for an accounting of the money. Some of the UN agencies have responded that they are not bound to respond to the Controller, as they have 'diplomatic immunity', or that they only 'report to their own organization's auditors'. Other organizations have ignored the Controller's request for information about how they have used COVID-19 money.

The situation in 2023:

Over the past 12 months, there have been very few serious illnesses from COVID-19 in the national capital, and few deaths recorded at Port Moresby General Hospital. One otherwise healthy University of PNG student was found dead in his accommodation after contracting an acute respiratory illness in 2022, but as this was a community death, it was never confirmed as COVID-19.

Many health workers in the division of Obstetrics and Gynaecology at Port Moresby General Hospital tested positive, when they presented with respiratory symptoms, but as all doctors in

the division are vaccinated, these illnesses have been mild.

Although only about 20% of the eligible (over 18 years) and accessible population (who live where vaccination has been made available) have been vaccinated, many other people have been infected and developed an immune response because of community acquired infections. It is unknown how many people are being infected in the community and there is no mechanism to keep track of community acquired infections. There is also no information from the verbal autopsy project in the community to help us understand whether there continues to be an excess of respiratory deaths occurring.

Vaccination is not readily available in health facilities. At the Port Moresby General Hospital maternity division, we tried to set up a vaccine clinic at the antenatal clinic in 2022; it took over 8 months for the responsible officers in the

National Department of Health to eventually assist us in getting this vaccination centre set up.

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WAS THE IMPACT OF THE COVID-19 PANDEMIC IN AFRICA UNDERESTIMATED?

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ABSTRACT:

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, has had a profound impact on the world. At the time of writing this article, almost 760 million cases have been confirmed globally with over 6.5 million deaths recorded. Africa had lower numbers of confirmed cases and deaths as compared to other regions despite initial fears of the devastating effect that the pandemic would have on the vulnerable continent. Many theories exist to explain why this was so. However, low testing rates, amidst other factors, have raised concerns about the possible underestimation of the impact of the Covid-19 pandemic in Africa.

Keywords: Africa, COVID-19, Impact, Pandemic, Underestimated

INTRODUCTION:

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, has had a profound impact on the world. Since the first case was reported in Wuhan, China in December 2019, the virus has spread rapidly and has affected millions of people worldwide [1]. According to the World Health Organization (WHO), as of 7th March 2023, there have been a cumulative 759,408,703 confirmed cases of COVID-19, including 6,866,434 deaths reported, and

13,229,471,213 vaccine doses administered globally [2]. Over 58,000 cases were reported between the 6th and 7th of March 2023 giving an average of about 41 infections every minute globally [2].

In Africa, the first case of COVID-19 was reported in Egypt in February 2020, and since then, the virus has spread to all the countries on the continent [3]. The continent currently (March 2023) has over 9.5 million confirmed cases with the highest number of cases (288,277 confirmed

cases) reported between December 20 and 27, 2021 [2]. While many developed countries have been able to respond quickly to the pandemic with vaccine rollouts and healthcare infrastructure, the situation in Africa has been more challenging [4]. Despite early predictions that Africa would be hit hard by the pandemic due to its weak healthcare systems and high burden of communicable diseases among other things, the continent has reported lower numbers of cases and deaths compared to other regions [4]. However, there are concerns that the impact of COVID-19 on Africa may have been underestimated.

VULNERABILITY OF THE AFRICAN CONTINENT AND THE IMPACT OF COVID-19:

Africa is one of the most vulnerable continents in the world, with many countries facing significant economic, political, and social challenges. Healthcare in Africa is plagued by a plethora of challenges, which include but are not limited to lack of funds, rampant government corruption, poor infrastructure, poverty, medical brain drains, and epidemics of infectious diseases such as cholera, Ebola, and Lassa fever. In a study done to sample healthcare quality in African nations [5], various threats to good public healthcare were identified. These included a low ratio of doctors to the populace, quoted as 1 per 2,000 people in Nigeria, as well as a small contribution of GDP to healthcare which is currently about 8 percent in

Nigeria (₦1.58 trillion out of a total budget of ₦20.51 trillion) [6]. The situation is not any better in South Africa with an expenditure of about 9.1 percent of its entire budget on healthcare as of 2019, a poor doctor-to-patient ratio as well as having poorly equipped public health facilities that are overcrowded and have long waiting times. The story is similar in Kenya, Zambia, Tanzania, and Uganda with a low budget for healthcare, few doctors available for the population as well as a significant difference in the type of care offered across the countries.

The African continent has long struggled with infectious diseases including malaria, tuberculosis, and human immunodeficiency infection/acquired immune deficiency syndrome (HIV/AIDS) [7]. These diseases have already placed a significant burden on the continent's health systems and have contributed to high levels of poverty and inequality [7]. The African health system is also characterized by limited access to essential health services, medical supplies, and trained healthcare workers [4]. These factors make Africa particularly vulnerable to the impact of COVID-19. The COVID-19 pandemic further posed a significant challenge to Africa's health systems, which are already overstretched and under-resourced. In terms of infrastructure, Africa has the weakest, with an average of only 1.8 hospital beds per 1,000 people, which is

significantly lower than the global average of 2.7 beds per 1,000 people [8].

Another major factor that can increase Africa's vulnerability to COVID-19 is the low proportion of the population that has been vaccinated. The proportion of the population in Africa that has been fully vaccinated against COVID-19 is only 29.9% [9], which is significantly lower than in other regions. This low vaccination rate is due to a variety of factors, including vaccine hesitancy, limited vaccine supply, and challenges with vaccine distribution and administration. The low vaccination rate in Africa is concerning, as it increases the risk of new variants emerging and spreading, which could lead to a resurgence of the pandemic. Therefore, it is crucial that efforts are made to increase vaccine supply and distribution in Africa, and address vaccine hesitancy and misinformation.

Poverty is a big contributor to the vulnerability of Africa to COVID-19. Many people in Africa live in overcrowded conditions, making it difficult to practice social distancing and other preventive measures. A large proportion of the population relies on the informal sector for their livelihoods, making it difficult to comply with lockdown measures and other restrictions that may affect their ability to earn an income. Despite all these challenges, the situation report by the WHO on COVID-19 in the WHO African region as of 5 March 2023 showed a 61 percent decrease in

reported cases compared to what was obtainable in January and February of 2023 [10]. A total number of 47 countries in Africa are said to have been affected with a cumulative number of cases of about 8.96 million unlike 191 million, 274 million, and 760 million cases seen in the American, Europe, and South East Asia regions respectively [10]. About 175,000 deaths in Africa were documented around the same period, which is extremely low compared to about 2.94 million, 2.2 million, and 6.9 million cases reported individually in the Americas, Europe, and South East Asia [10].

Although the morbidity and mortality rates reported were low, the pandemic has had a significant impact on Africa's economies, with many countries experiencing a decline in economic activity and job losses. The pandemic has disrupted global supply chains and reduced demand for African exports, leading to a decline in trade and investment. The economic impact of the pandemic is expected to be felt for years to come, with many African countries facing the risk of debt distress. The pandemic has pushed 39 million people into extreme poverty in Africa [11]. The economic impact of the pandemic is likely to linger for a long time, and it may take years for African countries to recover.

The COVID-19 pandemic had a psychological impact on individuals and communities as well. The pandemic has led to fear, anxiety, and stress,

and has exacerbated existing mental health conditions [12]. In Africa, the pandemic has led to increased social isolation, which has affected the mental health of individuals and communities. It has led to increased stigmatization and discrimination against certain groups, such as healthcare workers, which has further worsened the psychological impacts [12].

The effect of the COVID-19 pandemic on Africa's social structures, including education, gender equality, and poverty reduction cannot be trivialized. The closure of schools has disrupted the education of millions of African children, with long-term consequences on their future prospects. Globally, about 1.5 billion children were out of school during the pandemic [13].

Mobile networks do not serve about 56 million students in sub-Saharan Africa, which was a major limitation to the use of online learning as an alternative method for learning in educational institutions further worsening the disruption in education [14].

The pandemic has worsened gender inequalities in Africa, with women being disproportionately affected by job losses and increased care responsibilities. It has also increased the risk of poverty in Africa, with many households losing their sources of income and struggling to meet their basic needs [15].

POSSIBLE LOGIC BEHIND THE LOW IMPACTS REPORTED IN AFRICA:

Generally, the vulnerability of the health system in Africa makes one wonder if the impact of COVID-19 was underestimated and under-reported. In a report that attempted to answer the puzzling question of why the obvious was not seen or reported in Africa during the pandemic, a number of points were raised. One would naturally expect the transmission and spread of COVID-19 to be favored by large populations but instead, Africa ended up with a phenomenon called the “African Paradox”. This phenomenon has been described by several theories trying to explain why the impact of the SARS-Cov-2 virus seemed to be less in African countries. Such theories include that of herd immunity and a preponderance of a young population in Africa. Experience gained during previous public health crises such as the Ebola outbreak may also have allowed African public health agencies to contain the spread of the SARS-Cov-2 virus more effectively than expected. However, there could also be another more glaring reason for why this paradox may have occurred, which is easily explained by challenges of insufficient data, low testing, poor disease surveillance system, and a generally poor healthcare system [16].

The impact of COVID-19 on Africa may have been underestimated due to the low testing rates in

many African countries compared to other countries outside the continent (Table 1). Reunion is the country with the highest testing capacity in Africa with about 1.8 million tests per million population, which is still lower than that of many

other countries across the globe like the United Arab Emirate, Bermuda, United States of America, Austria, Chile, Tonga, and Australia among others (Table 1).

Table 1: Countries with the highest and lowest testing capacities in each continent of the world

Continents (Countries)	Testing per million population	Total Test	Cases per million population	Total Cases	Death per million population	Total Death
Africa						
Reunion*	1,766,027	1,603,660	535,854	486,588	1,014	921
South Africa	441,027	26,795,090	66,961	4,068,319	1,689	102,595
Nigeria	26,339	5,708,974	1,230	266,628	15	3,155
Algeria#	5,091	230,861	5,988	271,539	152	6,881
Asia						
United Arab Emirate*	19,787,984	199,498,197	104,546	1,054,008	233	2,349
Syria#	7,553	146,269	2,968	57,478	163	3,164
Europe						
Austria*	23,302,116	211,273,524	660,293	5,986,689	2,428	22,014
Bosnia and Herzegovina#	580,036	1,884,721	123,692	401,914	5,013	16,289
North America						
Bermuda*	16,607,372	1,028,644	304,106	18,836	2,599	161
United States of America	3,493,121	1,169,515,288	315,812	105,735,659	3,435	1,150,133
Haiti#	11,337	132,422	2,928	34,202	74	860
South America						
Chile*	2,529,035	48,684,419	270,855	5,214,020	3,342	64,333
Venezuela#	114,771	3,359,014	18,869	552,233	200	5,854
Oceania						
Tonga*	4,965,327	535,009	156,029	16,812	121	13
Australia	3,024,116	78,835,048	436,750	11,385,534	746	19,459
Papua New Guinea#	26,813	249,149	5,039	46,826	72	670

Country in the continent with the *highest and # lowest testing capacity per million (Worldometer. 2023. Accessed 15/3/2023. <https://www.worldometers.info/coronavirus/>)

Since the pandemic started, 95 million COVID-19 tests had been conducted across the continent as of February 2022 [17], which is small compared to the population of over 1.3 billion people. Europe recorded the highest number of tests with more than 60 tests per thousand population while Africa had the lowest number of COVID-19 testing done

(<10 per thousand population) [18]. This suggests that many cases may be going undetected, which could lead to the further spread of the virus increasing unreported morbidity and mortality. In addition, many people in Africa treated their own illnesses by self-medicating or by visiting other non-modern healthcare institutions when

they became ill instead of seeking appropriate medical attention. This practice is due to factors relating to the weak healthcare system, cultural beliefs, and poor healthcare-seeking behavior. The practice of proper health-seeking behavior in Africa is generally poor among the population and healthcare workers are not left out of this trend with about one-third of them reporting self-medication as the first response to illness [19, 20]. The COVID-19 symptoms were similar to those of malaria and other common respiratory tract infections, which most people treated as such and recovered from; leaving aside the fact that many persons were asymptomatic and inadequately examined. Due to insufficient testing capacity and a shortage of necessary medical equipment, the full number of COVID-19 cases may still be undiscovered [21].

Initial speculation suggested that hot weather might have something to do with the lowest mortality rates on continents like Africa and Asia [22, 23]. However, Oceania and New Zealand showed the lowest mortality rates with chilly weather around June, refuting this [18]. Nonetheless, as the southern hemisphere entered winter, the virus's transmission in South Africa accelerated, but as the weather warmed up, the incidence of infections sharply decreased [24]. Researchers from the University of Maryland discovered this in a study they did, finding that the virus spreads more readily under lower

temperatures and humidity levels but less readily in other circumstances [25].

The majority of African nations' young populations undoubtedly had a role to play. While in the rest of the world, most persons who passed away were older than 80 years, in Africa, the median age is only 19 years [23]. The young population in Africa is expected to be more susceptible to a pandemic since their immune systems are less established against infectious diseases but this was not the case with COVID-19 [26]. It was also noted that elderly people were kept in nursing homes in western nations, which increased the spread of COVID-19 while elderly people in Africa typically retire to rural regions, thereby preserving social distance from urban areas where the spread would have been more pronounced [24].

The inadequate transportation infrastructure and economic situation inside the nations in Africa have also served to be a gift in disguise because people do not travel as frequently as is done in other wealthy nations [24]. The majority of cases were recorded from nations with significant economies and substantial levels of international travel. The fewest cases were recorded by the Island nations, small landmass nations, and conflict-affected nations [27]. Comparatively little international travel occurs on the African continent [28]. The Republic of South Africa is ranked 22nd internationally and has the highest rate of international travel in Africa [28]. This suggests

that persons in Africa have a reduced chance of contracting travel-related diseases like COVID-19. According to the WHO Director General, Tedros Ghebreyesus, the reason why Africa has been able to control the COVID-19 pandemic is because its countries have accumulated a great deal of expertise from fighting diseases like polio, measles, Ebola, and many others. Moreover, Cyril Ramaphosa, the president of South Africa, should be commended for the African Union's quick response [29]. Another possibility is that the majority of Africans have some degree of immunity from numerous diseases such as malaria and other viral infections, which may have strengthened their herd immunity. Another factor might be that certain African countries have developed infrastructure and established protocols to deal with infectious disease outbreaks as a result of prior experience managing infectious disease epidemics [24].

Although there were few COVID-19 cases and fatalities reported in Africa, much remains to be studied. For example, most of the reported statistics were not divided by sex to understand sex disparities. Moreover, a select few nations, such as the United Republic of Tanzania, as well as a state in Nigeria- Kogi state initially did not see COVID-19 as a problem. It would therefore be intriguing to learn how this altered the pandemic's trajectory in their local populations [27]. Kogi state, Nigeria where the Government showed little

political will for the pandemic and refused the Nigerian Centre for Disease Control from testing and carrying out other control activities reported zero cases and death from COVID-19 for a long time even at the peak of the pandemic in the country. Could this really be true? As time went on, Africa recorded the fewest instances and fatalities compared to North America, Europe, South America, and Asia [30]. Although there is not much information or research on COVID-19 in Africa, what is available may not actually provide a picture of how the disease is faring in the continent.

CONCLUSION:

There are so many theories supporting why Africa was the least affected continent by the COVID-19 pandemic in terms of morbidity and mortality. These include the preponderance of a young population, herd immunity, weather condition, and low international travel among others. Despite these, the vulnerability of the African continent could have accounted for a more serious impact than was reported. The underreporting and underestimation of these impacts could have been a result of low testing capacity, poor surveillance, poor data gathering as well as poor record-keeping. Africa needs to expand the scope of its health system, especially those dealing with emergency/epidemic response to be able to

identify, track, treat, and report cases of diseases better in future pandemics.

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GERIATRICS SERVICES IN HOSPITAL AND THE COMMUNITY DURING THE COVID-19 PANDEMIC – THE BRUNEI EXPERIENCE

Short Running Title: Brunei Geriatrics Services during pandemic

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ABSTRACT:

This paper describes the Geriatrics services in the hospital and community in Brunei and the impact of the COVID-19 pandemic. Due to the need for clinical staff to assess and manage COVID-19 cases at the national isolation centre and to assist with contact tracing, outpatient services were suspended. Patients had to be contacted regarding clinic cancellations and ensure they had adequate medications. There was an increase in phone-call consultations and virtual clinics were introduced. Home based nursing patients had the interval of routine nasogastric and indwelling urinary catheter changes extended. Data on the pandemic effects on Geriatric services including outpatient clinics, home visits, phone-call and virtual consultations, admissions to hospital and the home-based nursing case load after the pandemic are shown. After the pandemic, there is a need to strengthen measures to prevent pressure injuries and delirium, improve patient self-management of chronic conditions and manage the physical and mental health sequelae of the pandemic such as frailty and depression.

Keywords: Community health nursing, COVID-19, Geriatrics, Older people

INTRODUCTION:

Brunei is a small country in Southeast Asia with a rapid rate of ageing. In the Western Pacific Region, the developed countries such as Australia and New Zealand took at least 60 years to transition from an ageing to aged society (percentage of population aged 65 years and older to increase from 7% to 14%). For Japan, the transition took 24 years, while in Brunei, it will only take 13 years to move from an aging to aged society [1].

In 2015, a retrospective review of patients admitted under Geriatric Medicine in the main tertiary hospital in Brunei found a median age of 85 years, two-thirds of the patients with severe functional impairment with more than half being bed-bound or transfers only and more than a third with dementia [2]. There was also an increase in the prevalence of pressure injuries, with an audit of medical inpatients in 2015 showing up to 20.4% had pressure injuries [3].

These concerns highlighted the need for a consistent approach for the assessment and management of older people and services for ongoing continued care for dependent older people after discharge from hospital. For pressure injuries, a standardised tool for assessment and documentation was developed, with an integration of care from hospital to the community, and strengthening of community nursing follow-up [4]. Home-based nursing (HBN) services were originally community-based nurses mainly tasked for managing and replacing nasogastric tubes and indwelling catheters for dependent older people. They were upskilled to assess and manage wounds, as well as comprehensive geriatric assessment, which includes screening for common geriatric conditions, such as malnutrition, delirium and falls [5]. An evaluation of patients' and families' feedback with HBN services in Brunei in 2019 showed a high satisfaction rate with these community nursing services provided [6].

COVID-19 pandemic in Brunei:

The first COVID-19 case in Brunei was reported on 9 March 2020. The measures implemented for a zero-COVID strategy contained the community spread, with the last case from this first wave reported on 6 May 2020. There were 457 days without community cases of COVID-19 in Brunei until 7 August 2021 when the second wave started in Brunei due to the Delta strain of SARS-CoV-2. Despite best efforts to contain these infections again, this became less

likely as the new variants were more infectious and transmissible, thus the strategy was changed towards living with COVID-19 [7].

Public health measures included movement restriction orders and quarantine measures, using a national mobile health application for contact tracing and symptom reporting and improving vaccination uptake [8]. Antigen-rapid tests (ARTs) are preferentially used for earlier detection of COVID-19 infections rather than the gold standard of SARS-COV-2 detection of polymerase chain reaction (PCR) tests [9]. There is a current move to reduce community restrictions, entrusting the public to take more responsibility for their health and self-isolate if they have symptoms of influenza-like illnesses and transition towards a 'new normal' way of living.

Geriatric Medicine Services before and during the pandemic:

Before the pandemic:

Geriatric Medicine specialty services are mainly provided in the Raja Isteri Pengiran Anak Saleha (RIPAS) hospital, the main tertiary hospital in Brunei. Patients are admitted under Geriatric Medicine from Internal Medicine acute admissions, elective admissions or transfer of care from other specialties. The Ortho-geriatrics service provides twice weekly consultations for hip fracture patients admitted under Orthopaedics. Weekly multidisciplinary case conferences with allied health professionals are

held to discuss progress and discharge planning. Outpatient Geriatrics clinics review referrals for Geriatric conditions, such as cognitive impairment, falls, multimorbidity, frailty, and for post-discharge follow-up. The Geriatrics team also oversees patients under HBN, with weekly case conferences and contacted by nurses as required if there are any queries or concerns with the patients.

During the pandemic:

For Geriatrics services, the inevitability of the pandemic affecting Brunei led to initially bringing forward urgent referrals with a slight increase in clinic appointments in February 2020. When the first COVID-19 wave hit Brunei in March 2020, clinical staff (including doctors, nurses and allied health professionals) were pulled from all services to assess and manage COVID-19 cases in the national isolation centre and to assist with contact tracing.

Outpatient services were suspended to provide staffing for these acute and COVID-19 related services. Staff who were primary contacts with people positive for SARS-CoV-2 infections had to self-isolate as well.

The remaining clinical staff contacted patients to inform regarding clinic cancellations and

ensured the patients had sufficient medications prescribed online using the national electronic health records, Brunei Health Information Management System (Bru-HIMS). There was an increase in phone-call consultations provided by Geriatric Medicine doctors for patients under Geriatric Medicine, focusing on patients who were due follow-up and were at risk of admission to hospital based on their comorbidities. Patients were also able to contact the team via the Geriatrics Helpline. A list of routine questions for the common medical conditions was drafted to ensure available doctors and nurses could obtain the relevant clinical information and facilitate self-management (see Appendix).

The number of patients seen in clinic and nursing home visits fluctuated depending on staffing levels which were affected by the pandemic. The outpatient clinic capacity has returned to the pre-pandemic numbers towards the end of 2022. Virtual consultations using the zoom platform started during the second wave, with an ongoing need for this service for dependent older people during the endemic phase.

The pandemic effects on Geriatrics outpatient and community services are shown in Figure 1.

Figure 1: Pandemic effects on Geriatrics services: Clinic, Home Visits, Phone Calls and Virtual Consultations.

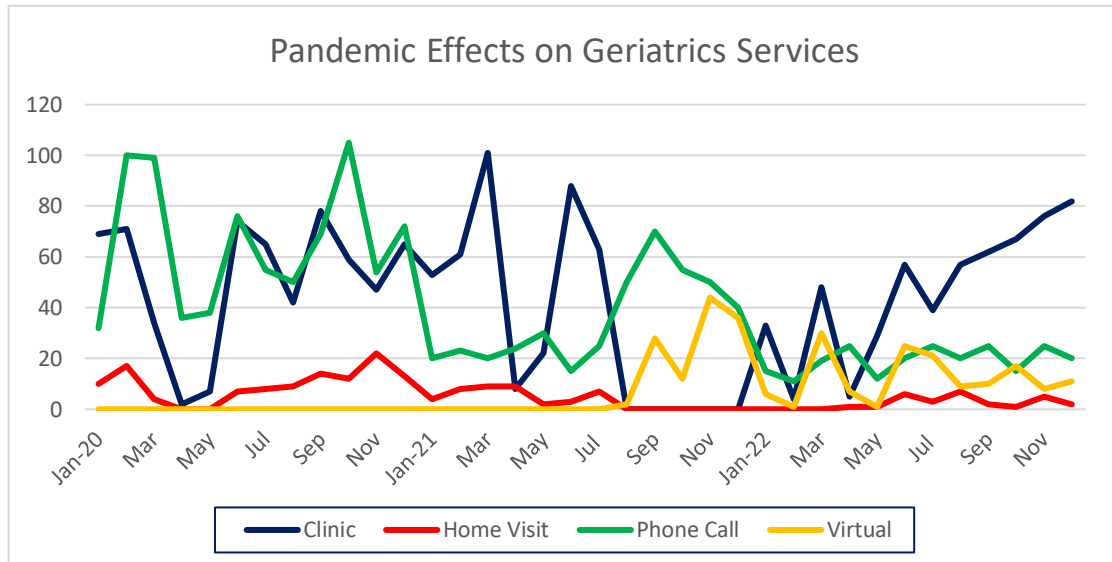


Figure 2: Admissions for Geriatrics and Palliative Services in RIPAS Hospital

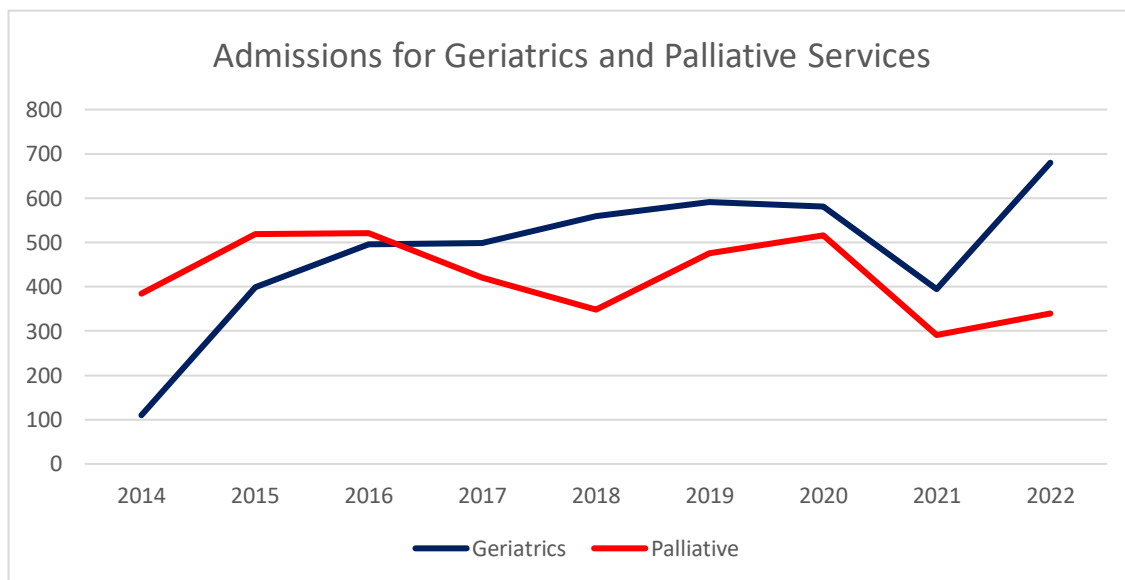


Figure 2 shows the admissions for Geriatrics and Palliative Services from 2014 to 2022. During the first wave in 2020, the Geriatrics and Palliative admissions and inpatient consultations remained unchanged despite significantly reduced staffing. During the second wave in August 2021, there was a temporary move to ward-based teams rather than specialty-based teams for the Internal Medicine department. This is reflected in the significant decrease in admission rates for both specialties that year. Geriatrics consultations for the ward-based teams were provided, but this was not captured in routinely collected statistics.

From 2022, there was a continuation in the general trend towards an increasing number of Geriatrics admissions annually over time. The palliative service generally would have between 400 to 500 admissions annually; the decrease in admissions under the service in 2018 was due to the temporary unavailability of a Palliative Consultant. The regular Orthogeriatric Liaison Service was suspended since the first wave in 2020, requiring hip fractures to be referred by the Orthopaedics team before the patients were seen by the Geriatrics team; this was subsequently reimplemented in January 2023.

Home Based Nursing (HBN):

During the first wave of COVID-19 in Brunei, the home-based nurses had inadequate access to

appropriate personal protective equipment (PPE) and mask fitting sessions to ensure they were adequately protected when using N95 (FFP2) masks. A protocol requiring patients and family members to have negative antigen rapid tests (ARTs) results before the home visit was developed. Patients were previously recommended a change of indwelling catheters and nasogastric tubes every four weeks. However, due to reduced staffing, home visits for routine reviews or general checks were deferred with tube change intervals being extended to six weeks. Patients who contacted HBN for issues with their tracheostomy or PEG tubes were required to directly contact the relevant specialty nurses based in the tertiary hospital to reduce unnecessary contact.

A review of the status of HBN patients was carried out in December 2022. There were 123 male patients (Median age 66 years, range 4 to 94 years) and 131 female patients (Median age 77 years, range 30 to 100 years). Generally, HBN services are provided for adults but referrals for paediatric patients may have occurred out of necessity to provide services to community paediatric patients. The age distribution and interventions required by HBN services are shown in Figures 3 and 4 respectively.

Figure 3: Age of patients receiving HBN services

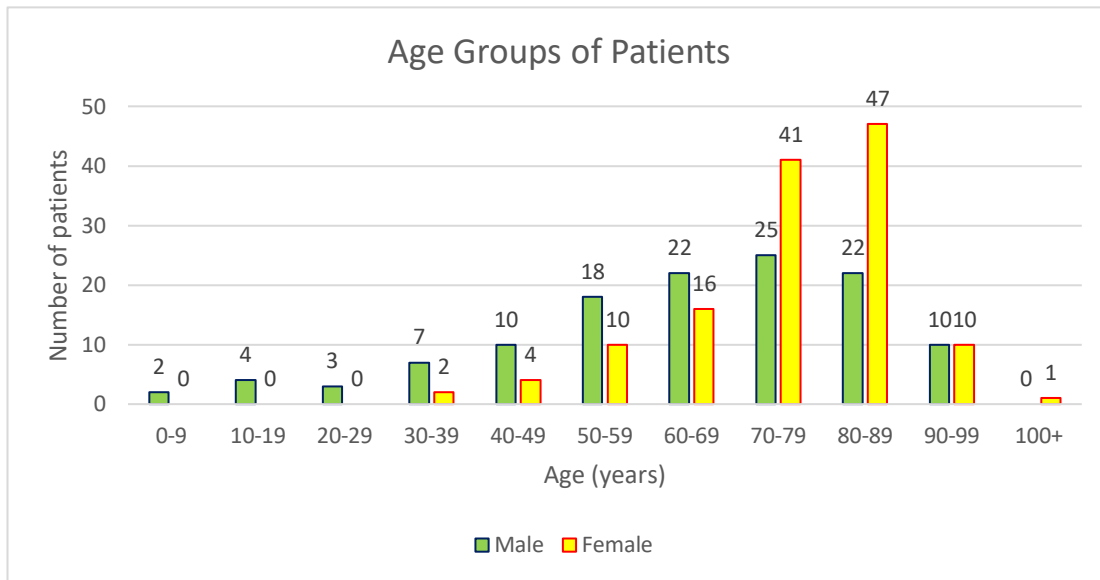
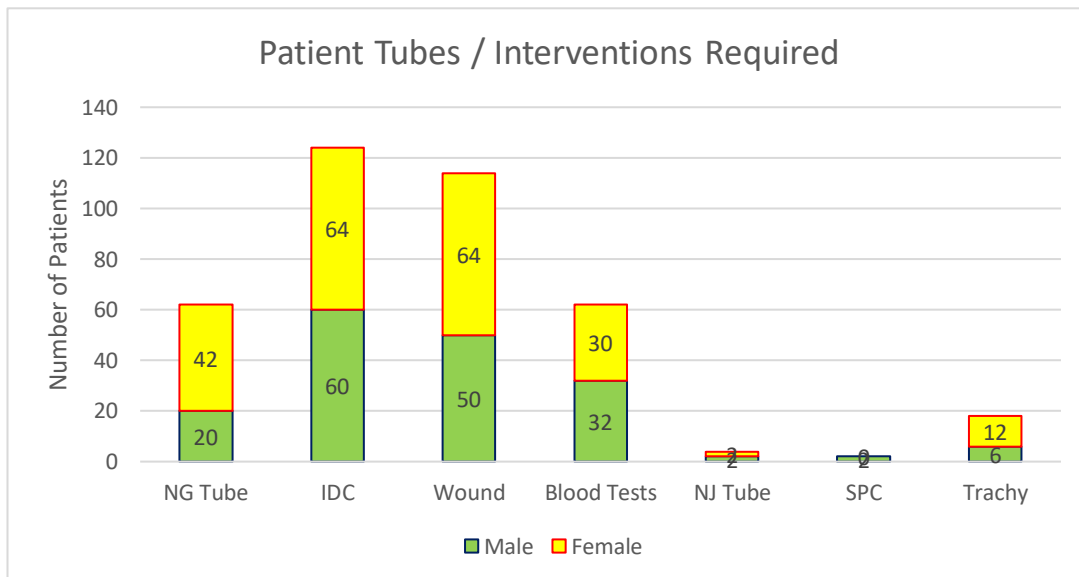


Figure 4: Interventions provided by HBN services



Lessons learnt regarding managing Geriatrics patients during the pandemic:

When COVID-19 movement restrictions were implemented, there was an associated reduction in cares provided for fully dependent patients. There was an observed increase in pressure injuries, including multiple Stage 4 sacral pressure injuries complicated by osteomyelitis admitted to hospital shortly after the first COVID-19 wave in Brunei [10,11]. The inpatients had to be isolated on admission to ensure they did not have SARS-CoV-2 infections before being transferred to general medical wards. There was also an observed increase in delirium for older patients during the admission [11]. During the endemic phase, there is a need to strengthen measures to prevent pressure injuries and delirium through educational sessions and quality improvement projects [12, 13].

Telemedicine or virtual consultations were introduced out of necessity during the second wave of the COVID-19 pandemic in Brunei. Although there was initial hesitation by doctors, patients and family members regarding this medium, there is now general acceptance of seeing a doctor virtually, with ongoing requests by patients and family members for virtual consultations during the endemic phase [14].

There was a move towards using each clinical interaction for education to ensure self-management of chronic diseases by patients

and their family members. This included checking whether they were able to check their blood pressure, glucose for those with diabetes, inhaler use for those with lung diseases, weights for those with cardiac failure. It was also important to emphasise the compliance with medications. For those with advanced diseases such as dementia, there was an opportunity to carry out advanced care planning, particularly the relevant question of 'Would they want to come into hospital if they were unwell with COVID-19 infections?' [15]. Given that older people are vulnerable to complications and adverse outcomes from COVID-19 infections, these clinical encounters were also an opportunity to counsel patients regarding the benefits of vaccination and ensure they are updated with their COVID-19 vaccine doses [16].

Finally, it was also observed that there was a general deterioration in cognition and functional status among older people seen in clinic and hospitals [17]. Older people should be screened for physical and mental health sequelae such as frailty and depression. Proactive rehabilitation and referral for allied health professional input to ameliorate these effects from the pandemic should be considered [18].

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Appendix: List of relevant questions for common medical conditions during phone consultations

Common conditions	Questions
Chronic heart failure	<ol style="list-style-type: none"> 1. Any chest pain? If yes, duration and characteristics. 2. Any symptoms of cardiac failure? Breathlessness (at rest and on exertion), waking up at night breathless (Paroxysmal nocturnal dyspnoea), number of pillows are used at night (Orthopnoea), leg swelling 3. How much water or fluid intake daily? 4. Do you weigh yourself at home? (compare with previous weight) 5. Do you check your blood pressure? What are the usual readings?
Asthma/COPD	<ol style="list-style-type: none"> 1. Any breathlessness (at rest and on exertion)? 2. Associated symptoms: Phlegm colour / volume, fever, sick contacts, exposures (dust, smoke) 3. Types of inhalers and whether a spacer is used 4. Frequency of salbutamol inhaler use 5. Are the inhalers (preventers) taken daily? (Compliance) 6. How often do you require the salbutamol inhaler?
Diabetes	<ol style="list-style-type: none"> 1. Any symptoms of hyperglycaemia – urinary frequency, thirst? 2. Any symptoms of hypoglycemia- sweating, dizziness, hungry, tired/sleepy? Frequency (in a week / month)? 3. Do you check your sugar levels at home? Frequency? What are the highest and lowest values?
Osteoarthritis	<ol style="list-style-type: none"> 1. Any joint pain? Location, characteristics 2. Analgesia required – type, amount 3. Is it affecting mobility or activities of daily living e.g. dressing?
Falls	<ol style="list-style-type: none"> 1. Any recent falls? <ul style="list-style-type: none"> • When and where? • How many falls this year? • Circumstances around fall? • Witnessed or unwitnessed? 2. Any symptoms prior to fall? Limb weakness/headache/dizziness/chest pain/breathlessness/palpitations/tinnitus <ul style="list-style-type: none"> • Any loss of consciousness? Duration. Any seizure like symptoms? 3. Any injuries sustained from fall? Did you seek medical attention?
Dementia (Questions for family members)	<ol style="list-style-type: none"> 1. How is their memory? Compared to the last appointment, is it better, the same or worsening? 2. Any other symptoms? (Repetitive speech, change in behaviour or personality, easily upset or anxious, disorientation to place and time) 3. Any impact on activities of daily living? (including praying) 4. Safety: Cooking, Driving, Finances, Medications, Wandering
General Questions	<ol style="list-style-type: none"> 1. Appetite and weight changes? 2. Bowel and bladder function? 3. Any sleep difficulties? 4. Any concerns regarding cognition and mobility? 5. Compliance to medications: taken daily, how often missed per week? 6. COVID-19 vaccination status

ENHANCING THE EFFECTIVENESS OF SURVEILLANCE SYSTEMS IN PACIFIC ISLAND COUNTRIES AS EARLY WARNING SYSTEMS FOR DETECTING AND RESPONDING TO COVID-19 OUTBREAKS: KEY STRATEGIES AND RECOMMENDATIONS.

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ABSTRACT:

The coronavirus disease 2019 (COVID-19) pandemic has uncovered the need for health systems to be strengthened in order to be able to respond quickly to any potential future outbreaks. In response, the Pacific Syndromic Surveillance System (PSSS) is currently being used by many countries within the Pacific Islands for tracking and addressing infectious disease outbreaks, including COVID-19. To maximise its usefulness as an early warning system, investments must be made in strengthening data quality, data sharing, health facility capacity, technology, and ongoing evaluation of surveillance systems. Doing so will ensure that the PSSS and other surveillance systems can remain effective tools for monitoring and respond to infectious disease outbreaks in the Pacific Islands.

Keywords: COVID-19, Coronavirus disease 2019, Syndromic Surveillance, Early warning system.

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INTRODUCTION:

The coronavirus disease 2019 (COVID-19) pandemic has revealed the need to reinforce health systems worldwide so that they can respond more quickly to outbreaks of diseases. Meckawy et al. [1] conducted a systematic review of syndromic surveillance early warning systems (EWS) and ascertained that the most successful implementations require extensive assets to be effective, which most high-income countries can afford. However, Pacific Island countries, which often have limited resources and distinctive difficulties, have adopted the Pacific Syndromic

Surveillance System (PSSS) as a viable way to detect COVID-19 outbreaks [2]. The PSSS is affordable, but its effectiveness has been limited by poor data quality, unreliable information technology support and a lack of analytical skills among users [2].

Strategies to improve data quality, data sharing, health facility capacity, technology, and evaluation will enhance the effectiveness of syndromic surveillance systems [1, 3]. Furthermore, appropriate technology can create a more streamlined approach to capturing and analysing data. Finally, evaluation of the systems and the

data collected should be regularly conducted to ensure the systems function correctly and achieve the desired outcomes. This article will provide an overview of how the effectiveness of syndromic surveillance systems used in Pacific Island countries can be improved by investing in the mentioned factors.

Improving data quality:

A key challenge in developing effective syndromic surveillance systems is ensuring high-quality data. Data quality is critical to enable syndromic surveillance systems to generate accurate and reliable information, which can inform public health actions [4]. Pacific Island countries' health authorities must review, revise and update data collection and reporting guidelines. The guidelines must be easy to follow, even in rural and remote health facilities.

Data standardisation and comparison can help reduce the obstacles associated with data sharing, such as varying formats and terminology. By implementing clear guidelines, identifying data sources and conducting effective analyses will become easier [5]. For example, outpatient visits and emergency department encounters can be utilised to identify and prevent the spread of COVID-19 [6]. Furthermore, standardising data collection and analysis will improve data comparison between health facilities and health provider agencies. This will provide a better

understanding of the situation and help to create more informed public health policies.

Health authorities must undertake regular in-service programs to train health workers to ensure high-quality data. The programs should cover various topics, such as syndrome definitions, collection protocols, quality assessment, quality assurance processes, and reporting formats [7]. These courses are essential for health professionals to possess the necessary skills and knowledge to assess and record health information accurately. This will guarantee the highest quality of data to inform public health actions.

Enhancing data sharing:

Data sharing is critical to enhancing the effectiveness of syndromic surveillance systems to serve as EWS. Without adequate information being shared between health facilities and agencies, these systems may not be able to understand the health situation comprehensively and respond promptly. Strategies to improve data sharing include developing protocols for data exchange and incentives for health facilities and agencies to share data quickly and reliably [8]. Doing so will allow for the broadest possible range of data to be captured, providing health authorities with a more accurate picture of the health situation in the country.

Data sharing among Pacific Island countries is often hampered by several obstacles, ranging from technical issues like incompatible information systems to more complex issues such as data ownership, confidentiality and privacy [4, 7]. Health authorities should work with other government sectors and industry partners to promote and facilitate data sharing to build better health system architecture and address these barriers. By doing so, data sharing will become more efficient and beneficial to all countries involved, allowing them to access and use crucial health-related information more easily.

Establishing a centralised database offers an effective way to improve data sharing. This database should be able to collect and store information from different sources like health institutions, clinics, and laboratories [9]. By having an integrated health information system, communication of syndromic surveillance data between health facilities and agencies can be made more efficient, thus allowing for a quicker response to detect and manage infectious disease outbreaks [9]. Such a system can also aid in better management of health resources and improve healthcare quality.

Strengthening the capacity of health facilities:

Health facilities are an integral part of syndromic surveillance systems. They collect, report, and analyse data, helping to ensure the effectiveness

of these surveillance systems. Strengthening the capacities of health facilities is a vital step in improving the efficacy of syndromic surveillance [10]. This can be done through improved training, access to resources, and implementing technology that helps streamline data collection and reporting [10, 11]. By doing so, syndromic surveillance systems can become more effective, providing greater protection for populations and improving public health outcomes.

To increase the effectiveness of health centres, health departments must offer assistance and instruction to their staff on how to collect and report data accurately. Educating their personnel on the significance of data accuracy and the influence the data gathered has on public health policy is of paramount importance [11]. Furthermore, health departments must provide resources such as electronic data capture tools and data management software to simplify the process of data collection and reporting [11]. Doing so will ensure that the data used by health authorities is accurate and current.

Syndromic surveillance is a critical component of disease monitoring and response, and healthcare providers must be equipped to take full advantage of it. Health facilities should be supported in integrating syndromic surveillance into everyday activities. By integrating syndromic surveillance data collection and reporting into existing health information systems, health authorities can help

ensure that health facility staffs know the importance of this type of surveillance and have the necessary tools to participate in the system.

Investing in technology:

Health authorities should invest in suitable technology to quickly detect and respond to outbreaks. Automated tools such as electronic health records, mobile applications, and data visualisation tools can help streamline data collection and analysis [10, 11]. This would provide health authorities with real-time information and the ability to respond swiftly to contain the spread of diseases. Such technology would also offer convenience and accuracy for health authorities and their staff, as data collection and analysis can be conducted quickly and accurately. This would help reduce the impact of disease outbreaks and keep communities safe.

Mobile applications were trialed in Papua New Guinea (PNG), but these systems were not adopted into the national health information system [10]. Such initiatives need re-visiting. Other examples include data visualisation tools that incorporate geographical information systems which can identify the geographical location of potential health threats [12]. Additionally, electronic health records can be used to track patient data, which can further assist in identifying patterns of illness and alerting authorities and health professionals to potential outbreaks [13].

Conducting regular evaluations:

To ensure the efficacy of syndromic surveillance systems, health authorities must regularly evaluate them. Evaluations should assess the system's ability to detect and respond to outbreaks and identify improvement areas. Through such evaluations, health authorities can identify gaps in the surveillance systems and work to close them [11]. They can also measure the impact of interventions and identify potential areas for further improvement. By conducting regular evaluations, health authorities can ensure that the syndromic surveillance systems are practical and efficient.

CONCLUSION:

The success of Pacific Island nations in identifying and responding to COVID-19 outbreaks rests on the effectiveness of their surveillance systems. Health authorities must prioritise data quality, data sharing, capacity building, technological investments, and regular evaluations to ensure the efficient detection and management of outbreaks. These strategies are vital for ensuring Pacific Island communities' health and well-being and strengthening health systems to contain COVID-19.

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SITUATION ANALYSIS OF COVID-19 ON DOMESTIC VIOLENCE IN FIJI

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ABSTRACT:

COVID-19, a highly contagious and deadly virus rapidly swept across the world from the year 2019 to 2020 killing more than two million people. Due to the magnitude of affect the virus was having, governments were forced into taking measures that required isolation of the infected from the unaffected, as mitigation to halt the spread. This brought about the “COVID-19 Lockdown”. Though the Pacific Island Countries (PICs) were with one of the least numbers of COVID-19 cases, similar measures were implemented as measure to prevent the virus from entering the countries. Like other countries, PICs like Fiji had a lockdown and this affected the lifestyles of the people. Amidst the lockdown, there was a rise in domestic violence cases. The literature review was done using databases; Medline, ProQuest, Embase, and Scopus. The research was done by using the relevant keywords in the field of COVID-19 which was aimed specifically on domestic violence during the pandemic. Moreover, local, and international publications, like media reports and published reports were also used. Upon carrying out this research it could be stated that there was a rise in the number of domestic violence cases in the wake of the COVID-19 pandemic lockdown. The literature review was aimed at identifying the consequences of COVID-19 and why it triggered a spike in domestic violence cases. The study concluded that the psychological impacts, and socio-economic state created as the result of the lockdown was the main contributing factor which gives rise to substance abuse, depression, which collectively lead to violence.

Keywords: COVID-19, Lockdown, Domestic Violence, Impacts, Causes, Fiji, Pacific

INTRODUCTION:

In January 2020, Severe Acute Respiratory Syndrome (SARS)-Cov-2, Coronavirus was announced by the Chinese Centre for Disease Control and Prevention (CCDCP), as the causative agent/pathogen for a number of novel

pneumonia cases in Wuhan, Hubei Province. Later the World Health Organization (WHO) named it Coronavirus disease of the year 2019 (COVID-19) [1]. In a few months COVID-19 had rapidly spread worldwide and on March 11 of the year 2020, WHO declared the disease as a

controllable pandemic disease [2-3]. COVID-19 has rapidly become one of the leading causes of death by an infectious disease. Current rates of the prevalence for the diseases stand higher than diseases like diabetes and other non-infectious/ Non-Communicable Diseases (NCDs).

There have been 759,408,703 confirmed cases of COVID-19, including 6,866,434 deaths, reported to WHO as of February 27th, 2023[4]. Indicative figures of the death rate compared to the number infected by the virus, it is evident that COVID-19 has a low mortality rate, during late 2020, the emergence of variants that posed an increased risk to global public health prompted the characterization of specific Variants of Interest (VOIs) and Variants of Concern (VOCs), in order to prioritize global monitoring and research, and ultimately to inform the ongoing response to the COVID-19 pandemic [5]. The virus is primarily spread through human-to-human contact and airborne droplets has forced the governments around the globe to introduce measures such as limiting contact between people, banning social gatherings, shutting down or reducing non-essential services, and quarantine. These measures are in place as a mitigation to slow down and potentially halt the spread of the virus [6]. The measure taken proved to be effective at controlling the virus but this at the same time has tremendously affected the livelihood of people [7].

According to given statistical data provided by the United Nations, it said that one in three women experience Intimate Partner Violence (IPV). The impact of domestic violence on the females affects their performance in both the work environments and personal settings. Moreover, IPV impacts the victim's mental health, earnings, and child health. According to United Nations Population Fund (UNPF), one of most prevalent human rights violations around the world is violence against women and girls [7]. Violence based on gender, or Gender-Based Violence (GBV) is one of the most silenced issues, mainly for cultural reasons. GBV can result in health consequences including severe injuries resulting in disabilities as well as mental health issues such as depression, suicide, reproductive health and also usher unwanted or forced pregnancy, which in turn may lead to unsafe abortion practices, mainly in regions that do not legalize abortions [8]. The causes of domestic violence vary, but one of the most prominent causes of domestic violence is due to the psychological state of the assailant. Mental health conditions, stress, economic and political conditions are mainly the reasons given by the assailants in their defense [9].

The lockdowns imposed since 2020 have forced the people of all backgrounds to be confined in their residences (except medical workers). Consequently, to keep the pandemic at bay, measures that limit population mobility and within-

population contact rates should be considered in affected areas. These include school closures, bans of gatherings, work-from-home covenants, and the most draconian measure, curfews, and total system shut-downs. This concept is also known as "flattening the curve", which involves decreasing and delaying an epidemic's peak to avoid overstressing the capacity of healthcare systems [10]. While the combination of risk area travel bans, school closures, bans of gatherings, and border closure leads to a decrease in the growth rate by 10.3 percentage points, the combination of all individual measures (including a national curfew) reduces the growth rate of confirmed COVID-19 cases by 16.4 percentage points [7]. The lockdown successfully slowed the virus but at the same time slowed down the economic growth internationally as developing countries were most affected, and a significant number of the population had lost their jobs and were forced into isolation. This in turn triggered a decline in the mental health conditions/psychology of many people that were affected by the lockdown, mainly due to the effect the lockdown had on the financial aspects of their lives mainly in developing countries [10]. This was also seen in several families in South Africa have been impacted financially due to the closure of business which led to the temporary/ permanent unemployment of some breadwinners in the families. This also has had a cascading impact on

the food security of families and their ability to afford other basic necessities. Distress as a result of financial challenges or failure to provide for the family alongside spending much time locked down together as a family has also led to violence in the family. This was further exacerbated by the fact that the victims were stuck with the abusers, and some could not report or find help due to the restricted movements [8].

The Pacific region is a region that is dotted with a number of developing countries. The Pacific, being one the most visited regions in the globe due to its tourism, weighed a risk for the virus to enter the Pacific Island Countries (PICs). In order to avoid COVID-19 becoming a health crisis, measures were adopted to help mitigate this risk. Border lockdowns and movement of people in the country were reduced, which in turn severely affected international trade, tourism, and remittance [11].

Fiji is one of the developing countries located in the South Pacific that went under a period of total lockdown during the peak of the global pandemic. Fiji recorded its first COVID-19 case on the 19th of March 2020, and border restrictions and self-quarantine measures were implemented [12]. On the 5th of June Fiji was declared COVID free after clearing the last COVID-19 patient [13]. Just as Fiji's economy started to pick up from 2020's hardships, the nation was yet again plunged into another round of lockdowns. On 17 April 2021,

the Fijian Government announced a resurgence of COVID-19 positive cases in the country. Although Fiji had previously been able to contain the first COVID-19 outbreak in the year 2020, the 2nd wave has been more rampant with severe ramifications to our nation and the economy. In the year 2021, parts of the nation remain under containment (restricted movement within zones), businesses are trying to reopen under stringent new COVID-19 protocols and Fiji's citizens were under revised curfew hours [35]. Thus, this review of literature aims at exploring the reason as to how the COVID-19 crisis had an effect on the rate of domestic violence cases on the Fiji at that period, and what factors were brought about by the lockdown that caused such an issue.

METHODOLOGY:

This review of literature aimed at the particulars of COVID-19, mainly in relation to the lockdown brought about by the pandemic. It focused on how the COVID-19 pandemic lockdown affected the prevalence of domestic violence cases in Fiji, with comparisons, and conclusions drawn from international reports and publications. Four databases were used to search for the relevant publications pertaining to the topic of COVID-19 Lockdown and Domestic Violence including Medline, Scopus, Embase, and ProQuest. The keywords used were (Factors OR determinants OR consequence) AND (COVID-19, OR

Coronavirus) AND (“Domestic Violence” OR “Gender Based Violence”, OR “Intimate Partner Violence”), AND (“Fiji” OR “Globe”). Local media publications were also used.

RESULTS:

Three themes were identified that escalated during the COVID-19 lockdown, and in turn affected the rate of domestic violence cases in Fiji. The themes are Unemployment and Domestic Violence, Alcohol during Lockdown, Sexual Abuse and Marital Rape.

Theme 1: Unemployment and domestic violence: During the time of the global pandemic, millions of people around the world were put into lockdown as a measure to mitigate the spread of the virus by limiting social interaction/ practice of social distancing [10]. Given the COVID-19 crisis, most tourism businesses are pessimistic (62 percent) about the future of their business. This is likely due to the pandemic's early impact on the tourism industry and the effects of international travel restrictions. Most non-tourism businesses (77 percent) are either optimistic or uncertain about the survival of their business [6]. According to CNN Business, New York, it is estimated that about 60% of the businesses that were closed due to the COVID lockdown may never open again [19]. Such a crisis ushered in a sudden increase in the amount of unemployment in the globe [19].

The widespread loss of jobs resulted in a widespread loss of income which had severe impact on the lives of people, mainly low-income earning families [19].

A surge in domestic violence coincided with the rise of unemployment around the globe. There was a substantial increase in domestic violence worldwide and the United Nations dubbed it a “Shadow Pandemic” alongside the COVID-19 pandemic [18]. Unemployment in a family creates various emotional mechanisms in the minds of individuals (psychological impact) due to loss of income [19].

Being a country that earns heavily out of tourism, Fiji relied greatly on a business sector that dealt with massive social interaction. The COVID-19 Lockdown affected the tourism sector and many workers had to be sent home [6]. This in turn affected the household incomes of many Fijian families. Being a developing country Fiji has a significantly high population living below the poverty line i.e. earning an income that is less than 15,000 per year [36]. Families were put in tremendous financial strain, and as a measure to ensure survival, the Fiji National Provident Fund began issuing assistance to people going through unemployment [37]. This chain of events had a negative impact on the mental states of the people.

In a cultural societal setting where the male is seen as the dominant force, loss of job in male

population impacts the “dignity” of the male in the family. This can be termed a type of ‘male backlash’. This is due to the change in the earnings of a man in such gender stereotypical settings. Moreover, due to the more time partners would spend time together, there is more exposure for conflicts arising from petty disagreements (which would also be fueled with stress), and more room for violent sexual demands and interactions that in turn may result in marital rape [38].

Fiji is a country that is modernizing, however there is still a significant preservation of culture. Households where the males are seen as the leader of the family is not an uncommon sight. Settings of significant domestic violent incidents are in such households. Even in households with both working individuals, males losing their job results in more controversy [43]. This in scenario where the male dominant in the house tries to control the income of the female/ or the other half. Such scenarios may lead to disagreement and conflict which gives way for violent retaliation as means to withhold “authority” in a family [39].

Theme 2: Alcohol and violence during Crisis:

The lockdown brought about severe economic impact on the businesses around the world [40]. One of the most affected sectors was the alcohol market. Alcohol is a commodity that heavily depends on other businesses, particularly

businesses that deal with “socializing”. With a ban on social gatherings, the major buyers of liquor were affected [20]. Bars, restaurants, night clubs, and hotels were closed during the lockdown, thus affecting the liquor industry. With the demand for alcohol experiencing a sudden decrease, the price for alcohol decreased with it [29]. The decrease in the price of alcohol was targeted for the tourism sector, however the general public had taken advantage of it [41]. In an interview with local media, the coordinator of Fiji Women’s Crisis Centre, Shamima Ali, expressed concerns on the drop of alcohol prices. Ms. Ali stated that during the COVID-19 restrictions, there has been conflicts between partners over their alcohol spending. She stated that the drop would only aggravate the situation [21].

Alcohol has long been used as an escape from stress. It is a widely accepted social practice in society for people to consume alcohol as a means to relieve stress and anxiety. This is due to the way alcohol affects the body. Alcohol dampens / reduces the physiological stress response of the body [22]. With the global pandemic, and the economic decline, stress and anxiety has increased among people, especially among low-income earners [42]. The decrease in the price of alcohol in a way encouraged the buying of alcohol to be used as an escape from the situation [21]. Besides the drop in the prices of alcohol,

according to the WHO Global Status Report on Alcohol, data collected from National Nutrition Survey 2011, show that consumption of alcoholic home brew is very common and widespread in Fiji [26]. This in turn raises concern as home brews usually contain an unmonitored level of alcohol which is mostly three times the commercially produced alcohol content [26]. According to the World Health Organization (WHO), alcohol has a strong link with the occurrence of intimate partner violence [23]. Studies in the United States of America and England show that 55% and 32% of victims of intimate partner violence respectively, believe their partner were under the influence of alcohol respectively.

The consumption of alcohol can have a direct link with two major factors: low socio-economic status, and impulsive personality [23].

Theme 3: Intimate partner violence and gender-based violence:

According to the United Nations Population Fund, there was an estimate that the COVID-19 pandemic had the potential to cause an additional 15 million new cases of Gender Based Violence cases worldwide with each additional 3 months of lockdown [30][7]. This derived from the 20% increase in domestic violence during the lockdown [30]. The factors that arise during the lockdown can be split into three reasons; The elements or situations trigger the perpetrators, limited support

to keep violence at bay, and the increase in the time spent (exposure to perpetrators) [25].

The triggers for perpetrators to succumb to violence are mainly to do with psychological and economic factors brought about by the lockdown [30]. The two main triggers for perpetrators during the lockdown is stress from the COVID-19 crisis, and the increased consumption of alcohol. The global pandemic has shaken the world economy including that of Fiji, which heavily relied on the tourism sector. According to the Fiji COVID-19 Business Survey 2020, the earnings from tourism sector has decreased by a staggering 59 % during the COVID-19 lockdown [31]. This in turn has given a sudden rise in unemployment which has put a strain on the family's socio-economic statuses, especially those in poverty. This factor has increased the stress in the population that directly and indirectly affects the surge in domestic violence figures. Stress is one of the leading motivators for sexual abuse this is further exacerbated by the patriarchal culture and gender norms inherent in the Fijian societies [43].

With the implementing of the lockdown, the access to the support services for the vulnerable population was reduced, and to none in remote parts of Fiji. Moreover, with authorities designated more to avoiding the spread of the virus, there was more room for the occurrence of violence [43].

Furthermore, the stigma associated with reporting sexual abuse cases influences a limitation, as cultural constraints created by aristocratic societies limiting women and girls to report cases dealing with sexual abuse and marital rape. This also goes for gender-based violence where homosexuals and bisexuals are being stereotyped and abused in settings with little to no service to support them [39]. Additionally, children were more exposed to being caught in the violence during the lockdown. This being due to the schools being closed. Children at home get victimized by impending conflict between parents [38].

The Fiji Women's Crisis Centre (FWCC), the organization's that looks into the cases of domestic violence in Fiji, saw a 300% increase in the cases of domestic violence during the COVID-19 period [45].

The following is data from the Fiji Women's Crisis Centre on the total number of reported domestic violence cases or cases related to domestic abuse for the years of 2019 and 2020, this data goes on to show that due to the COVID-19 lockdown measures many women and children were not able to register their cases with the police due to no movement which inhibited them seeking help from friends and families thus the end result was silent suffering [45].

YEAR	CASES
2019	833 cases
2020	718 cases

Source: FWCC

Number of calls per month 2020

Month	Calls
February	87
March	187
April	527

Source: FWCC

The generalized data given above shows the total cases for the respective years, however as per the FWCC, the months of March 2020, and April 2020 saw a stark increase in the number of calls recorded in their toll free helpline which is indicative of the fact that there were many issues of domestic violence but due to fear of the outbreak and lockdown measures the help seeking behavior part was missing [45].

CONCLUSION:

The COVID-19 pandemic has affected the rate of domestic violence cases. COVID-19 lockdown

has brought about a shadow crisis along with the pandemic crisis that is in the form of domestic violence. Upon the reviewing of published literature, it can be concluded that the COVID-19 lockdown brought about significant factors in livelihoods of families that contributed to an increase in the number of domestic violence cases. One of the major factors brought about by the lockdown was the unemployment situation. Unemployment has tremendously affected the family income which has led to stress. The events have also led to an increase in substance abuse which also in turn contributes to violence. This was

made worse in Fiji with the decrease in alcohol prices giving rise to more alcohol consumption. Further research is needed to determine the significance of the amount alcohol consumption by the population as an important driver in relation to the number of domestic violence cases. Political will and intervention are needed to address the drop in the prices of alcohol beverages, especially during lockdowns. This then further needs to be translated into effective policies and plans to mitigate domestic violence during pandemics as such and the impact and relationship of loss of income to stress and to alcohol consumption. Furthermore, research is also needed to gauge the perceptions of those that were victims of abuse during the pandemic in Fiji, this would give an insight to the realities they faced during the crisis and what they did in terms of seeking help.

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DEVELOPMENT OF PALLIATIVE CARE SERVICES AND IMPACT OF COVID-19 PANDEMIC: SITUATION ANALYSIS FROM FIVE ASIAN COUNTRIES

Short Running Title: Palliative Care and pandemic situation analysis

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ABSTRACT:

Palliative care provides active holistic care for people with serious health-related suffering due to illness, especially near the end of life. In the Asia-Pacific region, there is variability in palliative care services and access to drugs, with a predominant focus on hospitals and cancer. The COVID-19 pandemic also disrupted the development and provision of palliative services. In this situation analysis, palliative services and the impact of the pandemic in five Asian countries (Bangladesh, Brunei, India, Myanmar and Thailand) are described. Overall, palliative care is an underserved specialty despite an obvious need for the services in each locality. While the pandemic significantly interrupted palliative services, palliative care providers adapted by developing guidelines and using teleconferencing. Overall, much work still needs to be done to improve palliative care in the region.

Keywords: Asia, Community, COVID-19, Palliative care, Service development

INTRODUCTION:

Palliative care is defined as the 'active holistic care of individuals across all ages with serious health-related suffering due to severe illness, especially those near the end of life' [1]. In the Asia-Pacific region, a survey found that there was some form of specialist palliative care service available in each country, with variable

access to essential drugs [2]. Progress in developing palliative care services in the region is quite difficult to monitor due to limited details, documentation and reporting of measures regarding the provision of palliative care [3].

One of the identified strengths of the region is the ability to develop successful community-

based models of palliative care despite limited resources [4]. However, there is limited use of validated tools to measure outcomes, confirm the actual costs required, and adaptation to the cultural context of death and dying for these patients. A systematic review showed that three-quarters of palliative care research from the Asia-Pacific originated from high-income countries, and were predominantly cancer-related [5]. Otherwise, published literature regarding palliative care in low-and-middle income countries, particularly non-cancer related diseases is lacking.

Many countries in Asia are densely populated, have an ageing population with chronic diseases and increasing cancer burden. The COVID-19 pandemic disrupted many health services, causing a dual challenge of providing cancer care while containing COVID-19 spread [6]. Palliative services continue to evolve despite the pandemic to provide a rapid flexible response for symptom management, psychosocial and bereavement care, and adapt to technology for communicating with patients and caregivers [7]. A survey of palliative services in the Asia-Pacific region during the pandemic identified that the main challenges faced in providing palliative care were access to face masks and the lack of guidelines, particularly management protocols for stress, advanced care planning and bereavement care for family members [8]. An international survey found that health professionals deemed palliative care as an

essential or urgently needed service during the pandemic [9]. For Asians and minority groups, there is a tendency for late presentations and referrals to palliative care, which is associated with worse outcomes [10]. Taking these factors into account, palliative care should be prioritised for service development in the Asia-Pacific region.

This paper describes the situation analysis of palliative services and the impact of the COVID-19 pandemic in five Asian countries: Bangladesh, Brunei, India, Myanmar and Thailand. Among these countries, only India had general palliative care provision, while the remaining countries (Bangladesh, Brunei, Myanmar and Thailand) only have isolated provision of palliative care [11]. The authors are involved in palliative services in each locality and the information described originated from discussions on palliative care service development care as part of a Fellowship in Palliative Care jointly organised by St Christopher's Hospice (London, United Kingdom) and the Institute of Palliative Medicine (Kerala, India), a World Health Organisation collaborating centre for community participation in palliative care and long-term care.

BANGLADESH:

Bangladesh is a country with 170 million people. There are no palliative services in the mainstream healthcare facilities or any state policies to support palliative care. A study of

patients with advanced cancer or acquired immune deficiency syndrome (AIDS) from Bangladesh found a high prevalence of pain (70.6%), of which 62.6% were reported as severe and more than a third continuing to have severe symptoms despite treatment. There is a significant burden of symptoms which necessitates the strengthening of palliative care [12]. A cross-sectional study of physicians showed that the majority had an average to high level of knowledge regarding palliative care. However, there were many misconceptions that needed to be addressed and resolved; this includes beliefs that palliative care excludes patients from other specialty consultations or curative treatments, and that it was only for older people, oncology patients and for the final six months of life [13].

While there is an estimated 600,000 people with incurable diseases in the country, there are only six palliative care programmes, which are all based in Dhaka, the capital city. A homecare outreach service has been set up by the Centre for Palliative Care of Bangabandhu Sheikh Mujib Medical University (BSMMU) in Korail, one of the largest slums in Dhaka. This community approach was shown to be effective, with recipients expressing satisfaction with the provided care, hope and dignity for life despite the physical, social, psychological and financial circumstances [14]. A cross-sectional study of cancer survivors from Bangladesh showed that patients receiving home-based palliative care

had improved social and emotional well-being, although physical health and symptom management could be further improved [15].

During the pandemic, the community home-based palliative services required training in COVID-19 precautions and communication skills during physical and social restrictions. Home visits were replaced with weekly phone calls, while the availability of medications and food parcels were ensured. Community sensitisation continued but was changed to an online format [16]. Unfortunately, the COVID-19 pandemic brought out the 'death-denying urban culture' in Bangladesh, with many people preferring to die in hospital rather than at home. This contributed to the saturation of health services, which already encounters difficulties as Bangladesh is one of the most densely populated countries globally.

BRUNEI:

Brunei is a small country with a population of approximately 445000 people. It has a rapidly ageing population and a high rate of non-communicable diseases. A study of older patients admitted to the main tertiary hospital in Brunei (RIPAS Hospital) found that approximately two-thirds had severe functional impairment and more than one-third had dementia [17]. Palliative services are provided in the tertiary hospital and a private oncology hospital, mainly for cancer patients. There are several challenges to implementing palliative

care in Brunei. Pain assessment and management needs to be improved, with multiple barriers identified before achieving a pain-free hospital [18]. While clinicians support the introduction of advance care planning discussions, cross-cultural adaptation of available tools is required [19]. There is also a need to have a national palliative and end-of-life care policy nationally [20]. Thus, there is much to be done to advance supportive care and symptom management, that needs to be planned across all health care settings.

During the COVID-19 pandemic, many services were temporarily halted including inpatient consultations, outpatient clinics and community visits for dependent patients [21].

This reduction in community services was complicated by an increase in sacral pressure injuries; some were so severe they led to osteomyelitis and required a prolonged admission to hospital for intravenous antibiotics [22]. The pandemic led to several new developments to provide patient support. Virtual consultations were introduced to bridge the gap caused by cancelled community visits [23].

A palliative care bundle was also implemented to ensure a consistent palliative approach was provided for patients towards the end of life in hospital [24]. Further effort is required to extend the range of palliative services and improve access for patients.

INDIA:

India is the seventh largest country by area and the second most populated country with 1.4 billion people. There is a large burden of suffering from terminal and life-limiting illnesses. Palliative care is mainly restricted to major cities and cancer centres, except for Kerala, where services are more readily available than other states. The Health Ministry data analysis by the Federation of Indian Chambers of Commerce & Industry found that only up to 2% of those with palliative care needs have access to the services [25]. Generally, there is limited access to palliative care, curative surgery or cancer-directed treatment for metastatic disease.

There are several advancements for palliative care in India. In 2012, India initiated the National program for palliative care (NPPC). The Indian Parliament amended the Narcotic Drugs and Psychotropic Substances Act in 2014, removing legal barriers to opioid access. In Kerala, a Neighbourhood Network in Palliative Care (NNPC) was developed, enabling improved access to home-based palliative services. This was a community-led initiative supported by multiple community groups, schools, universities, religious groups and non-governmental organisations, providing for the social, spiritual and emotional needs of a large number of people [26].

There are many barriers to improving palliative care in India. There is a lack of awareness or education by healthcare professionals and the

public. There is a need for educational campaigns to sensitise the public regarding palliative care. An effective curriculum and clinical skills training is required to upskill healthcare professionals, and correct the misconceptions and biased attitudes against the specialty. Policy makers also require improve awareness of the importance of palliative care and provide support with resources such as medications including opioids, equipment, finances and a staff for a multidisciplinary team. A holistic collaborative approach involving alternative therapy such as ayurveda, yoga, unani, siddha, homeopathy (AYUSH) and naturopathy should also be integrated to meet the cultural needs of the society [27].

During the COVID-19 pandemic, the majority of patients with life-limiting diseases such as cancer were unable to access treatment. The hardest hit patients were frail, older people that were unable to reach services in-person or virtually. There was limited personal protective equipment (PPE) provided for home-based palliative care; with the infection prevention control measures increasing costs and consultation times (including time to don and doff PPE). The positive impact of the pandemic was the adoption of telemedicine and the use of health technology to deliver care to patients. There was also increasing acceptance of novel approaches and alternative medicine systems, including AYUSH during the health crisis [28].

MYANMAR:

Myanmar is a low-income country with under-developed palliative care services. Palliative care was introduced in 2013 from efforts by healthcare professionals and civil governments to increase the capacity and quality of national healthcare, including palliative care. This resulted in the development of two stand-alone hospices and one hospital-based palliative department in the country. However, current political conflicts have affected the delivery of essential healthcare services, capacity building and provision of palliative care. There is limited interest and support from policy makers for palliative care. The socioeconomic crisis restricted availability of funds to invest towards palliative service development, education and research; affecting patient access to the already limited palliative services [29].

Despite the significant need, there is a general lack of awareness and knowledge about the specialty among the public and clinicians. Most consider palliative care as needed only at the very end of life or simply to provide pain relief. This limited understanding contributes to clinicians' reluctance to refer patients early or when required [30]. A study of Myanmar physicians found that generalists and specialists from both public and private sectors have limited skills to provide primary palliative care to patients. There was a focus only on physical symptoms, without considering the psychosocial and spiritual suffering of patients and families

[31]. While charitable organisations are willing to offer help for the needy, the poor palliative knowledge limits the provision of effective supportive care. Information, education and training programmes and research development in the field is greatly needed.

There is a national shortage of health workers, including nurses and social workers, affecting regular palliative care services. These services were further affected by the pandemic, as all healthcare professionals including trained palliative care nurses were required to cover general medical and COVID-19 wards. Their specialized skills and clinical experience were not utilized, while the additional duties caused extra burden and distress. Consequently, the overworked healthcare personnel were reluctant to contribute charitable palliative services in addition to their current workload [32]. The lack of career opportunities and progression also affected clinicians' interest in palliative care.

There are limited resources available to develop palliative services, with a dependence on donations from charitable organisations. Opiate medications such as morphine are restricted and only available in some tertiary hospitals. In Yangon General Hospital, the palliative care department was moved to extend the COVID-isolation wards, limiting clinical space for service provision. This was eventually closed during the pandemic due to inadequate staff and space. During the pandemic, the limited face-to-face

assessments and physical barriers in dealing with patients also made communication difficult, especially for patients during the end-of-life. Many patients died alone due to public health restrictions.

However, during this difficult time, telemedicine became more prominent and the palliative care team gained more confidence and experience providing palliative and end-of-life support to COVID-19 cases. There was an improvement in healthcare providers' knowledge in palliative care and an emphasis on family support and caregiver training in caring for patients. There was also an increased willingness and acceptance by the public to utilise and receive palliative care services [33].

THAILAND:

Thailand has a population of 71.6 million people, with an estimated 170000 people accessing palliative care services annually. While there is a national palliative care plan covering all regions in Thailand, palliative care centres are mainly based in secondary and tertiary care hospitals [34]. Palliative wards or hospices are limited. The palliative care budget comes from healthcare funds providing universal health coverage, with additional funds from other government agencies and donations. In suburbs or rural areas, while services are less developed, family caregivers, community volunteers and local organisations cooperate to support palliative care needs [35]. The

availability of clinical practice guidelines, access to medical equipment and palliative care courses are enablers in the country.

There are several barriers to palliative care in Thailand. There is limited opioid availability, home care services, and trained palliative care providers in certain localities. There is stigma and negative emotions associated with impending death situations affecting acceptance of palliative care in the community [36]. Application of living wills or advanced care planning remains difficult to implement, despite available laws to support this. The religious perspective of Buddhism prohibiting killing of living things may misconstrue the public's views of morphine administration and withdrawing life support as hastening death, with associated karmic consequences to the family making a decision for palliation [37]. There is also a need to identify the place of medical cannabis use for palliative care, as this has just been legalized in the country. The lack of palliative care teaching in medical and nursing school, as well as residency training may lead to negative attitudes and reluctance to refer to palliative care, resulting in consultations only at the very end of life [38]. There are also limited palliative care physicians outside teaching hospitals, with most palliative care tasks run by full-time nurses and part-time physicians. This will require policies to ensure an aligned career path in this specialty for doctors and nurses [39].

During the COVID-19 pandemic, clinical practice guidelines were developed on how to manage patients during such outbreaks. This included the use of telemedicine consultations to support patients and postal services to deliver medications. There was an increase in personal purchases of oxygen equipment, with a large number of home oxygen concentrators donated to hospital. However, the peak of the pandemic resulted in hospital bed capacities being overwhelmed, with palliative care services unable to cover all COVID-19 patients. Specialised trained staff in palliative care were also deployed to care for COVID-19 patients. Due to social restrictions, dying patients with COVID-19 infections were unable to access palliative services for symptom management. These restrictions also affected funerals or religious ceremonies, leading to unresolved grief. Many patients were lost to follow-up, particularly for those who had COVID-19 infections at the time of review.

Thinking ahead, there is a need to prepare a contingency plan for the next pandemic. Undergraduate palliative care, bereavement care and palliative nurse training should be strengthened. In the post-pandemic period, living wills and advanced directives should be promoted and destigmatized to facilitate these conversations. Community-based palliative care especially in rural areas should also be strengthened [40].

CONCLUSIONS:

This situation analysis of palliative care in these five Asian countries identified many similarities and recurrent themes. Palliative care is an underserved specialty, despite an obvious need for the services in each locality. The COVID-19 pandemic significantly interrupted palliative services, but providers adapted to these challenges such as developing guidelines and using teleconferencing. Overall, much work still needs to be done to improve the palliative care situation in the Asia-Pacific region.

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COMMENTARY:**ISOLATION OF COVID-19 CONFIRMED RESIDENTIAL STUDENTS AT THE SCHOOL OF MEDICINE & HEALTH SCIENCES, UNIVERSITY OF PAPUA NEW GUINEA****SHALON TAUFA**Basic Medical Sciences Division, School of Medicine and Health Sciences,
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The School of Medicine & Health Sciences (SMHS) is one of five Schools at the University of Papua New Guinea (UPNG). It is situated as a separate campus on its own near the Port Moresby General Hospital (PMGH) where most of its students attend practical clinical sessions. In the SMHS just under a thousand students are registered to study Medicine (MBBS), Dentistry (BDS/BOH/DDT), Imaging Science (BMIS), Medical Laboratory Sciences (BMLS), Pharmacy (BPharm), Public Health, Nursing, and postgraduate studies. More than 50% of these students reside on campus in the student dormitories, thus accessing all the facilities provided on campus. There is a student mess hall which provides three meals a day for all boarding students. There is also a clinic on campus for both students and staff members.

COVID-19 has affected people all over the world. The first positive case of COVID-19 among the students at the SMHS prompted a very quick response from the administration and

staff in charge of the student clinic. The student was taken straight to the allocated isolation facility in the city of Port Moresby. He did not show any symptoms of respiratory illness and was then transferred back to his room on campus after a few days. Whilst he remained in isolation, several rooms around his had to be evacuated and he was the only student who used the bathroom facilities in that wing of the dormitory. His friends collected his food from the mess three times a day and left it outside his door.

This event then paved the way for a better option which was decided by the COVID-19 staff committee and approved by the Executive Dean of the SMHS.

One of the self-contained units (Yaram block) of the dormitories on campus was emptied and cleaned out in preparation for isolation of COVID-19 positive students. A protocol for isolation of COVID positive students who were symptomatically stable was also written out and kept in the clinic on campus.

PROTOCOL FOR ISOLATION OF COVID – POSITIVE STUDENTS.

SMHS Staff and Student Clinic UPNG.

1. Record details of the student – (most of this information will be in the students' chart) Name, ID number, gender, phone number, resident or non-resident student, symptomatic or non-symptomatic, types of symptoms (if symptomatic), duration of symptoms.
2. If the student is not residing on campus, then he/she can isolate at home. If the student is a resident on campus, then they will need to be moved to the isolation facility at Yaram blocks (one of the married quarter facilities).
3. Call SMHS student warden and notify her of the student. Give her the student's name and number.
4. The student warden will then arrange for the room and notify the student.
5. While the student is in isolation, SMHS clinic staff need to check on him/her regularly to make sure he/she is ok.
6. Medical Officer in charge will notify the students' lecturers of the isolation.
7. The student in isolation must not leave the facility for at least 10 days. He / She must provide a list of close contacts to be tested if they are showing any signs/symptoms.
8. The isolated students must have close friends who will bring their food to them.

9. By the 9th day of isolation, the student should ideally be retested for COVID-19. However, it also depends on lab facilities. If the student is not showing any more symptoms and is well, then they can be allowed to go back to their rooms on day 10.

This arrangement worked very well for residential students that tested positive for COVID-19. Several issues that affected the students during their isolation period were noted by the clinic staff. In the first few days, the students were calm and content and kept themselves busy with schoolwork. However, before the allocated ten days were up, they developed several issues. Not everyone who was isolated had the same issue.

Some of them became restless and frequently called a medical officer to ask if they could move back to their rooms. They became lonely and felt suffocated in the same enclosed environment. The usual form of communicating with others was via mobile phones and when the phone credits or data ran out, they became so alone. The issue of food also became a problem. Usually, their close friends would collect food for them from the student mess and deliver to their doorstep for each meal. If the friends did not arrange among themselves the schedule of delivery, or if they became too busy, or simply forgot, the food was not delivered to the isolated student and they would go hungry.

Some students could not cope with missing ten days of classes during those isolation periods. One student had to withdraw and repeated the academic year. The undergraduate programs have classes/seminars and practicals occurring on most days from 8am to 4pm and when a student misses just one day, they have a lot to catch up on. Missing ten days resulted in missing an enormous amount of work. The mental stress that resulted from all these issues was immense. Many of those students who were isolated were assessed by the medical officers

and then released back to their rooms even before the full ten days isolation was up.

The isolation protocol was adequate for the resident students in SMHS. However, the effects it had on the students mental and physical health were too much.

It was a relief when the isolation order from the government was relaxed so that the asymptomatic COVID positive students did not have to be isolated anymore. They still, however, continued to practice social distancing and proper sanitizing habits.

COMMENTARY:**TIMELINE OF COVID-19 PANDEMIC: FROM DECEMBER 2019 TO DECEMBER 2022****VICTOR J TEMPLE**Division of Basic Medical Sciences, School of Medicine and Health Sciences,
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The impact of the COVID-19 pandemic across the world cannot be overemphasized. It affected the day-to-day life in multiple ways, causing lockdowns to reduce the rapid spread of the virus. The emerging variants of the virus (nCoV-2) rendered the drugs and vaccines, that had been designed for the management of the disease, ineffective. The prolonged lockdowns affected the mental health of people, causing serious psychological disturbances, such as depression, anxiety, and inability to tackle negative emotions [1, 2]. The authorities in countries around the world responded in a variety of ways and with different timelines to the pandemic after it was declared by the World Health Organization (WHO).

The major objective of this paper is to highlight the timeline of the most important events which took place during the COVID-19 pandemic, using open access publications by the Center for Disease Control (CDC) [3], WHO [4] and Papua New Guinea Joint Agency Task Force National

Control Centre for COVID-19 [5] as major sources of information.

On December 12, 2019, a cluster of patients in China's Hubei Province, in the city of Wuhan, begin to experience the symptoms of an atypical pneumonia-like illness that does not respond well to standard treatments [3].

On December 31, 2019, the WHO Country Office in China was informed of several cases of a pneumonia of unknown cause with symptoms including shortness of breath and fever occurring in Wuhan, China. All initial cases seem connected to the Huanan Seafood Wholesale Market [3]. At the same time the Wuhan Municipal Health Commission, China, reported a cluster of cases of pneumonia in Wuhan, Hubei Province. A novel coronavirus was eventually identified [4, 6].

On the 1st and 2nd January 2020, the Huanan Seafood Wholesale Market in Wuhan was closed amid worries in China of a reprise of the 2002–2004 SARS (Severe Acute Respiratory

Syndrome Coronavirus or SARS-CoV-1) outbreak [3]. WHO had set up the Incident Management Support Team (IMST) across the three levels of the organization: headquarters, regional headquarters and country level, putting the organization on an emergency footing for dealing with the outbreak [3, 4].

On January 3, 2020, China informs WHO that they have identified over 40 cases of pneumonia of unknown cause [3]. On 4 January 2020, on social media the WHO reported that there was a cluster of pneumonia cases – with no deaths – in Wuhan, Hubei province [4].

On January 5, 2020, the CDC National Center for Immunization and Respiratory Diseases (NCIRD) activates a center-level response to investigate this novel pneumonia of unknown cause. The genetic sequence for the atypical pneumonia virus, Wuhan-Hu-1, was submitted to the Department of Zoonoses, National Institute of Communicable Disease Control and Prevention, Chinese Center for Disease Control and Prevention, in Beijing, China by Yong-Zhen Zhang of Fudan University, Shanghai. The complete genetic sequence of the virus remains unavailable to the rest of the world as the virus spreads [3]. On the same day (5 January 2020), WHO published the first Disease Outbreak News on the new virus. This was a flagship technical publication to the scientific and public health community as well as global media. It contained a risk assessment and advice, and

reported on what China had told the organization about the status of patients and the public health response on the cluster of pneumonia cases in Wuhan [6].

On January 7, 2020, public health officials in China identify a novel coronavirus as the causative agent of the outbreak. CDC establishes an incident management structure to guide their response to the novel coronavirus by following the preparedness plan for developing tests and managing cases made for Middle East Respiratory Syndrome Coronavirus (MERS-CoV) [3].

On January 10, 2020, WHO started using the phrase “2019 Novel Coronavirus” or “2019-nCoV” to refer to disease causing the outbreak in Wuhan, China. CDC publishes information about the 2019 Novel Coronavirus (2019-nCoV) outbreak caused by the SARS CoV-2 virus on its website. Edward C. Holmes of the University of Sydney, Australia posts online that the viral genome sequence of the unknown pneumonia causing the outbreak in Wuhan has been uploaded to GenBank as “Wuhan-Hu-1” (MN908947) and will be released shortly. He does so on behalf of Yong-Zhen Zhang of Fudan University, Shanghai in collaboration with the Shanghai School of Public Health, the Central Hospital of Wuhan, Huazhong University of Science and Technology, the Wuhan Center for Disease Control and Prevention, the National Institute for Communicable Disease Control and

Prevention, Chinese Center for Disease Control, and the University of Sydney. Hours later, Holmes and Zhang publish the sequence [3].

On the same day, 10 January 2020, WHO issued a comprehensive package of technical guidance online with advice to all countries on how to detect, test and manage potential cases, based on what was known about the virus at the time. This guidance was shared with WHO's regional emergency directors to share with WHO representatives in countries. Based on experience with SARS and MERS and known modes of transmission of respiratory viruses, infection and prevention control guidance were published to protect health workers recommending droplet and contact precautions when caring for patients, and airborne precautions for aerosol generating procedures conducted by health workers [4].

On January 11, 2020, WHO tweets that it has received the genetic sequences of the novel coronavirus from China and expects that the information will shortly become publicly available. CDC updates its Travel Health Notice (THN) system for persons traveling to Wuhan, China to Level 1 or "practice usual precautions." China reports the first death from the novel coronavirus and publishes a draft genome of the newly discovered coronavirus suspected of causing the outbreak. By January 12, 2020, four other genomes have been uploaded to the viral sequence database curated by the Global

Initiative on Sharing All Influenza Data (GISAID) [3].

On 12 January 2020, China shared publicly the genetic sequence of COVID-19 [7].

On January 13, 2020, the Thailand Ministry of Public Health confirms the first laboratory-confirmed case of the SARS-CoV-2 virus outside of China [3, 8].

On January 14, 2020, WHO finds evidence of possible human-to-human transmission of the SARS-CoV-2 virus, but WHO scientists say that human-to-human transmission is not surprising given our knowledge of respiratory pathogens [3]. On the same day 14 January 2020, the WHO technical lead for the response noted in a press briefing there may have been limited human-to-human transmission of the coronavirus (in the 41 confirmed cases), mainly through family members, and that there was a risk of a possible wider outbreak. The lead also said that human-to-human transmission would not be surprising given our experience with SARS, MERS and other respiratory pathogens [4].

On January 15, 2020, the Japanese Ministry of Health, Labor and Welfare reports an additional laboratory-confirmed case of the SARS-CoV-2 virus outside of China [3].

On January 19, 2020 Worldwide, 282 laboratory-confirmed cases of the 2019 Novel

Coronavirus have been reported in four countries: China (278 cases), Thailand (2 cases), Japan (1 case) and the Republic of Korea (1 case) [3].

On January 20, 2020, CDC reported the first laboratory-confirmed case of the 2019 Novel Coronavirus in the U.S. from samples taken on January 18 in Washington state and on the same day activates its Emergency Operations Center (EOC) to respond to the emerging outbreak [3].

On January 21, 2020, Chinese government officials confirm that human-to-human transmission is driving the spread of the SARS-CoV-2 virus in China [3].

Between January 20 – 21 2020, the WHO experts from its China and Western Pacific regional offices conducted a brief field visit to Wuhan [4].

On January 22, 2020, the WHO International Health Regulation Emergency Committee decided not to declare the 2019 Novel Coronavirus a Public Health Emergency of International Concern (PHEIC). Instead, the committee decides to monitor the situation and reconvene in 10 days to re-evaluate [3]. On the same day, 22 January 2020, WHO mission to China issued a statement saying that there was evidence of human-to-human transmission in

Wuhan but more investigation was needed to understand the full extent of transmission [9].

On 22- 23 January 2020, the WHO Director-General convened an Emergency Committee (EC) under the International Health Regulations (IHR 2005) to assess whether the outbreak constituted a public health emergency of international concern. The independent members from around the world could not reach a consensus based on the evidence available at the time. They asked to be reconvened within 10 days after receiving more information [10].

On January 23, 2020, in Wuhan, China— a city of 11 million people, was placed under lockdown due to the 2019 Novel Coronavirus outbreak [3].

On January 28, 2020, CDC issues a Level 3 Travel Health Notice— advising travellers to avoid all non-essential travel to China due to the 2019 Novel Coronavirus outbreak. The U.S. government relocates U.S. citizens from Wuhan, China back to the U.S. due to the 2019 Novel Coronavirus (2019-nCoV) [3]. On the same day 28 January 2020, a senior WHO delegation led by the Director-General travelled to Beijing to meet China's leadership, learn more about China's response, and to offer any technical assistance. While in Beijing, Dr. Tedros agreed with Chinese government leaders that an international team of leading scientists would travel to China on a mission to better understand

the context, the overall response, and exchange information and experience [11].

On January 30, 2020, CDC confirms that the SARS-CoV-2 virus has now spread between two people in Illinois with no history of recent travel. This is the first recorded instance of person-to-person spread of the 2019 Novel Coronavirus in the U.S and brings the total number of cases up to seven [3]. On the same day, 30 January 2020, the WHO Director-General reconvened the Emergency Committee (EC). This was earlier than the 10-day period and only two days after the first reports of limited human-to-human transmission were reported outside China. This time, the EC reached consensus and advised the Director-General that the outbreak constituted a Public Health Emergency of International Concern (PHEIC). The Director-General accepted the recommendation and declared the novel coronavirus outbreak (2019-nCoV) a PHEIC. This is the 6th time WHO has declared a PHEIC since the International Health Regulations (IHR) came into force in 2005 [12]. The situation report of the WHO for 30 January reported 7818 total confirmed cases worldwide, with the majority of these in China, and 82 cases reported in 18 countries outside China. WHO gave a risk assessment of very high for China, and high at the global level [13].

On January 31, 2020, WHO's International Health Regulation Emergency Committee reconvenes early to declare the 2019 Novel

Coronavirus outbreak a Public Health Emergency of International Concern (PHEIC). The Secretary of the Department of Health and Human Services (HHS), Alex Azar, declares the 2019 Novel Coronavirus (2019-nCoV) outbreak a public health emergency [3].

On February 3, 2020, the Department of Homeland Security (DHS) directs all flights from China and all passengers who have travelled to China within the last 14 days to be routed through one of eleven airports in the U.S. for enhanced screening procedures and possible quarantine. U.S. citizens who have been in Hubei province within 14 days of their return are subject to up to 14 days of mandatory quarantine; U.S. citizens who have been in other areas of mainland China within 14 days of their return are subject to 14 days of self-quarantine with health monitoring; and foreign nationals (other than immediate family of U.S. citizens, permanent residents, and flight crew) who have travelled in China (excluding Hong Kong and Macau) within 14 days of their arrival, will be denied entry into the U.S. CDC submits an emergency use authorization (EUA) to FDA to expedite approval for a CDC developed SARS-CoV-2 diagnostic test [3].

On the 3 February 2020, WHO releases the international community's Strategic Preparedness and Response Plan to help protect states with weaker health systems [14].

On February 4, 2020, FDA approves the EUA for the CDC developed SARS-CoV-2 diagnostic test kit [3].

On February 5, 2020, CDC begins shipping its laboratory test kit to detect SARS-CoV-2 virus, “CDC 2019-nCoV Real Time RT-PCR,” to select domestic and international laboratories [3].

On February 11, 2020, WHO announces the official name for the disease that is causing the 2019 Novel Coronavirus outbreak: “COVID-19.” The new name of this disease is an abbreviated version of “Coronavirus Disease 2019” [3].

Between 11 - 12 February 2020, WHO convened a Research and Innovation Forum on COVID-19, attended by more than 400 experts and funders from around the world, which included presentations by George Gao, Director General of China CDC, and Zunyou Wu, China CDC's chief epidemiologist [15].

Between 16 - 24 February 2020, the WHO-China Joint mission, which included experts from Canada, Germany, Japan, Nigeria, Republic of Korea, Russia, Singapore, and the US (CDC, NIH) spent time in Beijing and travelled to Wuhan and two other cities. They spoke with health officials, scientists, and health workers in health facilities (maintaining physical distancing) [16, 17].

On March 11, 2020, after more than 118,000 cases in 114 countries and 4,291 deaths, the WHO declares COVID-19 a pandemic [3]. On the same day, 11 March 2020, deeply concerned both by the alarming levels of spread and severity, and by the alarming levels of inaction, WHO made assessment that COVID-19 can be characterized as a pandemic [4].

On 13 March 2020, the COVID-19 Solidarity Response Fund was launched to receive donations from private individuals, corporations, and institutions [18].

On March 15, 2020, in the USA, States begin to implement shutdowns to prevent the spread of COVID-19. The New York City public school system—the largest school system in the U.S., with 1.1 million students— shuts down, while Ohio calls for restaurants and bars to close [3].

On March 17, 2020, Moderna Therapeutics begin the first human trials of a vaccine to protect against COVID-19 at a research facility in Seattle, Washington. The University of Minnesota launches a clinical trial testing hydroxychloroquine, an FDA-approved drug for the prevention and treatment of malaria, for the treatment of COVID-19 [3].

On 18 March 2020, WHO and partners launch the Solidarity Trial, which is an international clinical trial that aims to generate robust data

from around the world to find the most effective treatments for COVID-19 [19].

On 20 March 2020, the Prime Minister of Papua New Guinea announced the first positive COVID-19 case in the country [5]

On 22 March 2020, a “State of Emergency” (SOE) for 14 days was declared. The entire country was put on a 14-day lockdown. PNG government established the National Emergency Operation Centre (NEOC) which is a multi-ministerial and inter-agency coordination body, to coordinate all the strategic planning and operations on all the health and non-health aspects [5]

On March 31, 2020, the Journal of the American Medical Association Ophthalmology reports that COVID-19 can be transmitted through the eye. One of the first warnings of the emergence of the SARS-CoV-2 virus came late in 2019 from a Chinese ophthalmologist treating patients in Wuhan, Li Wenliang, MD, who died at age 34 from COVID-19 [3].

On April 22, 2020, after two pet cats in separate areas of New York state test positive for the SARS-CoV-2 virus, CDC recommends that people restrict their pets’ interactions with other people or animals outside their household to prevent the spread of COVID-19 [3].

On April 26, 2020, Clinicians in the U.S. and U.K. report clusters of children and adolescents requiring admission to intensive care units (ICUs) with a multisystem inflammatory condition that can lead to multiorgan failure—like Kawasaki disease and toxic shock syndrome. This condition became known as Multisystem Inflammatory Syndrome in Children (MIS-C), a serious inflammatory condition that affects children with current or recent COVID-19 infections [3].

On April 30, 2020, USA administration launches Operation Warp Speed, an initiative to produce a vaccine against the SARS-CoV-2 virus as quickly as possible. The operation funds the development of six promising vaccine candidates while they are still in the clinical trial phase, including the Pfizer-BioNTech and Moderna mRNA vaccines [3].

On May 1, 2020, the FDA issues an emergency use authorization (EUA) for the use of the antiviral drug Remdesivir for the treatment of suspected or confirmed COVID-19 in people who are hospitalized with severe disease [3]. CDC launches the SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology and Surveillance (SPHERES), a national network to provide real-time genomic sequencing data to public health response teams investigating COVID-19 cases, allowing them to track the SARS-CoV-2 virus as it evolves [3]. On the same day (May 1 2020), the

WHO convenes the International Health Regulation Emergency Committee for a third time and declares that the global COVID-19 pandemic remains a Public Health Emergency of International Concern (PHEIC) [3].

On May 8, 2020, FDA authorizes the first COVID-19 test with the option of using home-collected saliva samples [3].

On May 15, 2020, CDC distributes a warning for clinicians through the Health Alert Network describing Multisystem Inflammatory Syndrome in Children (MIS-C), a serious inflammatory condition that affects children with current or recent COVID-19 infections [3].

On May 21, 2020, AstraZeneca receives more than \$1 billion from the U.S. government in funding for the development of the AstraZeneca/Oxford University COVID-19 vaccine, with the first doses due to arrive in September 2020 [3].

On July 6, 2020, more than 200 scientists sign an open letter asking WHO to update its COVID-19 guidelines to include warnings about airborne transmission [3].

On July 9, 2020, WHO announces that the SARS-CoV-2 virus that causes COVID-19 can be transmitted through the air and is likely being spread by asymptomatic individuals [3].

On August 11, 2020, Sputnik V was granted full permanent approval in Russia. It becoming the world's first vaccine against COVID-19 to be granted emergency use authorization. Sputnik V has been authorized in 71 countries with a total population of over 4 billion people. Its one-component version, Sputnik Light, is authorized in over 30 countries, both as a standalone vaccine and a universal booster to other vaccines [20].

On August 14, 2020, CDC releases data indicating that most COVID-19 positive people are infectious to others for up to 10 days after symptoms first appear, but that individuals with severe illness or who are immunocompromised may be infectious for up to 20 days [3].

On August 22, 2020, a study published by the Journal of the American Medical Association calls into question the clinical benefits of the anti-viral drug Remdesivir being used to treat patients hospitalized with COVID-19 [3].

On August 23, 2020, FDA issues an EUA for use of convalescent plasma (the liquid component of blood that, when taken from someone who has recently recovered from an infection, can contain antibodies to that illness) to treat people hospitalized with severe COVID-19 [3].

On August 24, 2020, the first documented case of COVID-19 reinfection was confirmed by the University of Hong Kong [3].

On September 1, 2020, the U.S. and China decline to join the COVID-19 Vaccine Global Access Facility, or COVAX, a global program spearheaded by WHO that aims to develop and distribute COVID-19 vaccines worldwide—more than 170 other nations sign on [3].

On September 3, 2020, the Journal of the American Medical Association and WHO now recommend the use of steroids for the treatment of severe COVID-19 disease after multiple studies find that steroids like dexamethasone, hydrocortisone, and methylprednisolone— a group of cheap and widely available drugs that reduce inflammation and immune response— can reduce mortality in severe cases of COVID-19 by up to 36% [3].

On September 14, 2020, Pfizer BioNTech expands phase 3 clinical trials of its COVID-19 vaccine to 44,000 participants— increasing the trial population diversity to include adolescents as young as 16 years and people with chronic, stable HIV, hepatitis C, or hepatitis B infections. The Pfizer/BioNTech vaccine is a 2-shot series given 3 weeks apart and must be stored at a temperature of –70 degrees Celsius (or –94 degrees Fahrenheit) [3].

On September 21, 2020, Johnson & Johnson begins phase 3 clinical trials of its COVID-19 vaccine with 60,000 participants. The J&J

vaccine does not need to be frozen and may require just one shot [3].

On November 9, 2020, FDA issues an EUA for Eli Lilly’s drug Bamlanivimab, a monoclonal antibody treatment that mimics the immune system’s response to infection with SARS-CoV-2 and appears to protect patients at increased risk from a COVID-19 infection progressing to more severe forms of disease [3].

On November 17, 2020, Dr. Anthony Fauci discusses the need to understand the “long COVID” symptoms like persistent fatigue, shortness of breath, muscle aches, sporadic fevers, and concentration issues, that as many as one-third of patients experience for weeks or months after contracting COVID-19 [3].

On December 11, 2020, FDA issues an EUA for the Pfizer-BioNTech COVID-19 vaccine. ACIP recommends the Pfizer-BioNTech COVID-19 vaccine for all people ages 16 years or older for the prevention of COVID-19 [3].

On December 14, 2020, the U.K. announces the detection of a new and more contagious COVID-19 variant, B.1.1.7 [3].

On December 18, 2020, FDA issues an EUA for the Moderna COVID-19 vaccine [3].

On December 19, 2020, ACIP recommends the Moderna COVID-19 vaccine in persons ages 18 years or older for prevention of COVID-19 [3].

On December 30, 2020, the Oxford University / AstraZeneca COVID-19 vaccine is authorized for emergency use in the U.K. Within a week, 530,000 doses are available for care-home residents, adults ages 80 years and older, and healthcare workers [3].

December 31, 2020, One year anniversary of the first reported case of COVID-19 to WHO [3].

On January 25, 2021, the first case of the COVID-19 P.1 / “Gamma” variant, first identified by scientists in Brazil, is detected in Minnesota USA [3].

On January 28, 2021, the first case of the COVID-19 B 1.351 / “Beta” variant, first identified by scientists in South Africa, is detected in South Carolina [3].

On February 27, 2021, FDA approves an emergency use authorization (EUA) for Johnson & Johnson’s one-shot COVID-19 vaccine for all people ages 18 years and older [3].

On February 28, 2021, ACIP recommends Johnson & Johnson’s COVID-19 vaccine for all people ages 18 years and older [3].

On Tuesday 9 March 2021, PNG Medical and Scientific Advisory Committee (MESAC), after studying the various COVID-19 vaccines developed, recommended that PNG source the AstraZeneca vaccine that was developed through the COVID-19 Vaccine Global Access (COVAX) facility and approved by WHO [5, 21].

On March 11, 2021, first anniversary of WHO declaring COVID-19 a global pandemic [3, 22].

On March 14, 2021, Ireland, Iceland, Denmark, and Norway suspend distribution of AstraZeneca’s COVID-19 vaccine as the European Union (EU) investigates if the shot may be linked to reports of blood clots [3].

On March 18, 2021, after 13 European countries halt distribution of the AstraZeneca COVID-19 vaccine pending review, the European Medicines Agency (EMA) announces that they did not find any evidence that the vaccine causes blood clots, and while they were unable to definitively rule out a link between rare blood clots events and the vaccine, the AstraZeneca COVID-19 vaccine is still considered safe, is effective, and the benefits of this vaccine still outweigh its risks [3].

On March 29, 2021, CDC study finds that mRNA COVID-19 vaccines, Pfizer-BioNTech and Moderna, are highly effective at preventing infection with the SARS-CoV-2 virus in real-world conditions among healthcare personnel,

first responders, and other essential workers (groups that are more likely than the general population to be exposed to the virus because of their occupations), reducing their risk of infection by 90% [3].

On April 13, 2021, CDC and FDA issue a joint statement recommending pausing the use of the Johnson & Johnson's COVID-19 vaccine while six cases of a rare and serious blood clot in people who received the J&J COVID-19 vaccine are investigated [3].

On April 21, 2021, ACIP and FDA recommend the continued use of Johnson & Johnson's COVID-19 vaccine for all people ages 18 years and older in the U.S., following a thorough safety review after the use of the vaccine was paused when 6 cases of rare and severe type of blood clots were reported [3].

On May 10, 2021, FDA expands the emergency use authorization (EUA) for the Pfizer-BioNTech COVID-19 vaccine to include all adolescents ages 12–15 years [3].

On May 12, 2021, ACIP recommends the Pfizer-BioNTech COVID-19 vaccine for all adolescents ages 12–15 years [3].

On June 1, 2021, the COVID-19 B.1.617.2 / "Delta" variant, first identified in India, becomes the dominant variant in U.S. The variant begins

a third wave of infections during the summer of 2021 [3, 23].

On Thursday 3, June 2021 the "Direction No.2" authorizing AstraZeneca vaccination to be administered in the vaccination roll-out program in PNG was issued [5].

On July 9, 2021, CDC and FDA release a joint statement assuring the public that Americans who have been fully vaccinated do not need a booster shot at this time [3].

On July 20, 2021, the Lancet reports that more than 1.5 million children worldwide have lost their primary or secondary caregiver due to the COVID-19 pandemic [3].

On August 11, 2021, CDC releases a statement assuring the public that COVID-19 vaccination is safe for pregnant and breastfeeding people. CDC studies have found that an infection with COVID-19 during pregnancy increases the risk of developing severe illness from COVID-19 and that there is no evidence that any vaccines, including the COVID-19 vaccines, cause fertility problems in women or men [3, 24].

On August 13, 2021, ACIP recommends an additional dose of COVID-19 vaccine after the two-dose vaccine series for all people with moderately to severely compromised immune systems [3].

On August 18, 2021, HHS, CDC, and FDA release a statement concluding that booster shots of the Pfizer-BioNTech, Moderna, and Johnson & Johnson COVID-19 vaccines will be needed to protect against severe disease, hospitalization, and death in coming months [3].

On August 23, 2021, FDA fully approves the Pfizer-BioNTech COVID-19 vaccine for all people ages 18 years and older. Full FDA approval further reinforces that the Pfizer-BioNTech COVID-19 vaccine has been shown to meet the agency's high standards for safety, effectiveness, and consistent quality in manufacturing [3].

On August 30, 2021, ACIP recommends Pfizer-BioNTech's COVID-19 vaccine for all people ages 16 years and older [3].

On September 24, 2021, ACIP recommends Pfizer-BioNTech's COVID-19 vaccine boosters for all people ages 65 years and older, residents of long-term care settings, people age 50–64 years with underlying medical conditions, and people ages 18–49 years with underlying medical conditions and / or who live or work in high-risk settings to be given at least 6 months after their primary vaccination series [3].

On September 29, 2021, CDC issues an urgent health advisory to increase COVID-19 vaccination rates among people who are pregnant, breastfeeding, or who are trying to

become pregnant. More than 22,000 pregnant people have been hospitalized with COVID-19 and 161 have died. COVID-19 in pregnant people carries a two-fold risk of admission to intensive care, a 70% increased risk of death, and adverse pregnancy outcomes that can include preterm birth, stillbirth, and the admission of a newborn into the ICU with COVID-19 [3].

On October 6, 2021, WHO publishes a clinical case definition of "post COVID-19 condition" or long COVID. The symptoms of long COVID include, but are not limited to, fatigue, shortness of breath, and / or cognitive dysfunction that persists for at least two months and impacts everyday life, three months from the onset of an initial COVID-19 infection [3, 25].

On October 21, 2021, ACIP recommends Moderna or Pfizer-BioNTech's COVID-19 vaccine boosters for all people ages 65 years and older and all people ages 18 years and older who are residents of long-term care settings, have underlying medical conditions, and who live or work high-risk settings to be given least 6 months after their primary vaccination series. ACIP also recommends booster shots for everyone who received Johnson & Johnson's COVID-19 vaccine more than 2 months ago [3]. On November 2, 2021, ACIP recommends the Pfizer-BioNTech pediatric COVID-19 vaccine for all children ages 5–11 years [3].

On November 10, 2021, CDC and WHO report that more than 22 million infants missed their first dose of the measles vaccine in 2020. This is the largest global increase of unvaccinated children in two decades and is due in-part to the disruptions the COVID-19 pandemic has had on health care and immunization [3, 26].

On November 19, 2021, amid worries of an upcoming Omicron surge, CDC strengthens its recommendation urging that everyone ages 18 years and older who received a Johnson & Johnson, Pfizer-BioNTech, or Moderna COVID-19 vaccine should receive a booster after they are fully vaccinated [3].

On November 26, 2021, WHO designates the COVID-19 “Omicron” variant, first identified by scientists in South Africa, as a “variant of concern.” Changes in the spike protein of the Omicron variant of the SARS-CoV-2 virus, concern scientists around the world due to the potential for increased transmissibility and decreased vaccine protection [3, 27].

On November 29, 2021, CDC recommends that everyone ages 18 years and older who received a Johnson & Johnson COVID-19 vaccine should receive a booster shot 2 months after their initial J&J vaccine [3].

On December 1, 2021, the first case of the Omicron variant in the U.S. was detected by the

California and San Francisco Departments of Public Health [3].

On December 9, 2021, CDC and FDA expand COVID-19 booster recommendations to include everyone ages 16 years and older [3].

On December 20, 2021, CDC releases data estimating that the Omicron variant is around 1.6 times more transmissible than Delta variant [3].

On December 23, 2021, FDA authorizes Merck’s anti-viral pill Molnupiravir to treat COVID-19 under an EUA for all adults and children ages 18 years and older who test positive and are at high risk for progression to severe disease. It is the second treatment for COVID-19 that is taken orally and can be used at home but, despite supply concerns, Paxlovid remains the preferred oral anti-viral treatment for COVID-19 [3].

On January 3, 2022, FDA amends the emergency use authorization (EUA) for the Pfizer-BioNTech COVID-19 vaccine to allow a single booster dose for all individuals ages 12–15 years; shortens the time-period between the completion of primary vaccination series of the Pfizer-BioNTech COVID-19 vaccine and a booster dose to at least 5 months; and allows for a third primary series dose for certain immunocompromised children in the 5–11 years age group [3].

The WHO Emergency Use Listing (EUL) process determines whether a product can be recommended for use based on all the available data on safety and efficacy and on its suitability in low- and middle-income countries. As of 12 January 2022, the following vaccines have obtained the WHO EUL [29, 30]:

- The Pfizer/BioNTech COMIRNATY vaccine, 31 December 2020.
- The SII/COVISHIELD and AstraZeneca/AZD1222 vaccines, 16 February 2021.
- The Janssen/Ad26.COV 2.S vaccine developed by Johnson & Johnson, 12 March 2021.
- The Moderna COVID-19 vaccine (mRNA 1273), 30 April 2021.
- The Sinopharm COVID-19 vaccine, 7 May 2021.
- The Sinovac-CoronaVac vaccine, 1 June 2021.
- The Bharat Biotech BBV152 COVAXIN vaccine, 3 November 2021.
- The Covovax (NVX-CoV2373) vaccine, 17 December 2021.
- The Nuvaxovid (NVX-CoV2373) vaccine, 20 December 2021

On January 13, 2022, the Papua New Guinea authorities fully approved the administration of booster dose or second dose of the COVID-19 vaccine. The approved vaccines were AstraZeneca, J & J and Sinopharm [31].

On January 31, 2022, FDA fully approves the Moderna COVID-19 vaccine for all people ages 18 years and older. Full FDA approval further reinforces that the Moderna COVID-19 vaccine has been shown to meet the agency's high standards for safety, effectiveness, and consistent quality in manufacturing [3].

On February 4, 2022, ACIP recommends the use of Moderna's vaccine for all people ages 18 years and older [3].

On February 11, 2022, CDC releases data showing that COVID-19 vaccine boosters remain safe and were highly effective against severe disease during the Omicron and Delta variant surges for everyone ages 5 years and older [3].

On March 2, 2022, WHO releases data showing that COVID-19 pandemic triggered a 25% increase in anxiety and depression worldwide, with young people and women at highest risk [3].

March 11, 2022 was the second-year anniversary of WHO declaring COVID-19 a global pandemic [3].

On March 16, 2022, at the World Trade Organization (WTO) meeting the U.S., the European Union, India, and South Africa forge a preliminary agreement on a COVID-19 vaccine

intellectual property (IP) waiver, hoping to expand access to vaccines around the world [3].

On March 29, 2022, CDC, and FDA both recommend a second mRNA COVID-19 vaccine booster for immunocompromised individuals and all adults ages 50 and older 4 months after their last booster dose [3]. On the same day, CDC recommends that all adults who received a primary vaccine series and booster dose of Johnson & Johnson's COVID-19 vaccine receive a second booster dose with an mRNA COVID-19 vaccine. In addition, CDC recommends that all adults who received a primary vaccine series and booster dose of Johnson & Johnson's COVID-19 vaccine receive a second booster dose with an mRNA COVID-19 vaccine [3].

On May 5, 2022, WHO estimates that there have been approximately 15 million direct or indirect deaths (also called "excess mortality") globally from January 2020 – December 2021 that were caused by the COVID-19 pandemic. South-East Asia, Europe, and the Americas accounted for 84% of the excess deaths [3, 31].

On May 19, 2022, ACIP recommends Pfizer-BioNTech's COVID-19 vaccine boosters for everyone ages 5–11 years to be given at least 5 months after their primary vaccination series. ACIP also recommends everyone ages 12 years and older who is immunocompromised and those ages 50 years and older should receive a

second booster dose at least 4 months after their first to prevent severe disease, hospitalization, and death [3].

On June 18, 2022, ACIP recommends Moderna and Pfizer-BioNTech's COVID-19 vaccines for everyone ages 6 months – 5 years, expanding vaccine eligibility to over 20 million additional children in the U.S. All people ages 6 months and older are now eligible for COVID-19 vaccination in the U.S [3].

On June 24, 2022, ACIP recommends Moderna's COVID-19 vaccine for everyone ages 6–17 years [3].

On July 8, 2022, FDA fully approves Pfizer-BioNTech's COVID-19 vaccine for everyone ages 12–15 years. Full FDA approval further reinforces that Pfizer-BioNTech's COVID-19 vaccine has been shown to meet the agency's high standards for safety, effectiveness, and consistent quality in manufacturing.

On July 13, 2022, ACIP interim recommendation for use of Novavax COVID-19 vaccine in adults 18 years and older [32].

On August 5, 2022, FDA issues EUA for Novavax (Novavax, Inc), COVID-19 vaccine adjuvanted to provide a two-dose primary series to individuals 18 years of age and older [32].

On August 19, 2022, FDA expands age indication of Novavax COVID-19 vaccine, adjuvanted EUA to include use in individuals 12 years of age and older [32].

On August 22, 2022: CDC recommends Novavax COVID-19 vaccine for use in adolescents 12 years through 17 years as a primary series option [32].

On August 31, 2022, FDA amended EUAs of Moderna and Pfizer-BioNTech COVID-19 vaccines to authorize bivalent formulations for use as a single booster dose at least 2 months following primary or booster vaccination [32].

On October 12, 2022, CDC recommends expanding the use of updated (bivalent) COVID-19 vaccines (Pfizer-BioNTech for children ages 5 through 11 years, Moderna for children and adolescents ages 6 through 11 years) to children ages 5 through 11 years [32].

On December 8, 2022, FDA authorizes updated (bivalent) COVID-19 vaccines for children down to 6 months of age [32].

WHO continues to provide Coronavirus disease (COVID-19) weekly epidemiological updates and monthly operational updates [33, 34].

CONCLUSION:

The timeline presented here is not exhaustive because of the complexities of the coronavirus

pandemic effects and impact in different countries around the world. It briefly highlights the tremendous efforts by the CDC, WHO and other relevant agencies to track and record some of the events related to the pandemic over the last 3 years.

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INSTRUCTIONS FOR AUTHORS:**AIMS AND SCOPE:**

Pacific Journal of Medical Sciences is a peer-reviewed, multidisciplinary journal published by the School of Medicine and Health Sciences (SMHS), University of Papua New Guinea (UPNG).

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