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Editorial: COVID-19 and Vulnerability

The question of autonomy and mask wearing is discussed in the first two papers in this issue. Ann Boyd discusses how we can balance autonomy and justice. These fundamental medical ethical principles really epitomize the debates over the use of masks. The WeCope Committee statement on why people should wear masks was released in April 2020, and fortunately has been well implemented in most countries. Stephen Rothman also writes further on the use of masks with some interesting comparisons to foot binding and infibulation. Ethical principles have been applied over the millennia in different ways and we are still grappling with fundamental issues on the appropriate balancing of ethical principles in contemporary bioethics. For the sake of the vulnerable there should not be any hesitation to exercise solidarity with vulnerable people by wearing masks, and exercising physical distancing.

There are many trials of potential COVID-19 vaccines underway, and a very important question is whether or not the vaccine will be available all around the world, and how do we balance the interests of individuals opting out versus the protection that we need from herd immunity, This raises questions discussed by Chukwuneke et al. in the Nigerian context with questions over mandatory vaccination policies. Shahanaz Chowdhury presents some of the important issues faced by persons living with disability. This theme is one which has been addressed in some IPHA conferences and is being taken up in a WeCope subcommittee. We invite readers to contribute to this very important question of how to balance the vulnerabilities of people living with disability, to combat some of the harassment that people living with disability have faced in the pandemic. For example, when going out shopping some people with limited visibility need to touch items in the store, or some people are not able to wear masks for medical reasons. Other's may criticize them. Bandares-Paulino and Tudy looked at some of the challenges with mental health issues, and Nasir et al., look at mental health nursing. We need to treat people ethically despite the many vulnerabilities that we all have. Maria Yasuoka looks at organ transplant recipients, cancer survivors and elderly persons who are all at risk of serious consequences if they are infected with COVID-19.

It is not all gloom and doom as shown in the paper by Rogelio Bayod et al. who look at the way that plant lovers have been able to spend more time cultivating plants and vegetables and flowers during the pandemic shut down. Maybe this will also help us all as we gasp for fresh air in a very polluted world, as reviewed by Alex Waller.

This is the first of the extra issues of *EJAIB* for 2020, and it includes five further papers from the Nine International Public Health and Bioethics Ambassadors (IPHA) Conferences that have been regularly held over the past few months, along with three other papers.

The Tenth International Public Health and Bioethics Ambassadors (IPHA9) Conference will be held 1-3 October 2020. I invite many more readers to join. Please keep on submitting your papers, and joining the virtual conferences.

- Darryl Macer, Chair, World COVID19 Ethics Committee
https://www.eubios.info/world_emergency_covid19_pandemic_ethics_committee

COVID-19 community mask wearing: lessons from foot-binding and infibulation

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Abstract
Current scientific evidence promotes the use of masks as a primary measure, in addition to social distancing and self-quarantine, to prevent the further spread of COVID-19 from person to person. Despite the importance of masks, compliance with requests to wear masks varies across cultures around the world and low compliance may increase transmission rates among communities. After reviewing literature on mask-wearing, this article first examines two models of social behavior based on the Prisoner's Dilemma and the Stag Hunt (tipping point). Then, combining this work with research from foot-binding and infibulation mitigation, this article demonstrates that social community behavioral coordination along with game theoretic common knowledge are important components to increasing mask usage. Finally, the article provides some suggestions to increase mask usage among communities by re-orienting the social culture and increasing community common knowledge.

Introduction
Increasing evidence in epidemiological research for COVID-19 suggests the importance of public mask wearing as a means of preventing exponential spread of the disease (Wang, Ferro, Zhou, Hashimoto, & Bhatt, 2020). Even cursory examinations of the differences between the rate of infection in Western (non-face mask wearing locations) and Asia (common face-mask wearing locations) suggests that mask wearing, at least anecdotally, has a negative effect on spreading infection. Despite this evidence, mask wearing in the public remains controversial as a public health mandated measure. President Trump has signaled several times, for example, reluctance from issuing a national mandate for masks due to the importance of individual choice and freedom (BBC News, 2020). It is especially difficult for governments and authorities to encourage individuals to wear masks in public, especially in cultures where mask-wearing is not common place or the sociopolitical costs may be higher (Utych, 2020). Many political officials wear masks when necessary to signal to their constituency or when necessary outside of the public eye, yet do not wear them in front of cameras due to public scrutiny and possible criticism of their appearance. In contrast, other officials, such as Prime Minister Abe in Japan, consistently wears masks in public and during public speeches and announcements.

This paper generates two possible models for mask wearing suggesting a Prisoner's Dilemma like game or a Stag Hunt like game representing a tipping point model. Using the tipping point model as a point of particular examination, the paper presents two other cases of tipping point social behavior changes, foot binding and female genital mutilation, to illustrate how social community changes can result in moving the tipping point and increasing mask usage. The paper concludes with some suggestions on increasing implementation of mask usage in communities where it presents a higher social cost. The paper proceeds by reviewing basic information on the efficacy of mask wearing and the research on public mask wearing practices. Following this brief review, the paper establishes two common models for social behavior related to mask wearing and discusses the importance of common knowledge and group signaling to increase social mask wearing among communities. These practices draw on the research related to two other social practices of foot-binding and infibulation. The paper suggests two policies to encourage face mask wearing without the requirements of strict mandates.

Research on mask wearing during COVID-19 pandemic
The research on mask wearing consists of two primary areas in regards to COVID-19. One area of research discusses the importance and use of masks in relation to preventing the spread of the disease, essentially the epidemiological examination of masks in relation to disease and COVID-19. The second area of research involves the particular social behavior of individuals for mask wearing. Most of the research on mask-wearing concentrates on the issue of efficacy and effectiveness of mask wearing while little research discusses the social practices of mask wearing among the public, where this paper begins to fill such a gap in our understanding.

There is little doubt that properly fitted masks worn in medical environments help prevent the spread of infection to patients and to staff (Beckman et al., 2013; Klompas, Morris, Sinclair, Pearson, & Shenoy, 2020). The WHO recommends use of proper and rational PPE equipment for staff depending on their risks of exposure (WHO, 2020). Though this is commonly known and understood within the medical community, the question of mass mask wearing remains controversial and research has shown mixed results. For example, the executive director of the WHO health emergencies program stated that "There is no

specific evidence to suggest that wearing of masks by the mass population has any potential benefit" (Howard, 2020). Since the emergence of Covid-19, a number of studies emerged examining the effects of mass public mask wearing on the spread of the disease (Eikenberry et al., 2020; Gandhi, Beyrer, & Goosby, 2020; Pejo & Biczok, 2020; Wu & Zha, 2020). To determine whether and when masks are effective in preventing the spread of the virus is fundamental to understanding whether and when individuals might be asked to use and wear masks. However, under uncertainty, many political discussions advocate the precautionary principle such that unless wearing masks are deemed dangerous to individuals, it is better to wear them as a precaution. Today most officials in governments are recommending mask wearing when in closed spaces and in close contact with others to prevent spreading the disease, though actual use of masks is still mixed in some areas of the world.

In the second set of research, there is limited discussion. Although there are some studies on social behavior and mask wearing, there are very little conclusions drawn from this research and few suggestions for policy makers and communities. This research fills part of that gap by providing both a social science understanding of mask wearing behavior and suggestions for improving social conformity to mask wearing. The research from behavioral sciences is quite scant in the area of COVID-19. It is clear, however, through some survey research in Japan, for instance, that social factors pay a key role in community mask wearing (JapanLife, 2020). Though one research article in particular points to a large number of factors that contribute to behavior of individual during such a crisis pandemic, pointing to areas of communication and risk/threat assessment, political and social groupings, zero-sum thinking and cooperation within groups, moral decision making, leadership, and others (Bavel et al., 2020). The discussion is comprehensive, examining many areas of socio-behavioral variables that influence individual behavior, though limited in depth and recommendations on particulars to improve behavior during the pandemic.

Modeling mask wearing for COVID-19

Game theory modeling is useful to examine interaction between individuals when the actions of each individual affect the behavior and benefit of others in the model. Game theoretic modeling is widely used to examine behavior in social situations, such as community mask wearing. Modeling relies heavily on the importance of assumptions of the models and the rationality of actors when comparing the results of the model with the general behavior of individuals, external validity.

In the most basic model, we can simplify mask wearing to two individuals with two choices (to wear a mask or not to wear a mask). In this situation, we can assume that there is some cost to wearing a mask, whether that cost involves breathing difficulties, the cost of buying or cleaning masks or social difficulties. We also assume that there is some benefit to the wearer of masks in relation to the disease, but the benefit is greatest when the entire community wears a mask. When one individual wears a mask and others do not, for example, the benefits are very limited because while the mask offers some protection, its greatest benefit is in preventing exposure to others (wearing a mask). In other words, it would be best for any individual if everyone else is wearing a mask, thus he/she receives most of the benefits, while that same individual does not wear a mask, facing no cost (a free-rider). As a general guideline we assume that if the benefits of wearing a mask are greater than the costs, individuals will wear masks. However, the difficulty in knowing whether one benefits from wearing a mask comes from the fact that one's benefit is at least partially contingent on the behavior of other individuals. When everyone else wears a mask and you wear a mask the benefit is greatest.

There are two general game theoretic models that might illustrate the situation with mask wearing, the Stag Hunt model and the Prisoner's Dilemma model, depending on the assumptions made. In general, we can assume that the costs of getting sick are very high and that therefore the inverse, the benefit of avoiding getting ill is very high. Since these benefits are high, we can also assume that the costs of wearing a mask are somewhat small relative to the benefits. The issue, then comes to whether wearing a mask actually resolves to provide the benefits of preventing illness. The manifestation of this benefit depends on the behavior of other individuals.

These two models are quite commonly used within research on social behavior. In particular, the Prisoner's Dilemma is widely used to illustrate situations where individuals would prefer to engage in individually beneficial behavior that leads to sub-optimal social outcomes for the community. The Stag Hunt model is widely used more generally to illustrate the basic conditions of a tipping point, where two outcomes are stable – everyone chooses one highly beneficial outcome to society or everyone chooses a lower benefit outcome, individually beneficial but socially sub-optimal.

For both models, we can illustrate the interaction of individuals through a 2x2 game theory model (Table 1). The model represents an interaction between "society" and the "individual" as two players in the model. Each player has two choices, either to wear a mask or not to wear a mask. This creates four potential outcomes, both wear a mask, both do not wear masks, or one wears a mask and one does not (for each player). Within each outcome, we can illustrate the expected value for that player of the outcome by designating the left number for the left player (individual) and the right number for the top player (society). The expected value represents a measure of benefit relative to other outcomes possible in the model.

In the Stag Hunt model, we can assume that the benefit only occurs when there is universal compliance with social mask-wearing. If we assume that the benefit of avoiding illness occurs if and only if all others wear the mask, we generate a model that resembles the Stag Hunt or tipping point model of behavior. Thus, for the Stag Hunt model, the value of the outcome where both players wear a mask is 10 because there is a large benefit in this case when everyone wears a mask in the group, compared to a case where the individual wears a mask and no other person wears a mask. In this case, there is no benefit because the benefit only occurs when others wear the mask. By comparing these expected values, two Nash Equilibria emerge, where everyone wears a mask or no one wears a mask. Nash Equilibrium represents a stable state of the model, where neither player has an incentive to alter their choice without incurring a worse expected value. In this model, where there are two equilibria, the model does not predict which outcome will emerge, but illustrates the premise of a tipping point. If enough people wear masks, the equilibrium will shift to everyone wearing a mask, but if no one wears a mask, it is not likely that any individual will unilaterally decide to wear a mask.

In this model, illustrated in Table 1, we see that there are two stable pure strategy Nash equilibria, one where all individuals do not wear masks or one were all individuals wear masks. This represents closely to the Stag Hunt generalized model or the tipping point model. While both Nash Equilibria are possible and stable solutions, the preferable social optimal Nash equilibrium is one in which everyone wears the mask and prevents individuals from getting sick (note that the model ignores other social costs such as hospitalization and treatment for the ill, but that should only increase the benefits of wearing a mask and preventing the spread, thus strengthening the results illustrated.)

Table 1: Social models of mask wearing

Stag Hunt		Society	
		Wear a mask	Do not wear a mask
Individual	Wear a mask	10*, 10*	0, 2
	Do not wear a mask	2, 0	2*, 2*

Prisoner's Dilemma		Society	
		Wear a mask	Do not wear a mask
Individual	Wear a mask	3, 3	1, 4*
	Do not wear a mask	4*, 1	2*, 2*

An asterisk (*) indicates a preferred outcome, while two asterisks in the same cell indicate pure strategy Nash Equilibrium.

In the Prisoner's Dilemma model, we alter the assumptions slightly such that the benefit does not depend on universal compliance but depends on others' compliance. In other words, there is little benefit to yourself when you wear a mask, but there is benefit for others when you do so. Similar to the Stag Hunt model, the Prisoner's Dilemma models interaction between an individual and society, though the expected values and preferences over the outcomes differ. The model is drawn the same way as for the stag hunt explained above. Although in this case, the expected values represent a relative value preference (ordinal) primarily and should not be used to compare any magnitude difference (cardinal) outcome. In this case, however, the most preferred outcome is where the individual does not wear a mask, such that it incurs no costs, and everyone else wears a mask, achieving full benefit. This is essentially the free-rider position where everyone else incurs the cost for one's own benefit. The second most preferred outcome consists of everyone wearing a mask because there is a high benefit for each person to do so, though there is some cost involved in wearing the masks as assumed in the model. The second to worst outcome is where no one wears a mask. In such a case, there is no cost for wearing the mask, but also there is no benefit for not wearing a mask. Finally, in the worst case, one becomes the "sucker" whereby they wear a mask, but others do not. In this sense, the individual wearing the mask is incurring the cost for others' benefit, but not receiving any benefit of his/her own. In this case, we assume that if everyone else wears a mask one can receive the benefit of not getting ill though they do not have to wear the mask themselves. The model is illustrated in Table 1, which resembles closely to the Prisoner's Dilemma

model. In this case, we have one pure strategy Nash Equilibrium where no one wears a mask because there is no additional benefit from wearing a mask when everyone else is wearing the mask but there is an additional cost to wearing the mask. In this model, the only stable pure strategy outcome is one where no one wears a mask, but again we see a better social optimal in which everyone wears the mask.

In both cases we can consider policies that will help motivate individuals to wear masks without mandating such masks. One of the primary requirements for moving from one equilibrium to the other in the case of the Stag Hunt (tipping point) involves public coordination of behavior and maintaining common knowledge among the participants. For the Prisoner's Dilemma, the situation is only slightly more complicated as it is possible to move from sub-optimal social equilibrium to the optimal social equilibrium with increased transparency of actions and communication between the actors. In both cases, communication, transparency, and coordination can shift the outcome from a sub-optimal one to a socially optimal outcome. In the case for this paper, introducing specific policies oriented toward these variables would help move individuals from a non-wearing mask equilibrium, which is socially sub-optimal, to a more socially optimal situation of common public mask wearing. One of the policies used previously in other cases to encourage such behavior increases the social costs of non-compliance, such as is demonstrated in the cases of foot-binding and female genital mutilation. The following sections discuss these two cases and illustrate the findings that might apply to the cases of COVID-19 and mask wearing for individuals around the world and implementing government policies.

Chinese foot binding and infibulation

Chinese practice of foot-binding began as a practice designed to reduce uncertainty around paternity concerns during the polygamous period of the Chinese elite and to restrict the movement of consorts. In order for lower class individuals, fathers in particular, to help their daughters marry upward in the social hierarchy, they also adopted the practice and the practice became widespread among the population in China. In a sense, if a family did not bind the feet of their daughters, the daughter would suffer socially and would not be a preferred consort or marriage partner for higher levels of society (Rosenburg, "How history gets things wrong").

Mackie (Mackie, 1996) identified two background factors that encouraged the end of foot binding in China, in the introduction of westernized culture discouraging the practice and industrial changes that selected against those who had their feet bound and restricted movement for work. These factors altered individual preferences, but in the larger societal system, foot binding was still favored for marriage and consorts. In order to change the system, the tipping point equilibrium or Stag Hunt requires a large number of individuals within the same community to change their behavior to alter what is "normal" among that population. As individual families slowly made changes, the group of individuals and villages became larger and larger, changing the equilibrium from foot binding to non-foot-binding practices. Once the group became large enough it became disadvantageous socially to have footbound children because they were selected against in society (Mackie, 1996).

Similarly, these principles have been applied to other social practices encouraging the removal of those practices, exemplified with infibulation. Similar to foot binding, infibulation emerged in a similar set of circumstances to control paternity and "enforce imperial male's exclusive sexual access to his female consorts" (Mackie, 1996). By using the same methods of coordinating behavior among a large group, it is possible to generate a tipping point (Schelling, 1973) and shift behavior from engaging in the practice to disengaging in the practice. It is important to note that the tipping point model usually has one outcome with a much higher benefit for society than the other, despite the fact that both outcomes are stable Nash Equilibria. This type of tipping point and moving the equilibrium through common knowledge and social coordination of behavior is so strong that different organizations and advocates can implement the policies in local communities (UNICEF, 2005). By applying similar social common knowledge and coordination principles to the mask issue, it may be possible to shift the communities on a local level and eventually on a national level to encourage mask-wearing and away from the non-mask wearing equilibrium.

Recommendations

Policies oriented toward moving the equilibrium in the above models are best suited to increase mass mask-wearing among populations and communities where mask-wearing is not generally accepted. In particular, based on the experiences of foot-binding and infibulation practices, such policies include reorienting culture toward mask-wearing and building community common knowledge. Although there is some difficulty in accomplishing these goals, neither require government forceful implementation of mask-

wearing and penalties. In both cases, the social norms and tipping points can promote the use of masks among the community. When a small community is able to meet together and promise to wear masks, whereby all community members gain common knowledge that all others within the community also agree to wear masks, the policy can be most successful. This common knowledge requirement is vital to improving compliance with the norm.

Of course, other social policies can also be pursued to increase cooperation. This includes repeated interaction among individuals, which occurs within smaller communities and work places. When people interact on a regular basis, cooperation becomes more likely based on the models of repeating Prisoner's Dilemma indefinitely, which is usually the case in many work and social environments where the end of the relationship is unknown to the participants. In addition, extending time horizons beyond immediate gains can also improve cooperation among the group. Orienting people toward longer term relationships within the community makes cooperation more likely, just as the institution of marriage orients individuals toward long term relationships and away from one-date or short-term relationships.

By incorporating social policies such as those discussed above, communities can increase the compliance with mask wearing by building social norms among communities and discouraging individual non-compliance. Rather than focusing on the disease themselves and the risks involved, social norm compliance works better than individual risk assessment. Similar to risk assessment and error in processing long term risks of smoking (Slovic, 2001), individuals often discount long-term risks associated with illness and thus cost benefit analysis often fails to encourage appropriate behavior. Social norms and social conformity, instead, allow for greater compliance and conformity with mass mask wearing for preventing the spread of COVID-19.

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Balancing autonomy and justice in the U.S. with a coronavirus outbreak

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Abstract

With the emergence of a new respiratory virus, SARS-CoV2, in Wuhan, China near the end of 2019, it was soon determined that person to person spread could lead to a pandemic. Scientists quickly isolated and sequenced the virus and identified the basic virus as a coronavirus with severe respiratory pathology (COVID-19). WHO alerted nations to the seriousness and rapid spread of the virus in late January 2020. The Center for Disease Control (CDC) in the U.S. responded with public health alerts and local public health departments began preventative best

practices: test, isolate, quarantine and treat. However, the response was slow and inconsistent and by March, 2020 states were imposing social distancing, closing schools and other social gatherings to reduce spread. Testing was limited in availability and individuals responded to public health requests with variable compliance. In less than a year, 5.5 million citizens in the U.S. were infected and 172,000 died. Even as the pandemic continues its natural course, and scientists spare no time in creating a vaccine, it is clear that COVID-19 reveals conceptual tension between autonomy and justice.

Introduction

The coronavirus disease 2019 (COVID-19) caused by infection with Severe Acute Respiratory Syndrome – Coronavirus 2 (SARS-CoV2), a newly emergent virus, is challenging public health and healthcare systems globally. The national guidance from the Center of Disease Control (CDC) in the United States, includes social distancing, self-quarantine, and closure of many businesses including schools. The speed of virus spread prompted more dramatic social restrictions than are common in other pandemics such as seasonal flu. Such actions are justified in order to protect the functional capacity of the healthcare system. It is difficult to accurately predict the severity of any one individual case of COVID-19. Individuals may accept or reject messages about public health constraints. The pandemic reveals a shift in focus from individual patient focused clinical care to communal strategies highlighting social justice. Imbedded in the shift is the tension between autonomy and social justice. The goal of this paper is to analyze how harmony of autonomy and justice would benefit response to this pandemic.

Coronaviruses

Four common coronaviruses circulate globally in a seasonal pattern causing common cold symptoms and resolve without medical intervention unless individuals have some underlying immunological or medical compromising condition. In 2002-2003, a spillover occurred in Guangdong, China. On November 16, 2002 a man in Foshan had fever and respiratory distress, and three weeks later a restaurant chef in Shenzhen became ill with similar symptoms. Both men had exposure to several wild animals used in culinary dishes. Symptoms included headache, high fever, chills, body aches, severe and persistent coughing, coughing up bloody phlegm and progressive destruction of pulmonary system, oxygen deprivation leading to organ failure and death (Quammen, 2012). The severe acute respiratory syndrome (SARS) describes the medical symptoms, but the causative agent was unknown. Scientists tested specimens for antibody and searched for nucleic acid (RNA and DNA) matches by polymerase chain reaction (PCR) using probes to known infectious agents, e.g. H5N1, Hanta virus, pneumococcus. Nothing was found in the known agent collection that could produce such symptoms. The interpretation was that a virus had crossed from some animal to humans, an emerging zoonosis.

Efforts to cultivate virus from patient samples succeeded and the publication cautiously announced a new coronavirus as the "possible cause" of SARS. It was the first coronavirus ever found to inflict serious illness in humans. Family and health workers attending these cases were infected and the virus spread to Hong Kong. When a grandmother visiting family in Hong Kong, returned to her home in Toronto infected, the virus became an outbreak but good public health intervention prevented it from causing a pandemic. Eight thousand cases were documented with 774 deaths. The scope of the outbreak was limited by good laboratory diagnostics, finding and identifying the virus, coupled with efficient public health interventions: cases were isolated, contacts were traced and quarantine measures were instituted in southern China, Hong Kong, and Toronto (Quammen, 2012).

In 2012 another coronavirus emerged in the middle east causing a similar respiratory illness in 2494 confirmed cases with 858 deaths. This outbreak was called MERS for Middle East Respiratory Syndrome. Scientists identified the virus sequence and mapped both MERS and SARS-CoV to a phylogenetic tree of coronaviruses. The spike glycoprotein is the outer most structural protein on the virus and is responsible for attachment to cells through the angiotensin converting enzyme (ACE2) in the case of SARS but MERS uses a different receptor and antibody does not cross react between SARS and MERS. Furthermore, antibody that neutralizes SARS-CoV1 does not neutralize SARS-CoV2 (Ou, X. et al., 2020).

SARS-CoV2 was named an international public health emergency by World Health Organization (WHO) on 30 January 2020, following isolation and sequencing of the virus in January 2020 in Wuhan, China. The announcement was preceded by scientific data indicating communal spread of the respiratory pathogen and reports of person to person spread. By February 2020, cases were confirmed in Europe and the US. Incubation of 2-14 days with an unknown case fatality rate made it difficult to limit exposure especially among asymptomatic infected persons. In addition to intense study of the virus, its complex pathology, scientists and medical personnel sought ways to

treat the infection and research escalated toward creating a vaccine (Rabi, F. et al., 2020).

Every known vaccine creation strategy previously used and several new approaches are in development with over 140 trial vaccines being developed and fourteen of them in human clinical trials. The leading vaccines currently in Phase III trials include AstraZeneca and University of Oxford vaccine made from a weakened version of a common cold virus (adenovirus) as vector and expressing SARS-CoV2 spike protein. The Phase III trials are taking place in Brazil and South Africa. The developing company has promised to supply more than 2 billion doses globally anticipating delivery of 400 million doses before the end of 2020. Moderna in partnership with the NIH began phase III trial July 27, 2020 with 30,000 adult volunteers. The vaccine is mRNA-1273 that carries instruction for cells to produce the viral spike protein. BioNtech, Pfizer and Fosum Pharma collaboratively are testing four vaccines each using messenger RNA in different combinations to targeted antigens. The US government has placed an initial order for 100 million doses paying $1.95 billion (Doheny, 2020). Lacking a thorough knowledge of immunological requirements for protection against infection if exposed, it is difficult to assess each vaccine candidate's worth (Amanat and Krammer, 2020).

SARS-CoV-2 pandemic and US response: Abiding by the public health guidelines to reduce risk of coronavirus infection, people were asked to restrict activity, many businesses closed, schools and churches and other places of group gatherings ceased meeting. Self-quarantine and stay at home orders were variously enforced by local officials and by state authorities. Hourly wage workers were more severely impacted than employees who either had paid leave or could work remotely from home. The economic toll was immediate and serious. While the rate of infection steeply rose in some areas, others were minimally affected. This led to some skepticism about whether the restrictions were necessary in relationship to the economic hardships. In some cities, groups protested the shut-down, arguing the economic impact was disproportionate to the public health measures. Individuals expressed concerns that autonomy and liberty was being infringed without sufficient justification. It is difficult to measure the number of infections that did not happen due to the shut-down and mobility restrictions. If a person is young, healthy, and dependent on income based on hours worked, it is harder to demonstrate that the risk to one's health is more important than the deprivations caused by lack of income. For those living paycheck to paycheck, the hardships were amplified, risking housing, food, and other life - essentials. Here communication that is consistent and transparent and uniformly applied would help but perhaps not satisfy everyone. Desperation and a highly valued individual autonomy made some individuals defy precautionary restrictions. Refusing to stay home, gather in groups, or wear masks were expressions of individual freedom that would not meet the standard of a relational concept of autonomy. Individual risk-benefit assessments reflected many confounding variables in their lives, from socio-economic, trust in public health protections, and perception of seriousness of infection. Many choose survival of the family with its accompanying risks in working jobs that exposed them to infection.

Autonomy is the exercise and privilege of self-governance, advocated by people across a wide spectrum of political philosophies. The Western ethical and philosophical notion of autonomy is the cognitive ability and freedom, values and reason. Eighteenth century philosophers such as Immanuel Kant emphasized autonomy as an ethical exercise of reason. Any person could apply a reasoned analysis to a situation and create a defensible plan of action. Kant is clear that in the reasoning process the action decided upon will be one that all others could act on simultaneously and would never use others as a mere means. An autonomous agent then recognizes his intrinsic value as a rational being and sees no relevant difference between persons, accepting all other rational beings as equals.

Conditions in our social, physical and emotional environment influence exercising the will set by autonomous reason. In the midst of a pandemic with rapid spread of virus from person to person, how many people can exercise the freedom to ignore public health guidance without doing harm to others? In the more traditional context of a doctor-patient conversation regarding treatment of a diagnosed illness, the freedom to apply reason to decide how to medically proceed with treatment is a very different scenario than having a virus and spreading it to others. Autonomy recognizes individuals as moral agents but anticipates a level of moral responsibility that is important.

Moral responsibility refers to the accountability of an agents' voluntary choice and to a judgment about the rational justification of the agents' choice. In both ways, a moral agent, while free to choose according to reason, is nevertheless responsible for the weight of considerations given to the effect of an action on others. A person who accepts responsibility for acting as a moral agent is subject to the critique of the community. The willingness to take responsibility for our own

character as persons – to know who we are – and to care about how our choices affect others is moral responsibility (Gauthier, 2000).

Justice: Individuals live within communities, families, and societies. Recognizing the unfair distribution of talents, abilities among individuals within a society led Rawls to propose a system that would give special advantage to the disadvantaged by way of compensating adjustments. Developing a fair and just system could be obtained by imagining a hypothetical position in society where our talents and position is unknown and can be anyone within the collective. This so called "veil of ignorance" awakens a sensitivity to economic and social inequality so that if we were at the "bottom" of the social construct, we would advocate for a decent minimal assistance to be contributing members of society. By elevating the worst-off members of a social group, the entire society becomes more attractive and socially stable (Rawls, 1971)

In the current context of a virus pandemic, justice in health care would expect equivalent and equal medical treatment for persons infected by the virus without limitations imposed by insurance coverage and affordable treatment. For the benefit of the community in which a COVID-19 patient resides, treatment and confinement of the sick individual benefits the sick person and all who are potentially exposed to the virus through him/her. Equality would support a system in which every worker could recover wages while socially isolated for the benefit of others (MacKay, 2018). To achieve fair distribution of risks and benefits, if we ask hourly workers to keep the subways moving and the nursing homes staffed, some protection should be provided through regulations or policies (Rawls, 1993). It is clearly in the best interest of society to make it possible for an infected individual to quarantine. Likewise, it is reasonable for public health authorities to impose restrictions on behaviors contributing to virus spread, being particularly protective of the most vulnerable.

Public health is defined by the Institute of Medicine (IOM) as "what we, as a society, do collectively to assure the conditions for people to be healthy." To address the problems spawned by pandemics, public officials are right to consider the collective benefits of population health over individual interests. It is tempting to stress the tension between individual and collective interests and ignore the synergies. Without ignoring the importance of individual liberty, freedom of choice, and the importance of autonomy, public health's charge is the health and well-being of the whole community. Prevention of harm is prioritized in public health. The "harm principle" in bioethics insists competent adults have freedom of action unless they pose a risk to others. Just as states require seat-belt use through legal means, public health authorities with the support of state governors can and should act in paternalistic ways to limit spread of a deadly virus.

Local public health agencies in high impact areas struggled in the beginning of the pandemic with allocation of personal protective equipment (PPE). Front line workers in health care, essential workers whose exposure to the public increase their risk of infection are due the protection of PPE and should have first priority in distribution (Gostin, 2016). As vaccines clear clinical trials and are approved, it is likely that distribution of the first available batches will be another serious distribution dilemma. Will the same priorities as for PPE serve for vaccine?

Some states mandate vaccination for specific infectious diseases for all school children, providing exceptions on medical grounds. The proponents of mandatory vaccination priorities the collective welfare and health of community over individual liberty claiming beneficence as the guiding principle. A public health mandate or policy should clearly articulate the justification and the message needs to be delivered consistently and clearly. Careful analysis is required to ensure that such policies don't infringe upon some groups more heavily than on others.

A sad example is the shortage of ventilators that caused rationing decisions in some hospitals. A recommendation to limit elective surgeries was intended to preserve high value resources for care of COVID 19 patients. Physicians were required to make a rapid transition from patient centered practice to triage of limited resources (Dunham et al., 2020; DeBruin and Leider, 2020).

Vulnerable Groups: Age is one of several criteria used to allocate beds in the intensive care units (ICU) in assessment of likelihood of survival. In early weeks of the outbreak, younger people appeared to not develop serious complications but that turned out to be only partially true. It is actually very hard to predict who will and will not benefit from ICU intervention. Persons aged 50 or older represent 35% of the US population, account for 40% of the gross domestic product and contribute 43% of tax revenue according to American Association of Retired Persons (AARP). Respecting each person, regardless of age, and evaluating best treatment options is the most just approach (Carrieri, et al., 2020). The rates of severe symptoms were observed to increase with age and among those hospitalized early in the pandemic more than half were age 60 or older (Powell and Ehrlich, 2020). Preventing infections

among frail older adults with comorbidities may have been better if the distribution of PPE to nursing home attendants and universal adherence to public health best practices had been enforced early and consistently.

African American and Hispanic communities bear a disproportionate burden of disease that reveal systemic injustice. CDC data reveal that one in three people sick enough to require hospitalization from COVID-19 were African American who make up 13% of the U.S. population. Underlying medical conditions and higher rates of job exposure to virus may account for increased incidence. To protect older adults and those with underlying medical conditions is the main justification for preventive measures.

Applying these principles and the Rawlsian society to the SARS-CoV2 pandemic, it is clear that Rawls would be concerned about vulnerable groups and how they would be impacted by social distancing, stay at home orders, or other restrictions aimed at curtailing virus spread. Some people have greater share of responsibility for keeping society functioning, such as health workers, first responders, essential businesses. Closing schools and day care centers created more difficulty for families wherein the parents were essential employees. Childcare became a shared social, expanded family responsibility, in order to protect children from exposure to the virus by parents who were professionally exposed to virus daily. Children who receive free meals, staying home could mean hunger, so efforts to provide meals at a common location were efforts to address the inequality of affect the imposed public health measures had on different families.

Competing principles

Conflict and controversy arose after weeks of imposed restrictions, with people expressing concerns about loss of human freedom or liberty. As free human beings, liberty cannot be taken away but it can be restricted temporarily as the second principle of Rawls suggested: unequal distribution is allowed as long as it is advantageous to all. Under the conditions of restricted movement to limit spread of a seriously pathogenic virus, social distancing and self-isolation are the most effective control measures available. Because SARS-CoV2 is a newly emergent virus, there is no known effective treatment other than symptom control. Given the rapid spread of infections globally, the most effective public health intervention was to limit spread by quarantine (Lei and Qui, 2020).

Liberty infringing measures to control disease are justified if the risk of harm to others can be significantly reduced. Government authorities have a responsibility to act and rule in favor of their citizens. They are responsible for the well-being of citizens and for provision of a framework in which every person can pursue their self-directed goals (autonomy). Sadly, mistaking limited, temporary restrictions to mobility as an assault on individual freedom and liberty could contribute to the fact that confirmed cases of coronavirus infection grew faster in the US than any other nation (Nace, 2020).

Healthcare coverage is a patchwork in which some benefit more than others. Whereas the Affordable Care Act (ACE) provided more Medicaid coverage, and expanded access to health insurance, opponents consistently chip away at the law, seeking to either amend or repeal it. The US has discussed universal health care since Theodore Roosevelt was President and we still lack consensus to make it a national policy. Pandemics like SARS-CoV2 remind us again that the failure to cover all citizens with adequate health care access, leads to inequalities that call forth social justice concerns. It may be autonomous choice to have or not have health insurance, but when your infection goes untreated and you expose me to a potentially lethal virus, the ethical issue quickly moves from autonomy to justice. Larry S Tempkin remarks: "many believe that it is unfair when fundamentally decent people don't fare well…and since reasons of justice apply to everyone, there would be reason to provide equal and high quality health care to all fundamentally decent people whose illnesses left them worse-off than they deserved to be" (Tempkin, 2014).

Lacking universal health care in the U.S., we might encourage empathy for fellow human persons. Empathy invites us to see and acknowledge human suffering and to integrate that knowledge into the decisions we make. Common humanity is a bridge to moral maturation and a leveler in mutual respect. The implication of empathy moves us to see others as equivalent to ourselves, deserving of healthcare if ill, and respectful actions that limit exposure to infectious virus. Leaving subpopulations without medical insurance, vulnerable to higher rates of infection, is difficult to reconcile with communal good. It is in such limited choices where autonomy is constrained by social inequalities. The autonomous choice of individuals to not wear masks or self-isolate puts others at risk especially those in vulnerable groups. Disproportionate sharing of burden of disease by some suggests that social justice needs more emphasis. Understanding autonomy as moral responsibility helps create harmony with social justice requirements in public health. Where these two principles are out of balance, people suffer. Careful rebalancing is

needed to avoid more harm and to protect the health and wellbeing of everyone.

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Nursing students' perception of mental health, mental illness and mental health nursing

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Abstract

The shortage of healthcare providers in psychiatry both in mental health nursing and psychiatrist is evident globally. Multiple factors lead to making the decision to work in a psychiatric setup. The perception of nursing students and other health care providers play an essential role. This study was aimed to identify the perception of nursing students regarding mental health, mental illness and mental health nursing. A cross-sectional study was conducted with 73 nursing students enrolled in BSN 3rd year. Participants completed a questionnaire of demographic and clinical characteristics on mental health, illness and mental health nursing. Purposive sampling was used and data analysis was done through SPSS version 23. A total of 13.7% (n=10) male students and 86.3% (n=63) female students with a mean age of 19 years (SD±5) participated in this study. 76.5% participants belonged to rural and 23.2% to urban population. 90.4% of nursing students reported a positive contribution in providing services to individuals suffering from mental problems. However, only 43.9% responded that they are neutral to apply in mental health nursing. On the other hand, 52% of students showed high anxiety dealing with mentally ill patients in contrast to 50.6% participants who reported they are self-confident at work with mentally ill individuals. On stigmatization, 71% of participants responded that mentally ill patients are unpredictable. This study highlights the knowledge and skills of nursing students in mental health, mental illness and mental health nursing and may serve to encourage nursing students to pursue a career in mental health nursing.

Background

Mental health is satisfactory functioning in daily living activities towards individual's full potential. Mental illnesses are health circumstances that involve alteration in emotion, thought process and behavior, and mental health nursing is about promoting and supporting an individual suffering from mental illness to recovery and to enable them to have more participation and control over their

disorder[1]. Globally, the leading cause of disability is mental illness and approximately 450 million suffer from mental illness. Unfortunately, there is scarcity of healthcare providers including well prepared nurses and physicians to look after mentally ill persons. A WHO report shows that less than 1 psychiatrist and 7.7 nurses are available per 100,000 population[2,3,4]. In Pakistan, 10% of the population (20 million) suffer from mental health issues [5]. In a state summary of Pakistan, 10-16% of individuals suffer from mild to moderate, and 1% suffer from severe mental health conditions. Mental health illness institutes 11.9% of the entire worldwide illness burden and adds to the 1,607 Disability Adjusted Life Years (DALYs/100,000) of the people in Pakistan[6]. The alarming statistics in provinces, Sindh 16%, Punjab 8%, Baluchistan 40% and Khyber-Pakhtunkhwa 5% indicate that immediate measures are needed to prevent further rise in mental illnesses[7].

In order to deal with the alarming burden in healthcare system of Pakistan, manpower development is required and nurses and other healthcare workers should be trained. In order to prepare nurses related to mental health illnesses, nursing education faces many challenges. Nurses belong to the same racial, religious and social background where the concept of mental illnesses is stigmatized. In order to prepare nurses effectively, we need to identify their perception related to mental health, mental illness and role of mental health nurses. That is why this cross-sectional study was designed. The purpose of this paper is to highlight the burden of disease, its causes and share the perception of nursing students related to mental health, mental illness and mental health nursing. Authors shall propose recommendations based on the results, limitation and conclusion of the study.

Teaching nursing students to deal with individuals with mental disorders is very challenging where students need to collaborate in teaching. After entering the psychiatric setup, nursing students feel nervous and incapable to make therapeutic interactions[8,9]. The learning process for nursing students in a psychiatric setting is very complicated. Anxiety is a common response of many students as they become prejudiced by media publicity and community about individuals with mental disorders. Another concern in nursing students is poor attitudes toward mental illness and consumers of mental health facilities may be accountable for a lack of attention in mental health nursing. This leads nursing students away from seeing a career in the field of mental health[10].

Mental illness is considered negatively in Pakistani community; individuals suffering mental illnesses become stigmatized and this causes a barrier in recovery of mental health[11,12]. Evidence shows that 70-80% population do not seek mental healthcare services due to stigma and that is one of the major barriers[13,14]. These stigmas include views that individuals with a mental illness are hazardous, impulsive, more likely to commit violence, and are somewhat responsible for their illness. Previous research has recommended that attitudes toward mental illness by healthcare professionals are very alike to those of the overall public. Nursing students 'attitudes reflect the predominant observation of the overall population, toward individuals with mental illness[15,16].

Research proposes that students' stereotypes and negative perceptions of the mentally ill patients and mental healthcare affect their professional selections and unfavorably affect looking for a career in mental health nursing[17]. Nursing students learn about mental health and mental illness and their management in their third year of training, so that they can develop good understanding about health situation and relevant baseline knowledge. However, preparing nursing students for mental health and illness is somewhat challenging due to their pre-conceived perceptions, beliefs and attitudes. When they enter the clinical phase, this causes anxiety and hindrances to developing therapeutic communication with the clients, patients and their family members. The consequences of first interactions with mentally ill patients can be particularly distressing[18]. Furthermore, these misunderstandings can lead to a lack of acceptance of individuals in the psychiatric setting with undesirable opinions and attitudes held towards them[1]. Therefore, this research study attempts to identify the nursing students' perceptions towards mental health, mental illness and mental health nursing.

Methodology

A cross-sectional research study was planned to achieve the research objective. This study was conducted at a private university college of nursing in Karachi, Pakistan. Purposive sampling of a total of 76 students enrolled in BSN-3rd year nursing program was done who were going to take Mental Health Nursing course. Data was collected using MHN-I questionnaire which is pre-tested by Furr (2014) in his study about perceptions of undergraduate students. The questionnaire was distributed to all nursing students after consenting to the study. Students were briefed about the study and were assured of anonymity and confidentiality.

Data collection and instrument

The study participants were examined with MHN-I pretest questionnaire which is an educational tool and is self-descriptive originated by Wynaden, Orb, Mcgowan and Downie to measure the specific perceptions towards mental health, illness and mental health nursing. The instrument was administered to nursing students. The instrument consists of 24 responses. The subscale contains the level of preparedness for the mental health setting, understanding of mental illness, beliefs on stigmatization; pursue it as a career, course efficacy, anxiety about the mental conditions and important contributions.

The responses 1, 4, 7 and 10 refer to level of preparedness while responses 9, 18, 19, and 23 are about knowledge of mental illness. Another subscale about stigmatization consists of responses 8, 21 and 24. The subscale of pursuing career in mental health is 6 and 12. Course effectiveness included responses from 14 to 17. The subscale on anxiety was responses 3, 5 and 22. The subscale about valuable contribution for providing services to mentally ill was in responses 2, 11 and 20.

Table 1: Descriptive analysis of demographic indicators

Age *Mean ± SD*		*19 ± 5*	
		No.	*%*
Belongs	Rural	56	76.5
	Urban	17	23.3
Gender	Male	10	13.7
	Female	63	86.3
Province	Sindh	20	27.7
	Punjab	1	1.4
	Baluchistan	1	1.4
	KPK	41	56.2
	Gilgit Baltistan	10	13.7

Data analysis

Data was analyzed using SPSS version 23. Descriptive statistics were formulated such as frequencies and percentages to compute relevant sociodemographic characteristics. For descriptive analysis all responses of mental health nursing education survey were grouped. The response items were grouped into three categories as "strongly agree", "agree" and "somewhat agree" combined to form agree category while neutral remained on its own and another category was made as disagree with combination of "strongly disagree", "somewhat disagree" and "disagree". Interpretations were agreed upon by the authors.

Ethical approval

Approval was granted from college of nursing to conduct the study as part of faculty development. Nursing students were briefly informed of their voluntary participation and consent form was filled.

Results

A total of 76 questionnaires were distributed and 73 questionnaires were returned completely (96% response rate). Respondents were mainly females (86.3% n=63) with a mean age of 19 years (SD =5). The province wise percentage of the participants was Sindh (27.7%), Punjab (1.4%), Baluchistan (1.4%), KPK (56.2%) and Gilgit Baltistan (13.7%). Participants were taken from BSN year three because they were taking mental health nursing course and need to attend the clinic of mentally ill patients as course requirement. 43.9% of participants responded neutral whether to apply for graduate program in mental health while 28.8% disagreed. On the issue of mental health nursing makes a positive contribution, 90.4% of nursing students agreed, 52% reported that they feel anxious working with individuals suffering mental health problems and 50.6% reported they are confident working with mentally ill patients.

Discussion

In expressions of general perception about mental health nursing, students showed mainly a positive perception, which is consistent with previous research studies conducted across the world.

The level of preparedness reported through attending mental health clinic and also knowledge of mental illness is reported with positive regard as shown in table-I. This is consistent with other research study findings of encouraging nursing students exhibiting their competence in terms of skills, knowledge and their abilities in mental health nursing[19,20]. Stigmatization is an issue where individuals cannot work up to the potential for prejudice which is a negative behavior and is reported with high percentage which is consistent with other research studies because stigma is belief about mentally ill that they are dangerous, more prone to violence and are responsible for their illness. These beliefs are due to lack of knowledge of community[21,22,23].

Pursuing a career in mental health nursing is not a favorable choice as shown in table-1 which is seen in other research studies where lack of interest in mental health services is highlighted due to poor attitudes to individuals suffering from mental conditions. These negative attitudes direct nursing students not to choose mental health nursing as career.

Table 2: Descriptive analysis of demographic indicators

		Strongly disagree	*Disagree*	*Somewhat disagree*	*Neutral*	*Somewhat agree*	*Agree*	*Strongly agree*
		n (%)						
	level of preparedness about MHN							
1	I feel well prepared for mental health clinical placement	-		-	3 (4.1)	8 (11.0)	8 (11.0)	35 (47.5)
4	I have a good understanding of the role of psychiatric nurse	19 (6.0)	1 (1.4)		5 (6.8)	7 (9.6)	22 (30.1)	18 (24.7)
7	I feel confident in my ability to care for people experiencing mental health problems	20 (27.4)	10 (3.7)	11 (15.1)	7 (9.6)	8 (11.0)	12 (16.4)	12 (16.4)
10	Theoretical components of mental health have prepared me well for me clinical placement.	13 (17.8)	-	-	2 (2.7)	7 (9.6)	14 (19.2)	23 (31.5)
	knowledge of mental illness							
9	Mental illness is not a sign of weakness in a person	11 (15.0)	10 (13.0)	8 (11.0)	5 (6.8)	16 (21.9)	12 (16.4)	11 (15.1)
18	Someone I know has experienced a mental health problem	1 (1.4)	3 (4.1)	9 (12.3)	18 (24.7)	14 (19.2)	14 (19.2)	14 (19.2)
19	When a person develops a mental illness it is not their fault	2 (2.7)	5 (6.8)	4 (5.5)	7 (9.6)	11 (15.4)	16 (21.9)	28 (38.4)
23	The way people with mental illness feel can be affected by other people's attitudes towards them	1 (1.4)	-	3 (4.1)	8 (11.0)	20 (27.4)	17 (23.3)	24 (32.9)
	Stigmatization in mentally ill patients							
8	People with mental illness are unpredictable	-	2 (2.7)	6 (8.2)		8 (11.0)	18 (24.7)	26 (35.6)
21	People with mental illness can't handle too much responsibility	13 (17.8)	2 (2.7)	4 (4.5)	3 (4.1)	4 (5.5)	14 (19.2)	26 (35.6)
24	People with mental illness are more likely to commit offences or crimes	20 (27.4)	2 (2.7)	2 (2.7)	6 (8.2)	8 (11.0)	14 (19.2)	28 (38.4)
	pursuing career in MHN							
6	I will apply for graduate programs in psychiatric/mental health	1 (1.4)	8 (11.0)	12 (16.4)	20 (27.4)	17 (23.3)	11 (15.1)	4 (5.5)
12	I intend to pursue a career in psychiatric/mental health nursing	1 (1.4)	8 (11.0)	12 (16.4)	20 (27.4)	17 (23.3)	11 (15.1)	4 (5.5)
	Course effectiveness							
14	My course has prepared me to work as a graduate nurse in a medical graduate program	-	2 (2.7)	6 (8.2)	8 (11.0)	18 (24.7)	26 (35.6)	13 (17.8)
17	My course has prepared me to work as a graduate nurse in an age care graduate program.	2 (2.7)	3 (4.1)	13 (17.8)	2 (2.7)	20 (27.4)	23 (31.5)	10 (13.7)
	Anxiety attending mentally ill patients							
3	I feel anxious about working with people experiencing a mental health problem	3 (4.1)	7 (9.6)	7 (9.6)	18 (24.7)	7 (9.6)	22 (30.1)	9 (12.3)
5	I am uncertain how to act towards someone with a mental illness.	5 (6.8)	4 (5.5)	12 (16.4)	22 (30.1)	21 (28.8)	7 (7.6)	2 (2.7)
22	I feel safe about this psychiatric/mental health placement	3 (4.1)	7 (9.6)	7 (9.6)	18 (24.7)	7 (9.6)	22 (30.1)	9 (12.3)
	valuable contribution for providing services to mentally ill							
2	Mental health nursing positively contributes to people experiencing a mental health problem	-	-	7 (9.6)	-	-	30 (41.1)	36 (49.3)
11	Placement in mental health nursing will provide valuable experience for my nursing practice.	-	-	-	3 (4.1)	13 (17.8)	25 (34.2)	32 (4.8)
20	Mental health services provide valuable assistance to people experiencing a mental health problem.	1 (1.1)	1 (1.1)	2 (2.7)	2 (2.7)	12 (16.4)	29 (39.7)	26 (35.6)

These negative perceptions of nursing students about the field of mental health nursing unfavorably affects them as not to pursue mental health nursing as career. [24,25,26]. On the responses about anxiety related to dealing with mentally ill clients, students reported fear which is similar to the other research findings because nursing students encounter issues of mental disorders during the bachelor program in nursing. Research showed nursing students to have fear and anxiety about mentally ill patients thus it is very important for nursing students to have communication before encountering real patients to reduce their level of anxiety. Fear is a common reaction after entering the psychiatric area because of negative media about mental disorders. This becomes a challenge for nursing students to provide teaching and do therapeutic communication with patients.[27, 28, 29]. Valuable contribution in terms of recovery from mental illness is a major factor which is enhanced through group volunteer services; also good physical health is a major contributor in recovery through providing services[30, 31].

Conclusion

This study found that nursing students showed positive perceptions regarding working in mental health setup. Although working with mentally ill clients is much stressful but it is really valuable to provide services to individuals suffering from mental conditions. Through teaching the course of mental health nursing and by attending the clinic nursing students can make a positive change towards selecting mental health nursing as a career choice.

Limitations

This study was conducted at one private college so sample size was only from one class which is not enough representation. Through these findings it is recommended, to conduct a quasi-experimental study on the same group and make a comparison after they complete the course of mental health nursing.

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Mandatory COVID-19 vaccination in Africa: The philosophy of objectivism on individual rights vs public rights in a culture bound society, Nigeria

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Abstract

The mandate to ensure and protect the health of the public is an inherent moral pursuit of any responsible government whose obligation is to care for the well-being of its citizens. Through well planned prevention of ill health, individuals can spend more of their years in good health and contribute meaningfully to the development of the society. Because of the concern in balancing respect for individual autonomy and liberty, ethical justification for government intervention to promote public health through vaccination deserves renewed scrutiny. A case in point is the suggestion for a mandatory vaccination necessitated by the latest COVID-19 pandemic. Vaccination campaigns aiming to eradicate disease have been deployed in the past to create herd immunity within a given population. Depending on the epidemiological situation, vaccinations may be voluntary in some countries but mandatory in others, with mandatory policies sometimes leading to resistance against the government. Acceptance of vaccination for preventable diseases is often high at various places. However, in Africa, as its often the case with many developing countries, a significant number often refuse vaccination due to various concerns, including cultural and religious perceptions, ideological differences, or stark ignorance or misinformation about vaccines. Proponents of mandatory vaccination argue with justification that under such epidemiological condition the state is right to act in the interest of public health. But the complexity of African society with varying cultural and religious practices also reflects on the people's perception and understanding of their health matters. Many African cultures have different notions and understanding of the causes of diseases and may thus reject vaccination for a disease they believe is spiritual or even non-existent. We are of the opinion that mandatory vaccination for COVID-19 for Africans given its heterogeneous and complex nature and significant uncertainties in both the pathophysiology and management of the virus calls for intentional and robust community engagement and dialogue. This paper will explore any ethical dilemma and present a platform to address concerns around safety, access and dissenting opinions as well as sustainability before any form of implementation.

Introduction

The historical journey to prophylactic vaccination as one of the least costly and most effective forms of medical intervention started from Edward Jenner's work in 1796 (Dohertya et al., 2016). Jenner is considered the founder of vaccinology after he inoculated a 13 year-old-boy with vaccinia (cowpox) virus and demonstrated immunity to smallpox that led to the development of the first smallpox vaccine in 1798. Today several vaccines are produced based on new knowledge and better understanding of molecular biology and have led to a reduction in the mortality rate of many infectious diseases. In the 18th century they used the vaccinia virus while in the 19th century, Louis Pasteur and Émile Roux demonstrated that inactivated or attenuated organisms could provide protection (Dohertya et al., 2016). The 20th century witnessed an accelerated development of new vaccines involving many new technologies which became available for immunization against many diseases with high mortality. Despite being one of the most widespread and successful of all health interventions after the provision of safe drinking water, immunization has been controversial since its introduction, with opponents claiming it was unnatural or contaminating (Schwartz,2012) and could be harmful. Because vaccines are different from most medicines and are administered to large and mostly healthy populations including infants and children, there may be low tolerance for potential risks or side-effects. In addition, the long-term benefits of immunization in reducing or eliminating infectious diseases may induce complacency due to the absence of cases (Di- Pasqualea et al., 2016). In some cases, there may be associated vaccine scares.

The largely unproven relationship of measles-mumps-rubella (MMR) vaccine with autism, and whole-cell pertussis vaccines with encephalopathy, can result in reduced vaccine uptake and consequent disease resurgence (Di- Pasqualea et al., 2016). Vaccinations have had an enormous impact on population health and the prevention of disease and have been one of the greatest public health achievements of the last century. However, over the past decade, acceptance of vaccines has been challenged by individuals and groups who question the benefit and safety (Kristin and Sarah,2017). Ethical issues pertaining to mandatory vaccination activities and the public health versus individual rights debates are important in the implementation and the public's response to vaccination programs. The debates will continue, and as healthcare professionals, our duty is to empower and educate consumers so that decisions can be made with the best interests of all in mind (Luke et al.,2014). Notwithstanding, a comprehensive vaccination program is a cornerstone of good public health and will reduce health inequities and the universal disease burden.

From a human rights perspective, vaccination equitably promotes and protects public health when the focus is on its public good. On the other hand, individual rights issues come up where there is hesitancy and refusal to be vaccinated based on some reasons such as religion, personal belief and culture. The ethical principles of beneficence, non-maleficence, justice and autonomy tend to provide a morally justified basis for mandatory vaccination, even though the autonomy of the individual

becomes restricted. The final goal of a mandatory vaccination program, to prevent disease, disability and death, is noble and moral both from the deontological and utilitarian perspectives (Umeora et al., 2012). The philosophy of objectivism and distributive justice is better served by mandatory rather than voluntary vaccination programs when dealing with a known disease that has demonstrated success in control with known vaccines.

This may not be the case with COVID-19 vaccine until the safety and efficacy are determined through clinical trials. COVID-19 is an official recognized name for a novel coronavirus first isolated from persons with pneumonia in Wuhan city, China (World Health Organization, 2020). The virus can cause a range of symptoms, from mild illness to pneumonia. Symptoms of the disease are fever, cough, sore throat and headaches. In severe cases difficulty in breathing and death can occur. At the moment there is neither a definitive cure for COVID-9, nor an effective vaccine.

Methodology

We carried out Internet search of articles, conference proceedings, media reports, and textbooks on vaccination with focus on mandatory vaccination and human rights, public health ethics and cultural norms published locally and globally without limitation of time span and language using Google search, Google Scholar, PubMed, African Journal Online, Medknow, Hinari and NIH.gov, ResearchGate, and Elsevier. We also searched for published papers and technical reports on the novel disease COVID-19 and biomedical care in Africa from the Internet and university libraries. The search engines yielded 25 relevant publications which, in addition to the authors' knowledge and experience in public health and bioethics, supported the information as presented in this article.

Mandatory vaccination: individual rights vs public rights

In discussing this issue, some pertinent questions must be addressed and they include;

- ❖Are the rights of individual more important than the rights of the society?
- ❖When should an individual right be sacrificed for the collective good?
- ❖When should a collective concern be eliminated to protect an individual's rights?
- ❖Do governments have the right to determine what is best for everyone within their domains?
- ❖Should people surrender their autonomy to get vaccinated at the cost of probably having adverse reactions to the vaccine for a novel disease such as COVID-19 that has not yet been properly understood?

There is no doubt that ethical challenges abound in making vaccination mandatory especially in a pluralistic society with different cultural dispositions. Because most of the diseases being vaccinated for prevention are transmitted from person to person, there is a need to provide both individual and public protection against the disease. A mandatory vaccination in Africa for a novel disease such as COVID-19 will inevitably present strong ethical concerns when weighed against a risk –to- benefit ratio. This is because the immunogenicity is not yet properly understood and despite clinico-pathological similarities with the seasonal influenza viruses (flu), it is much more contagious and fatal. In sub-Saharan Africa (with the exception of South Africa and parts of the Maghreb) flu vaccination is rare. Nigeria does not have a vaccination program against flu because it is rare and when it occurs, it runs a mild course with or without malaria or other common infectious disease like typhoid-fever.

Respecting individual concerns and the right to accept or refuse COVID-9 vaccination as well as acknowledging exemptions seems a good ethical decision in the light of the present outbreak. When an adequately large proportion of individuals in a community is immunized, those persons serve as a protective barrier against the likelihood of transmission of the disease, thus indirectly protecting those who are not immunized (Kevin and Alan, 2007). This means not everyone will be vaccinated for several exemption reasons such as medical conditions which governments may accept as a waiver irrespective of the individual autonomy to opt out due to personal, cultural or religious beliefs. Exemption should not only be based on medical grounds; people have a right to decide whether they should be vaccinated or not based on vaccine safety concerns and risks they may feel outweigh the benefits.

In children, proposals for vaccination requirements often precipitate vigorous discussions of ethical issues, especially among parents. Some parents do not accept existing safety evidence. Others oppose the concept of mandatory vaccination for specific reasons such as religious or philosophical beliefs that conflict with vaccinations (CDC, 2015). Because several scientific studies have found that individuals who exercise religious or philosophical exemptions from mandated vaccinations are at a greater risk of contracting diseases, which puts themselves and their communities at risk, public health advocates often struggle to balance the ethics of protecting individual beliefs and the public's health (David and Saad, 2006). A society is made up of numerous individuals without which, the society does not form. Individual right is a person's justifiable claim, protected by law, to act or be treated in a dignified manner that protects the liberty and right to decision making. However, in reality, the individuals' rights are grounded in relativism when the issues of collateral damage and public harm are envisaged by the state especially on issues of epidemic and pandemic disease outbreak. In such a situation an individual right may be sacrificed for the collective good so as to avoid group harm and collateral damage.

Autonomy and right to personal liberty mean that an individual deserves the right to take decisions affecting him/her in all issues including right to receive or reject any form of healthcare, preventive or therapeutic (Lavery et al., 2007). A mandatory vaccination policy implies no consent is to be sought before the vaccine is administered to an individual. This obviously negates the individual's rights to liberty and autonomy and could therefore be

argued on this basis as illegitimate irrespective of the intended outcome (David and Saad, 2006). The government has the mandate to ensure and protect the health of the public in its moral pursuits and obligation to duty in caring for the well-being of its communities through vaccination but governments cannot always determine what's best for everyone within the society. Forced vaccination against a person's right to decision-making may in certain cases lead to serious harm or possible death following vaccine reactions which on its own violates the fundamental right to life of an individual.

Vaccination in Nigeria: an overview

The complexity of African society with different cultural and religious practices often reflects on the people's attitude and understanding of their health matters. The influence of culture on the health-seeking behavior of Africans cannot be underestimated as many African cultures have different notions and understanding of the causes of diseases (Chukwuneke et al., 2012). Anecdotal evidence suggests that a significant percentage of Nigerians and indeed many Africans, believe that COVID-19 does not exist or is a Western disease. This default position has placed Africans on the quagmire of dealing with the impending catastrophe as predicted (Zhao et al., 2020). In Nigeria, vaccination (immunization) began in 1956 when smallpox was severe nationwide. The national expanded program of immunization (EPI) started in 1979 to combat deadly childhood diseases, which were regarded as the cause of high infant morbidity and mortality in Nigeria (Endurance et al., 2014). Nigeria is divided into six geo-political zones: North Central, North West, North East, South East, South West and South South, that make up 36 states and the Federal Republic of Nigeria. The most populous country in Africa, Nigeria is estimated to have a population of 167 million (National Population Commission, 2008).

The Expanded Program of Immunization (EPI), introduced in 1979 with the aim of providing routine immunization to children less than the age of two years, recorded initial but intermittent successes (Odusanya, 2008). Immunization has always been a very difficult health project in Nigeria because many families do not always allow their family members including children to be immunized mostly due to cultural and religious beliefs. Some studies have shown Nigeria as the worst immunization defaulter in the West African sub-region, only better than Sierra Leone (Green, 2004). The vision of EPI in Nigeria was to improve the health of Nigerian children by eradicating all the six killer diseases: polio, measles, diphtheria, whooping cough, tuberculosis, and yellow fever (Endurance et al., 2014). As outlined in the national health plan between 1985 and 1990, the objectives of EPI were to strengthen immunization, accelerate disease control and introduce new vaccines, relevant technologies and tools (Endurance et al., 2014). However, these objectives were hampered by some challenges such as rejection of selected vaccination by parents or on religious ground. Many decision-makers and caregivers reject routine immunization due to rumors, incorrect information, and fear of complications that may follow the vaccination (Endurance et al., 2014). In the past, some Nigerians objected do so due to fears and worries regarding routine vaccination because of little knowledge or limited information and mistrust. Some are of the opinion that the Western world is indirectly using vaccination to reduce the population of the Africans as they are determined to regulate and impose population control especially in Northern Nigeria (Feilden, 2005; Yola, 2003). This lack of trust and confidence in routine immunization is also found in many parts of Nigeria (Babalola and Adewuyi, 2005).

Ethical considerations and right to personal liberty: A mandatory vaccination program implies that no consent from the individual is to be sought before the vaccine is administered. This obviously negates the principle of personal liberty and ownership of one's body because an individual deserves the absolute right to determine what happens to his or her health including vaccinations. For the minors, this autonomy resides with the parent or legal guardian. Mandatory vaccination is therefore an affront on autonomy as it negates the protestations of parents and the voluntariness that should follow informed consent (Colgrove, 2006). The principle of autonomy demands that each individual has a competent right to self-determination (Belmont report) and be treated as an end in itself, never to be used as a means while considering a mandatory COVID-9 vaccination program. Mandatory COVID-9 vaccination bears the human rights and ethical burden of relegating informed consent, restricting autonomy and liberty against the population.

The proponents of mandatory vaccination of a novel disease such as COVID-9 may argue that such vaccination program may provide the requisite herd immunity but this could also be interpreted in terms of using the individual as a means and not as an end for a disease not yet clearly understood. A further concern would be the achievable goals of the mandatory program since the effectiveness of the immunization in poor developing countries such as Nigeria will be hampered by chains of reaction of events: lack of good infrastructure for effective movement of health personnel to most rural areas, erratic power supply which can compromise the integrity of the vaccine cold chain, lack of adequate manpower, poverty and ignorance especially amongst the rural populace. At the end, not everyone willing can be vaccinated, mandatory program notwithstanding.

Some proponents (Chukwuneke, 2020; Alberto and Julian,2017) of mandatory vaccination have argued that it is ethically justified because people have a moral duty not to harm or risk harming other people especially when avoiding harm, or risk of harm comes at a small cost to individuals. Apart from moral obligation, mandatory vaccination is justified based on the fundamental principle of fairness. On the basis of this principle, everybody should make their fair contribution to important public good from which everybody benefits (Alberto and Julian,2017). Though the COVID-19 pandemic may pose a health threat to many people across the globe, we suggest that there may even be a greater threat to personal liberty by mandatory vaccination. With respect to more preventable diseases, especially those that affect children, the emphasis on COVID-19 many argue, may be exaggerated (Alberto, 2017). With the successes gained in childhood vaccinations for preventable disease such as polio, diphtheria, measles

without mandatory vaccination, would that of COVID-9 be necessary since it is yet unclear that the vaccine (when one is developed) may provide lasting immunity such as seen in the common flu.

Conclusion

Mandatory vaccination policies apart from moral obligation would guarantee that everybody makes their fair contribution to an important public good such as herd immunity. However, in the case of a mandatory vaccination for a novel disease whose vaccine has not been fully developed and clinically tested on risks and benefit ratio, it is fraught with many ethical concerns. People are also concerned about proposals from certain quarters for a mandatory vaccination without any evidence of clinical trial outcome of the vaccine. We are of the opinion that mandatory vaccination for COVID-19 for Africans is particularly worrisome. Efforts must be made to account for the numerous cultural beliefs of the people, and proper community engagement and ethical dialogue to address different concerns and dissenting opinions before any form of implementation.

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Turning tragedy into creative work: experiences and insights of plant lovers in Davao del Sur during COVID-19 pandemic

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Abstract

The Covid-19 pandemic has resulted in disruption of work and other social activities of so many people. Some were forced to stay at home and many decided to stay at home for fear of being infected with the virus. This phenomenon brought different reactions and even mental stress to many people. However, there were people who turned this kind of tragedy into creative work. This paper discusses the experiences and insights of known plant lovers in Digos City, Davao del Sur Philippines. Digos City is one of the heavily affected places during the series of earthquakes that jolted Davao del Sur last year. While people are still recovering, COVID-19 added an additional burden to the residents. In this paper, we argue that their decision to focus on gardening was not only to fight boredom and to divert their attention during lockdown but this was their way of maintaining their well-being by participating in the on-going work of creation and re-creation and to rise from the tragedy. We further argue

that it might be good that this creative work will go beyond home gardening and beyond pots and slowly extend to creative work for environmental protection and preservation through more active engagements into reforestation activities.

Introduction

The COVID-19 pandemic created several unforeseen challenges and has taken a significant toll on people all across the world. Our daily routines have been interrupted, work has been displaced, school time for children and adult stopped and the once busy streets at night turned into peaceful paths. All these we are currently embracing as we gradually face the reality of the new normal. But this circumstance also ignites character formation. According to (Rashid, n.d), character is the virtue of hard times. Individuals, despite many set-backs in life, try to utilize their strength to deal with challenges adaptively. It is said that applying our strength helps us to reframe and reappraise challenges, and provides us with a steady dose of well-being to build positive coping mechanisms. Research, informed by positive psychology concepts (Southwick, Satodiya & Pietrzak, 2016) shows that tapping onto our strengths helps us to tackle tough challenges (Niemiec, 2018; Niemiec & Mcgrath, 2019). To some, strength means resorting to plant collecting and plant growing. A person who loves plants and flowers is called an anthophile. Plant and flower growing and collecting have been proven to stimulate the mind, improving focus and concentration. Bringing natural elements indoors and outdoors helps memory retention and productivity in the office and the environment we are in.

As we gathered stories and experience of people who are into home gardening, plant growing and plant collecting, we argue that the reason that they are into gardening is not only to do away with boredom during lockdown and quarantine, but because it is their mechanism to maintain their well-being through actively participating in the on-going work of creation and re-creation and to also rise above the series of tragic events they have experienced. We also further argue that this creative pastime needs to go beyond pots and garden soil, and shall extend to creative work for the purpose of protecting and preserving our environment and more so, active engagements with reforestation activities.

We asked our participants the following questions: What is your main reason you resorted to gardening during this time of pandemic? How does gardening help you during this time of pandemic? What lessons can you get from engaging into gardening?

Reasons why they resorted to gardening: Home gardening can be very exhausting and time consuming if it is not considered as a passion or a pastime. In this time of pandemic, when there are government mandates to stay at home for safety, we can actually sustain for a week or a month but adding more days and weeks would result to boredom, depression and worse, laziness and procrastination. According to the Center for Disease and Control Prevention (2018), well-being is a positive outcome that is meaningful for people and for many sectors of society, because it shows that people perceive their lives as going well. This is true to the individuals who resorted into home gardening, plant growing and plant collecting. They perceive these activities as meaningful in the midst of the strains brought about by COVID-19 pandemic; to them there is still hope that their lives go well by taking care and growing plants and flowers in their gardens. There is no consensus around a single definition of well-being, but there is general agreement that at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning (Andrews & Withey, 1976; Diener, 2000; Ryff and Keyes, 1995 cited by Center for Disease and Control Prevention, 2018). These ideas also are likened to George Kelly's *Personal Construct* (1963) which stated that any event happening in our lives is open to a variety of interpretations and it is the individuals' perception on how they make sense of it (Engler, 2010). If individuals perceived gardening as a way of coping with stress and fear of being infected with the virus, then individuals create their own way of understanding the events in a positive manner. Instead of becoming paranoid to the situation and hysterical to the negative information, they do something to make their lives productive. Thus, when asked about the reasons why they are into home gardening, these people say they engaged into this activity because of the following: *To relieve stress, strengthen family bonding, and to focus on positive things while staying at home.*

To relieve stress. It cannot be denied that COVID-19 pandemic has caused so much stress to people in many countries in the world. Stress according to the US National Library of Medicine (2020) is a feeling of emotional or physical tension. It can come from any event or thought that makes you feel frustrated, angry, or nervous. In order to release the stress brought about by COVID-19, our participants resorted into home gardening because it eases out and relieves the stress they are feeling. One participant said: *"gardening is fun and removes stress".* Another participant said: *"for a short time I do not worry about the healthcare; instead, doing gardening work relaxes me and eases my worries".* In other words, they engaged into gardening because they experienced a sense of happiness and fulfillment and that gardening takes away their worries about what is happening in the society. It is therefore important to learn to manage stress which includes avoiding stress and taking actions to decrease stress as it occurs. Human beings are gifted with powerful dispositions and it is up to us to maximize this potential to be able to adjust to various adversities that we go through in our lives.

This is very true to people who engaged into home gardening during this pandemic. They experienced and they believe that by engaging into gardening, they were able to manage the stress brought about by the current pandemic. Aside from taking away their stress, gardening gives them a feeling of enjoyment and relaxation when they see their plants and flowers growing. In short, gardening enhances their well-being. Gardening relieves their stress and since plants are living beings, it serves as company in the house and plant owners do not feel alone while staying at home during the pandemic. They take

control of the situation by managing their mental well-being and hold on to the hope that growing plants and collecting its varieties divert their attention from the toxicity brought about by the pandemic.

To focus on positive things while staying at home. Another reason that motivates our participants to engage into home gardening is that they want to focus on positive things while staying at home. During the interview, one participant said: "*stay at home, work from home, lockdown, quarantine caused me to think about what other things to do during this period"*. Another participant said: *"I find diversion from the negativities that our environment is experiencing at the moment".* The tragic events that they experienced allowed them to focus on positive things and to enhance their capabilities to rise above the tragedy. The capability approach purports that the freedom to achieve well-being is a matter of what people are able to do and to be, and thus, the kind of life they are effectively able to lead (Sen 1992: 48; Robeyns, 2005: 94–96; Qizilbash, 2008: 53–54; Sen 2009a; Robeyns, 2016). It is said that optimists find opportunity in every difficulty. This implies that despite the negative situation, people chose to find ways and means to live with positivity by taking care of plants and flowers and engaging into home gardening. And thus, quarantine and lockdown allow our participants to think of other beneficial things to do and because they already have plants at home, they decided to propagate them and cultivate their soil.

Cultivating the soil is cultivating life. For Kumar, (2013) as cited by Bayod (2020), "soil is the source of all life, literally and metaphorically and that, all life comes from the mother soil and returns to her". Thus, Kumar loves soil as his mother and takes care of her (Bayod, 2020). Kumar even made a beautiful analogy of the interconnectedness of life when he said:

> "If my outer body is soil, then my inner being is the soul. As I cultivate the soil to grow food for the body, I take care of the soul and cultivate love, compassion, beauty and unity to realize the harmony within and without. When I am at ease within, I am at ease without. I am at ease with the whole of humanity. Through caring for soil (land) I am a member of the Earth community and through caring for society I am a member of the human community." (Kumar, 2013, p. 10).

According to Bayod, (2020), Kumar's new trinity of *"Soil, Soul, Society"* is a way of saying in three words the inter-relatedness, inter-connectedness and inter-dependence of living organisms on earth. Indeed, it is a trinity of wholeness and unity of life in its myriad forms (Kumar, 2013).

How gardening helped them during this time of pandemic: In this new normal, people got so much craze in buying pots, plants, flowers, and some even propagated more plants by growing seedlings at home. Friendly neighbors, office friends and even social media vlogs shared tips on how to grow healthy plants thriving in an everchanging environment. People were happy and excited because of these activities despite the presence of the pandemic. In her capabilities' theory (Nussbaum, 2002, cited by Kleist, n.d) she emphasized: "if a person lives a life where she is unable to exercise her human powers (for example, self-expressive creativity) then she is living her life in more of an animalistic manner than as a human being". Nussbaum seeks a capabilities' approach that can fully express human powers and not just provide opportunities for people to perform certain functions. As human persons we are gifted with capabilities and choices which transcend us from the rest of the living creatures. We can do something to turn trying times into a worthwhile undertaking and these activities help us sustain during the pandemic that stripped us of things we are accustomed with. The answers of our participants fall into the following themes: *Provides relaxation and calmness; Enhances self-esteem and well-being; Provides source of income.*

Provides relaxation and calmness. To relax means to calm the mind, the body, or both. Relaxing can quiet our mind and make us feel peaceful and calm. In fact, our body reacts when we relax. According to the American Institute of Stress (2019), one is lucky to live in a home that provides its own garden or green space because one can feel a sense of tranquility. For our study participants, gardening helps them to slow down, be calm and reflective about life. It also provides them enjoyment and comfort while seeing the plants grow. As mentioned by one of our participants: *"Home gardening makes me slow down the pace of my busy life because plants and flowers bring calmness and serenity. I found comfort with the plants every time I see them. They are immediate medicine to my worries in this time of pandemic".* Mental focus and mindfulness are popular ways of combatting the stress and anxiety caused by the COVID-19 pandemic. Indeed, gardening helps them to slow down, relax and be calm. It also provides them with enjoyment, relaxation and comfort while they nurture their plants. Certainly, spending time in the garden is a great way to relax and calm. Plants and flowers have magical power to relax our mind and body. That is why in many retreat houses where people are expected to pray and be still, they are surrounded with plants and flowers. Aside from the oxygen that they provide to help people breath normally and comfortably, gardens are also pleasing to the eyes and help you stay calm and relax.

Enhances self-esteem and well-being. Due to the increasing demand of plant and flower varieties, several social media groups are created to answer these needs of plant growers. A very good example is a Facebook page that allows people to sell, barter and introduce plant varieties and discuss matters related with plant growing and home gardening. Our participants were very proud to express their thoughts on the fact that home gardening enhances their self-esteem. One participant said: *"Gardening enabled me to appreciate my talents and capabilities. That I have the capability to give life and nurture life. This enhances my self-esteem. Instead of focusing on the problem, gardening helps me re-align my energies to be more productive in the society. Every time people come and see my plants, they are happy and I'm also proud of myself".* Another participant mentioned: *"It gives*

me positive outlook. I love seeing little ones growing. And it gives me a very wonderful experience, especially on knowing plant names and propagation process that makes me more excited waking up each day". The same concept was shared by another participant when she said: *"Gardening makes me happy and develops my self-pride. It builds my patience, clears my mind and challenges me to enjoy simple things in life without spending too much".* Seeing their plants grow enhances their self-esteem and they are affirmed of their capabilities to nurture life. Sharing these experiences with their fellow gardeners also allows them to establish and develop friendships with them. According to Scott, Masser and Pachana, (2020), gardening groups offer a way for people to connect with nature and each other, allowing social benefits to accrue. Connecting with other members of a gardening group allows people to receive social support and to contribute positively to the lives of others, an important protective factor against isolation and loneliness (Haslam et al, 2019). As expressed by majority of the study participants, they think and feel that gardening really enhances their self-esteem and well-being as they enjoy simple things in life. Gardening makes them feel excited to wake up each day as it provides them with a positive outlook in life.

Provides source of income. A lot of people have been displaced due to the pandemic. Some lost their jobs and others are forced to stop going to work because they are directed to have home quarantine. With meager amount of income, these people looked for ways and means to live by and to sustain especially that they have mouths to feed. This is one of the major reasons why home gardening became a source of income to plant and flowers growers. According to one participant: "*I started my investment in collecting different varieties of plants for future plans like having a nursery/farm as additional income".* Another participant said, *"For economic survival, gardening really helps me."* It reveals that home gardening provided them an opportunity to earn money especially in this time of pandemic. According to Wallin (2019), flowers are among the most profitable plants, producing one of the highest returns of any specialty crop. One can get started with very little, just enough for seeds and supplies, and most new flower growers make money in the first year. There are plant and flower growers especially during the time of pandemic, who only collect for home beautification at first and later turn their love of plants and flowers into profitable ventures. They make money out of their hobby which becomes an addition to their income.

Lessons they get from engaging into gardening. Planting flowers and vegetables can reap good harvest. As stated by Frost (n.d): "Beyond the reward of homegrown produce, gardens provide health, environmental and enjoyment advantages for the gardener". It is a fulfilling job and it also bring us back to commune with the wonders of nature. As mentioned by our participants, the lessons they get from engaging into gardening are: *To be patient and to treat and enjoy life properly; Promotes physical, mental and emotional health; To focus on gratitude instead of competition and to let the flowers bloom in its perfect time; To go beyond backyard gardening to take care of our environment.*

To be patient and to treat and enjoy life properly. Patience is a virtue especially when it comes to gardening. According to Kinzler (2017), gardening is a refreshing throwback to a quieter, more patient time, which is part of its charm. And since plant and flower growers are very excited to see their flowers bloom and their plants produce, there will always be strides in quickening the pace because plants take all the time they need in order to grow. As cited by Ellison Chair in International Floriculture (n.d), flowers generate happiness. Having flowers around the home and office greatly improves people's moods and reduces the likelihood of stress-related depression. According to one of the participants: *"I learned that you have to be patient in life because you cannot rush your plants' growth. They have to be treated properly, tended regularly so that they can grow right".* Another participant said that "*It taught me patience, tolerance and endurance. It made me realize the simple things in life. That joy can be attained by simply looking at your plants blooming and giving back the love"*. Indeed, gardening really develops your virtue of patience in waiting. But while waiting, you are full of excitement and joyful anticipation of the development of your plants. Gardening helps us to reflect about life in general – that we need to be patient as we journey and in every step of the way, let us just enjoy the journey and embrace what life has to offer.

Promotes Physical, Mental and Emotional Health. As emphasized by (Eliades, 2013), gardening promotes physical and mental health through relaxation, satisfaction and better nutrition. There is no greater joy than seeing the plants thrive well, healthy and green. According to Ellison Chair in International Floriculture (n.d), flowers can help achieve a more optimistic outlook in life, which pleases visual stimulation and helps increase the perceived happiness of the planters. Researchers often find in their studies that subjects who participate in gardening have a positive mental outlook (Lombard, Forster-Cox, Smeal, O'Neill, 2006; Armstrong, 2000). As one of our participants said: *"home gardening helps me to be mentally and emotionally healthy".* Another participant expressed: *"Plants are our outlet and one that boosts our energy to continue living with grace and enthusiasm in this challenging time"*. Studies reported in the Journal of Health Psychology in 2012 show that people who feel a connection to nature are indeed happier (Cervinka, Roderer & Hefler, 2011).

To focus on gratitude instead of competition and to let the flowers bloom in its perfect time. It is said that people who spend extended lengths of time around plants tend to have better relationships with others. As they share stories of their plant varieties and their experiences in home gardening; these people also have expressed gratitude to friends and neighbors who share seedlings and other plant materials that can be added to the home garden. As one participant happily said: *"Despite all the negative things happening around us, there is always something to be thankful for and to look forward to. Just like plants, we all bloom in our own ways and in God's perfect time"*. Throughout generations, plants have been a

beautiful medium through which we can learn some of life's valuable lessons (Click and Grow, 2019).

To go beyond backyard gardening and to take care of our environment. Gardens are not just aesthetically pleasing, they are a building block of a healthy space and a reduction in carbon footprints (Throne, 2018). Gardens help keep the environment healthy and strong. The absence of plants and flowers in our gardens can increase pollution, global warming, carbon dioxide, and unhealthy lifestyles. As mentioned by a participant: *"It would be good to plant trees. I wish I had a big area here. I am still not energetic enough to climb up mountains to plant trees. But I can just plant few trees or fruit trees here in our backyard".* And another participant said: "*I realized that God has a reason for letting us experience home quarantine, not only to value the presence of our loved ones and pets but also to help mother earth revive its beauty through planting/gardening*." The more people decide to engage in home gardening, they will not only be helping themselves to improve their well-being but also help protect and nurture the environment we live in. Many of our study participants have the desire to go beyond backyard gardening and to get involved in large-scale tree planting activities to really protect the environment if given the chance.

Conclusion

Our environment is an important part of our existence. As we journey together in facing the tremendous effects brought about by the COVID-19 pandemic, people are able to turn tragedy into creative work by doing home gardening and by growing plants and flowers. These plant lovers resorted into gardening during this time of pandemic to relieve stress and to focus on positive things while staying at home. Furthermore, gardening provides relaxation and calmness, enhances self-esteem and well-being and provides a source of income. Thus, people who engage in gardening have not only earned additional income but also gain lessons in life that are priceless. They learn to be patient and to treat and enjoy life properly. Gardening also helps them to promote physical, mental and emotional health and to focus on gratitude instead of competition and to let the flowers bloom in its perfect time. While momentarily they are just doing gardening in their own backyard, many of them also share that they are willing to go beyond backyard gardening to take care of the environment if given the chance to do so. It might be more noble if this creative work that is discovered and transpired in the time of pandemic like home gardening and love of plants and flowers shall go beyond the garden soils and pots in the gardens (including projects for greening of backyards at home) and lead to active participation and involvement in activities on environmental protection and preservation. It is already established that loss of biodiversity and deforestation will result in virus outbreaks (Climate Council, 2020; Walsh et al, 2017; Kessler et al, 2108; Plowright et al, 2015; Martin et al, 2018). Thus, to prevent a future pandemic, there is a need to restore our ailing environment. Restoring our ailing environment through reforestation and greening projects may not only prevent a future pandemic but will also give, nurture and protect life not only for the present generation but for the next generations yet to come.

The present pandemic also allows us to channel our energy in enhancing our capabilities. As discussed by the Standford Encyclopedia of Philosophy (2016): "the capability approach is a theoretical framework that entails two core normative claims: first, the claim that the freedom to achieve well-being is of primary moral importance, and second, that freedom to achieve well-being is to be understood in terms of people's capabilities, that is, their real opportunities to do and be what they have reason to value". According to many philosophers, the best description of the capability approach is a conceptual framework for a range of normative exercises, including most prominently the following: (1) assessment of individual well-being; (2) evaluation and assessment of social arrangements; and (3) design of policies and proposals about social change in society. In other words, the capability approach prioritizes the capacity, freedom and opportunity of people to do important actions that will also enhance the core of their personhood. Martha Nussbaum (2011) has described the general capability approach as consisting of two clusters: one focusing on the comparative quality of life and the other on theorizing about justice. While most experiences of our participants are still centered on their own well-being, we can glean from their insights that some of them are willing to extend their activities to a much broader context and issues such as environmental protection and climate justice.

It has been said that great things start from small beginnings. This gardening venture of many people, while primarily intended only to help themselves physically, emotionally and spiritually, must extend into greater involvement into the different collective actions towards taking care of the environment, protecting our remaining forests and even restoring denuded forests. While we need to take care and maintain the beauty and bounty of our home, let us be reminded that we are citizens of this one big home – our planet. Thus, we need to take care of our common home by establishing a deep reciprocal relationship with our planet and all that it contains. While we take good care of our planet and all that it contains, it shall take good care of us. Indeed, there is no tragedy, no matter how big and terrible it is, if people continue to sing our SONG – our relationship with Self, Others, Nature and God.

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Ethical issues of COVID-19 for persons with disabilities

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Introduction

Globally, more than 1 billion people, roughly 15 percent of the world population, live with some form of disability. People who are older, people with chronic health conditions, or people with disabilities that, for example, affect their respiratory capacity, may be at particular risk of serious illness or death from COVID-19 infection.[1]

In the current situation of a global health crisis due to COVID-19, there is the higher risk faced by persons with disabilities or chronic illnesses**,** especially in low and middle-income countries. In order to successfully meet this challenge and comply with the 2030 goals, persons with disabilities must be included in all plans to manage the current COVID-19 corona virus outbreak. This implies that the information provided by governments and institutions to prevent infection and to know how to act in case of illness must be available in accessible formats, including sign language, video captioning, the use of alternative text in images and graphics displayed digitally, and easy-to-read versions.[2]

Even in normal times, people with disabilities and chronic illnesses confront biases in medical care, face waiting lists to get support in their own homes instead of at nursing homes, and struggle to access government benefits. But amid a global pandemic, those challenges are heightened. [3]

While the COVID-19 pandemic threatens all members of society, persons with disabilities are disproportionately impacted due to attitudinal, environmental and institutional barriers reproduced in the COVID-19 response. Many persons with disabilities have pre-existing health conditions that make them more susceptible to contracting the virus, experiencing more severe symptoms upon infection, leading to higher levels

of death. During the COVID-19 crisis, persons with disabilities who are dependent on support for their daily living may find themselves isolated and unable to survive during lockdown measures, while those living in institutions are particularly vulnerable, as evidenced by the overwhelming numbers of deaths in residential care homes and psychiatric facilities.[4]

Impact of COVID19 in different institutions: COVID-19 has shown a disproportionate impact in psychiatric institutions, social care institutions (orphanages, day-care centers, and rehabilitation centers) and institutions for older persons, resulting in high rates of infection and death. In some preliminary studies, the number of deaths in care homes represented from 42% to 57% of all COVID-19 deaths in those countries. Institutionalized persons with disabilities face a heightened risk of contracting COVID-19 due to underlying health conditions, difficulty in enforcing social distancing amongst residents and staff, and abandonment by staff. Persons with disabilities living in institutions also face greater risks of human rights violations, such as neglect, restraint, isolation and violence.[4] COVID-19 could be catastrophic in settings such as refugee camps or other temporary camps, where people live in close proximity and often lack access to basic services. People with disabilities in such places face severe obstacles to basic services such as shelter, water, sanitation, and medical care, including in countries like Bangladesh, Cameroon, the Central African Republic, Greece, Syria, and Yemen.[1]

Facing discrimination and barriers during COVID19 crisis: Persons with disabilities also continue to face discrimination and other barriers in accessing livelihood and income support, participating in online forms of education, and seeking protection from violence. Particular groups of persons with disabilities, such as prisoners and those who are homeless or without adequate housing, face even greater risks.[4] It is also important to remove the barriers in accessing health services and hygiene products, as well as to consider reasonable accommodation measures to allow them to work from home and, if that is not possible, to ensure they receive a paid leave to guarantee their income.[2] Older persons are at an increased risk of multiple rights violations in the COVID-19 pandemic,[5] such as discrimination based on age, and must be supported to access services on an equal basis with others. While having a disability probably doesn't by itself put someone at higher risk from coronavirus, many persons with disabilities do have specific underlying conditions that make the disease more dangerous for them.[6]

For people with disabilities, all the general challenges that come with the pandemic certainly apply, but there are additional barriers. Equitable access to healthcare is a long standing barrier worsened by COVID-19. This ranges from getting a coronavirus test to being seen in an emergency room. The use of personal protective equipment, including masks, can make communication more difficult for patients with hearing loss. Medical resource allocations, including ventilators, may be discriminatory against patients with disabilities. This issue echoes an underlying misconception that people with disabilities cannot have a high quality of life and therefore the lives of disabled people may not be prioritized. There has been a shift toward telehealth for non-urgent medical visits. That has provided challenges but also future opportunities for the disability community. [7]

People with disability may be at greater risk of contracting COVID-19 because of:

a) Barriers to implementing basic hygiene measures, such as hand-washing (e.g. hand basins or sinks may be physically inaccessible, or a person may have physical difficulty rubbing their hands together thoroughly);
b) Difficulty in enacting social distancing because of additional support needs or because they are institutionalized;
c) The need to touch things to obtain information from the environment or for physical support;
d) Barriers to accessing public health information. Depending on underlying health conditions, people with disability may be at greater risk of developing more severe COVID-19 if they become infected. This may be because of exacerbating existing health conditions, particularly those related to respiratory function, immune system function, heart disease or diabetes;
e) Barriers to accessing healthcare. People with disability may also be disproportionately impacted by the outbreak because of serious disruptions to the services they rely on. The barriers experienced by people with disability can be reduced if key stakeholders take appropriate action. [8]

Responses during the COVID19 crisis: Personal assistants and interpreters should be, when possible, proactively tested for COVID-19 to minimize the risk of spreading the virus to persons with disabilities.[9] Similarly, confinement measures should be adapted to the needs of specific groups to ensure their well-being. For example, people who need home assistance should keep receiving it and, in the case of persons with psychosocial disabilities, they cannot be required to live in total isolation. [2]

The government and healthcare responses to the COVID-19 crisis are having a significant impact on the lives of people all over the world. It is vital that governments and health officials ensure that human rights are part of this response. In particular, they must ensure that the rights of people from marginalized communities—those who are most likely to see their livelihoods evaporate, their healthcare needs go overlooked, and their lives upended during a crisis—are top priority.[10] All preparedness and response plans must be inclusive of and accessible to all persons with disabilities, including women and girls with disabilities. [9] Children and adults with disabilities should be enabled to participate in decision making and their treatment and when required they should be supported to communicate their needs while under treatment.[11]

Governments should take urgent steps to move people with disabilities (who can be moved safely) out of closed institutions and similar settings and stop new admissions.

Children with disabilities in residential institutions should be reunited with families, wherever possible. Governments should provide adults with disabilities with social support and services to live in the community. Inside institutions, authorities should follow strict hygiene and physical distancing and should develop visitor policies that balance the protection of residents and staff with needs for family and connection. With policies requiring social isolating to stem the spread of coronavirus, people with psychosocial disabilities, such as anxiety or depression, may be in particular distress and may benefit from additional mental health support services. Indeed, self-isolation and quarantine could be distressing for most people in general.

Government policies should ensure community-based services continue and crisis counseling programs are accessible to all. Disruption of community-based services should not result in the institutionalization of people with disabilities and older people.[1] All service providers must ensure that people with disabilities are not left behind during the COVID-19 outbreak and that they are treated with respect, dignity and without discrimination. Specific actions must be taken by various groups to ensure that people with disability have equal access to information, healthcare services and the support they need to stay healthy and safe.[12] We must ensure that telehealth visits are accessible to patients with vision or hearing loss or other disabilities in order to maintain equity in healthcare delivery. If accessibility is prioritized as we make this change, a transition to telehealth could open the door to a more accessible healthcare system.[7] Ensure persons with disabilities receive information about infection mitigating tips, public restriction plans, and the services are offered in a diversity of accessible formats, including easy to read format, high contrast print and, where possible, braille, along with the use of available technologies such as subtitles in verbal messaging.[9]

Conclusion

With the spread of COVID-19, it is vital that everyone, including people with disability follow basic measures to protect themselves and others from becoming ill with the virus. Equally as important is social distancing and self-isolation that can be difficult for some people with disability.[12] Ensure access for persons with disabilities to essential services and protection on an equal basis with others.[9] Persons with disabilities, through their representative organizations, are the ones who can better advise the political authorities to include the disability dimension in the prevention, mitigation and monitoring plans related to this disease.[2] The issues of pre-pandemic care delivery only become more urgent in a time of crisis because people with disabilities have often been considered in a disaster or pandemic planning. We need to learn from this crisis and ensure disability in part of future pandemic planning.

Many people with disabilities are at high risk of COVID-19, but their perspective is not being included in efforts to address inequities in the response. This includes understanding the unique challenges of this community during this crisis. COVID-19 has elevated that conversation, and the legacy should be a continued focus on disability disparities and constant efforts to address disability inequities. As we all make substantial changes in our daily lives, such as working from home and adjusting how we connect to others, look to people with disabilities for guidance, as we have always used alternative strategies. We must look forward that COVID-19 will lead us to better understanding of inclusion and bringing an opportunity to the disability community.[13]

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COVID-19 and mental health: government response and appropriate measures

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Abstract

As governments around the world imposed lockdowns or stay-at-home measures, people began to feel the stress as time dragged on. There were already reports on some individuals committing suicide. How do governments respond to such a phenomenon? Our main focus is the Philippine government and how it responded to the COVID-19 pandemic. In this paper, we argue that the problem with COVID-19 went forth just dealing with physical health. First, people suffer not just from being infected but the psychological stress of possibly getting the virus and the toll of the government lockdown or quarantine. Second, the Philippine *Bayanihan 'We Heal As One Act'* lacks focus on mental health issues while the government's response seemed to focus on security issues. Third, there are countries around the world that have acted effectively in protecting people's mental health. Lastly, we propose appropriate measures to help address the people's mental health while still in the pandemic and for a future one.

Introduction

COVID-19 has brought so many problems both for individuals and governments. These problems could lead

into enduring health problems, isolation, and stigma (Torales, O'Higgins, Castaldelli-Maia & Ventriglio, 2020). However, it seems that most of the news nowadays center on one thing: national security. In the Philippines, the military is actively involved in the fight against the COVID-19 pandemic. With the nationwide imposition of community quarantine in different levels such as General Community Quarantine (GCQ), Enhanced Community Quarantine (ECQ), and Modified General Community Quarantine (MGCQ), the military and the police are in the forefront of implementing it. There were also criticisms on the composition of the Inter-Agency Task Force (IATF), a body responsible for the country's response to the pandemic. Some people were critical of the absence of experts in the medical field, except the chairman who is the Secretary of the Department of Health (DOH), a doctor by profession; others were retired military personnel. While the military and the police must be involved, some people questioned if other aspects of this pandemic crisis are taken care of. One of these is the mental health of the people.

In this paper, we present the scenario of mental health situation as reported. We argue how important this problem has to be addressed just like other health-related concerns. We also point out the lack of government response about the people's psychological and mental needs, particularly during the prolonged lockdown or quarantine, the term used by the Philippines. Moreover, we also identify measures that cater to mental health in times of a pandemic. This paper addresses the gap of having a comprehensive plan in fighting against the COVID-19 pandemic. It also contributes to the body of knowledge on the importance of mental health and how governments must include it in the whole spectrum of healthcare.

COVID-19 and mental health

The devastating effect of COVID-19 was not just death due to complications. People suffered mental problems. Staying at home and the fear of death took a toll for some. For example, preventing people's mobility caused distress and loneliness among Indians and led to suicides (Dsouza, Quadros, Hyderabadwala & Mamun, 2020). In a review of literature of articled published related to COVID-19 pandemic, Rajkumar (2020) found anxiety, depression, and stress as the most common psychological reactions. In Pakistan, reports suggested that the cause of suicides in the country was mainly due to lockdown related economic recession (Mamun & Ullahm, 2020). In Bangladesh, a man committed suicide because of pressure from villagers who suspected him of having the virus despite no diagnosis (Mamun & Griffiths, 2020).

Despite being known for their resilience in times of disaster or crisis, Filipinos did not escape from the psychological battle. There were reports of Filipinos who committed suicide like the case of a Filipina mariner who took her own life inside her cabin while waiting for repatriation back to the Philippines (Ramos, 2020). In Lebanon, a Filipina domestic helper took her life while at the shelter run by the Philippine embassy (Agence France-Presse Reuters, 2020). A 34 year-old in Occidental Mindoro, Philippines, diagnosed with Dengue Fever, thought himself of having the COVID-19 virus, and committed suicide. He also wrote a note to his wife to quarantine herself, although the wife did not show any symptoms (Delos Reyes, 2020). There were other unconfirmed reports both in the Philippines and abroad who succumbed to the same fate. These reports were very alarming. People and the government should realize that mental health is as important as other health-related problems.

COVID-19 and national security

We pointed earlier that national security seemed to take a priority stance in the Philippines in dealing with the pandemic. When one speaks of the Philippine National Security Laws, they actually refer to the following: (a) Philippine Constitution; (b) Laws enacted by Congress such as the Revised Penal Code and the relatively new laws, the RA 10173 otherwise known as the Data Privacy Act of 2012, RA 10175 or the Cybercrime Prevention Act of 2012, the RA 11036 or the Philippine Mental Health Act. Also included are the anti-terrorism laws, namely: RA 9372 or the Human Security Act and RA 10168 or the Terrorism Financing Prevention and Suspension Act of 2012; (c) Executive issuances; (d) Jurisprudence; and (e) International treaties.

National security is defined as a "state or condition wherein the people's welfare, well-being, ways of life, government and its institutions, territorial integrity and sovereignty and core values are enhanced and protected" (2011-2016 National Security Policy, Securing the Gains of Democracy). Based on the definition of national security, it is correct to say that almost all laws of the Philippines are national security laws. Laws that enhance and protect the people's welfare, well-being, ways of life, government and institutions, territorial integrity and sovereignty, and core values are national security laws. But there is a need to amend the present national security laws to be truly responsive to the needs of the people and of the times, especially during a pandemic.

Experiences may show that the present national security laws are insufficient to address the situations and problems that threaten national security. The current national security laws may be inadequate to address the conditions and issues that threaten national security. The Marawi Siege, the Yolanda and Pablo typhoons, and the Mindanao major earthquakes, and now the COVID-19 pandemic only reveal the inadequacies of the Philippine laws in response to both man-made and natural calamities. For example, RA 10121 or the Philippine Disaster Risk Reduction and Management Act or law which was enacted to (a) strengthen the Philippine Disaster Risk Reduction and Management System; (b) to support national disaster risk reduction and management framework and; and (c) to institutionalize the National Disaster Risk Reduction and Management Plan do not even contain a specific provision on the mental health of survivors of these natural or man-made calamities. The mental health of the internally displaced persons brought about by these disasters is not prioritized.

Philippine Government and the Bayanihan 'to Heal as One Act'. On March 20, 2020 Republic Act No. 11469,

otherwise known as the Bayanihan to Heal as One Act, also known as the *Bayanihan Act*, was enacted to grant the President of the Philippines additional authority to combat the COVID-19 pandemic in the Philippines. A cursory reading of the law shows that the law provides the President with the power to implement temporary emergency measures to respond to the crisis brought about by COVID-19, such as but not limited to the following:

- adopting and implementing measures, which are based on World Health Organization guidelines and best practices, to prevent or suppress further transmission and spread of COVID-19 through education, detection, protection and treatment;
- hastening the accreditation of testing kits;
- providing an emergency subsidy amounting to five to eight thousand pesos to low income households based on prevailing regional minimum wage rates;
- providing all public health workers with "COVID-19 special risk allowance";
- directing the Philippine Health Insurance Corporation to shoulder all medical expenses of public and private health workers related to exposure to COVID-19 or any work-related injury or disease during the pandemic emergency;
- enforcing measures against hoarding, profiteering, injurious speculations, manipulation of prices, product deceptions, cartels, monopolies or other combinations to restraint trade or affect the supply, distribution, and movement of food, clothing, hygiene and sanitation products, medicine and medical supplies, fuel, fertilizers, chemicals, building materials, implements, machinery equipment and spare parts for agriculture, industry and other essential services;
- ensuring that donation, acceptance, and distribution of health products for COVID-19 public health emergency are not unnecessarily delayed;
- ensuring the availability of credit especially in the countryside by lowering the effective lending rates of interest and reserve requirements of lending institutions;
- liberalizing the grant of incentives for the manufacture or importation of critical or needed equipment or supplies for carrying out the policy of this law provided that importation shall be exempt from import duties, taxes and other fees;
- ensuring the availability of essential goods by adopting necessary measures to facilitate and minimize disruption to the supply chain;
- moving statutory deadlines and timelines for filing and submission of any document, payment of taxes, fees and other charges required by law;
- directing all private and public banks, quasi-banks, financing companies, lending companies, and other financial institutions, including the Government Service Insurance System, Social Security System and Pag-ibig Fund to implement a grace period of 30 days, minimum, for the payment of all loans falling due within the enhanced community quarantine without interests, penalties, fees or other charges;
- Provide a minimum of 30 days grace period on residential rents falling due within the period of the enhanced community quarantine without interest, penalties, fees and other charges;

The word "*bayanihan*" is a Filipino word which means communal work; the spirit of communal unity and cooperation. Like other laws that aim to respond to natural and man-made disasters much focus is given to rehabilitation of infrastructure and the reestablishment of the livelihood of the people, but there is no specific provision on how to help survivors cope with the trauma and to deal with post-traumatic stress disorder. Lawmakers are so much into rebuilding bridges, roads, and buildings, and reenergizing the economy but forget to address the "invisible wounds" of the victims. In response to the COVID-19 pandemic, the Bayanihan We Heal as One Act, a law enacted in response to the pandemic, did not contain a provision to address the people's mental health. It is focused much on the economic and medical aspects, the effects of which are visible to the naked eye. But mental health is as important as physical health. The invisible wounds need addressing as well. The failure to prioritize the treatment of the invisible wounds has led to death by suicide. Hence, this law, while addressing the concerns of the pandemic, lacks the specific inclusion of mental health issues.

Notable responses on mental health during COVID-19 pandemic

The COVID-19 pandemic, as we mentioned earlier, is not only about physical health. It is also about mental health. While most of the countries focused on the former, there were notable responses that included mental health, or at least led to mental healthcare. In China, a 24-hour online psychological counselling was offered using online platforms like WeChat. It was done by mental health professionals coming from medical institutions, universities, and medical societies (Liu et al., 2020). The Chinese availed of these services, mainly because these were very accessible using their personal gadgets and also because they needed help.

Germany reaped the benefits of its earlier promotion of digital solutions for healthcare services. As the country quickly responded to the pandemic, Health Innovation became one of the most important sources of information as it listed different trusted telemedicine services, for example, the Corona-Bot, an application that provides online chatting services. According to the chairman of Health Innovation Hub, Corona-Bot allowed patients to access relevant information and get advice from experts (Olesch, 2020). They were also protected from fake-news, which could lead to panic and psychological stress as experienced by many people around the world.

Vietnam was credited for its effective strategy. No less than the WHO praised Vietnam's response to the pandemic. The Vietnamese did not experience panic, generally speaking, because of how the government handled the situation. It was able to get the cooperation of the people, civil society, and government (La et al. 2020). Specifically, the government was able to gain the support of media in spreading accurate information, which made the people updated, felt secured, and confident.

New Zealand is a classic example of how people were helped to feel at ease, at least during the pandemic, because of the swift response of the government like lockdown and the timely information they got from the government. For example, the prime minister was seen using different media platforms, including Facebook Live, explaining the government's move and how people should cooperate (Bremmer, 2020).

Appropriate measures towards mental health

In times of pandemic, mental health should be part of the programs and services. First and foremost, there should be education and training among the respondents, and government health officials on how to deal with psychological issues brought about by the pandemic and the measures by the government on addressing it (Pfefferbaum & North, 2020). These people are crucial in the fight against the pandemic, but if they are not well-informed about the issues related to mental health, their actions are inadequate to serve the overall need of the people. There is also a need to debunk the myth of COVID-19 because it can also lead to distress (Kar, Arafat, Kabir, Sharma, & Saxena, 2020). One of these is downplaying the pandemic's negative effect, especially on the psychological and mental stress it causes. Thus, the knowledge and wisdom should start from responsible persons and agencies to be cascaded to ordinary citizens.

Second, mental health should be part of the whole healthcare services during a pandemic. For example, mental health experts should be part of the available personnel in hospitals. For instance, in China, mental health professionals were stationed in hospitals and available for on-site services (Li et al., 2020). In the Bayanihan We Heal as One Act, there was no clear stipulation as regards to mental health. It appeared to be neglected or not seen as a priority at all. Fiorillo and Gorwood (2020) proposed five important things to address mental problems: (1) limit the source of stress, (2) break the isolation, (3) maintain usual rhythm, (4) focus on the benefits of isolation, and (5) ask for professional help. Of the five, it is the last one that needs government support. First, the government provides education on the needs, accessibility, and benefits of receiving such help. Second, assistance must be given to the people in receiving this kind of help. Third, the government promotes the training and professional education of mental professionals and experts.

In the Philippines, the government shall allocate a budget to make its National Mental Health Crisis Hotline working and not merely a program. In its advertisement, the NCMH is supposed to be a 24/7 mental health crisis phone service established by the Department of Health. However, there are various complaints that it is not functional as there is no one to answer calls. This hotline must be operational, and its existence made known to the public.

Third, the government should act fast. There is a need for early intervention to avoid the consequence of mental illness caused by isolation (Galea, Merchant, & Lurie, 2020). Learning from the lesson of the recent pandemic, the government must be proactive rather than reactive. It should include planning for the inevitable effects to loneliness and depression.

Fourth, as effectively done by the mentioned countries, the government must have an accurate and dependable information dissemination system. Without proper information, people tend to panic. In the world of the Internet, so much false information or fake news are proliferated, even during the pandemic. The government must ensure that people get the right information.

Conclusion

The COVID-19 pandemic is not just a physical health problem. It is also a mental problem as evidenced by the effects to people due to stress brought about by the measures imposed by the government, particularly lockdowns. Lessons have been learned, and these include the specific and deliberate inclusion of mental health in the whole healthcare program and systems. More importantly, the government needs to expand its education and training of front-liners, health officials, and policymakers on how to respond to people's psychological and mental health needs during a pandemic. Mental health should be part of the whole healthcare program and systems. The government must be fast in responding, providing early intervention, and using media platforms to provide accurate and reliable information to the people. All these measures are crucial to keeping the mental health of the people during a pandemic.

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Challenges for organ recipients and elderly persons during the COVID-19 Pandemic

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Abstract
All patients and persons with immune health problems require greater care, in clinical and public health practices, because infectious diseases such as COVID-19, attack their immune system. The risk to be a victim increases many-fold compared to healthy people. Because of increased morbidity and mortality, they face anxiety of uncertainty every day. In this paper I focus on informants who are organ recipients and candidates who are in the waiting list, and elderly persons who are in elderly homes which are associated with current Japan's rapidly super-aging society. I argue that during the pandemic period, the government has been struggling how to protect Japanese people's health but not enough for immune-compromised patients and elderly persons.

Organ recipients have to take immunosuppressant drugs to avoid rejection of transplanted organs every day, so their bodies are always immunologically compromised. Organ recipients have to avoid all kinds of infectious diseases with protective vaccinations, avoiding raw food, wearing masks, avoiding people, the cold and dry environment and so on. Among organ recipient candidates, those waiting for a kidney are dialysis patients, and their number two killer is infectious disease.

Another high risk group are elderly persons, especially those who stay in elderly homes. Elderly people whose immune system is weakened are at risk of care home acquired infections by residents, caregivers, official visitors and family members. In the pandemic, most administrators prohibit to bring foods and refuse all visitors (including families), however, elderly persons' loss of motor function with being physically separated from the outside world can produce bedfast elderly people, who progress to dementia related to isolation, poor communication and social connections.

Introduction

In Japan, COVID-19 pandemic started in Sapporo city, in the Northern part of Japan and my hometown, where I live now. Sapporo is international big city with a population of two million and it is famous for Snow Festival and Winter Olympics. Sapporo is a sightseeing town and has a tourism-based economy. So not only Japanese but also many foreign tourists visit, especially in winter-time many foreign skiers stay and sightseeing visitors come from all over the world. During "Sapporo Snow Festival time which is held the same period of Lunar New Year during February 4 to 11 every year. Many people from Wuhan (China) came to Sapporo and the 1st wave (Wuhan type) official pandemic had started in Sapporo and there was a "Declaration of a state of emergency" from February 28 to March 19. After March 2020 the pandemic spread all over Japan. The official pandemic "Declaration of a state of emergency has been started all over Japan on April 7 until May 6, 2020. Sapporo started the 2nd wave of pandemic and the Sapporo governor declared another state of emergency from April 12 until end of May. The second wave is said to have been from the European type. As a result, many Japanese had to "Stay Home" for various periods (Scott 2020).

Broader implications of the stay at home policy: Emergency Level 3 (20 April – 31 May 2020)

COVID-19 pandemic spread in Japan and we are threatened by not only health problems but also an economic recession. Sapporo's economic situation become "Business level 3" from 20 April to 31 May. We have to "stay home" except hospitals and grocery stores. Also we stay home to 80% reduce to meet others in public and avoid three "Mitsu" (close), (1) closed spaces, (2) crowded places, (3) close-contact setting, and the government calls for "Zero Mitsu" (close) for all persons who live in Japan. For example, Hokkaido University (my university) has been closed except for the hospital and some laboratories which keep animals or having specific reasons, and we have to work at home except professors who have private rooms. At the start of the new school year on 1st April no students had live classes and partially e-learning was provided. Gradually professors prepared online classes, but there was cancelation of practical education. For many part-time lecturers and other workers across Japan there is no work so no payment. It has been reported that overall 20% of Japanese students have to give up their universities because their parents have reduced or no salary, and most student's lost their part-time jobs. As a result, they cannot pay university fees. The "Stay home" policy is not only losing jobs but also depriving students' education opportunity, hope and future.

High risk persons and Patients with immunological health problems

During the pandemic time three categories of persons who are at high risk include Immunosuppressant and anticancer drug users; Patients with diabetes, heart failure, breathing problems and dialysis patients; and Elderly people. These three categories of people have some immunological system problems due to diseases or aging. Immunosuppressant users include organ recipients (bone marrow, hearts, kidneys and livers etc.) to avoid both acute rejection and chronic rejection. Also, these drugs are used as treatment for autoimmune disease patients and those with autoimmune disorders

such as articular rheumatism, myasthenia gravis, systemic lupus erythematosus, Crohn's disease and ulcerative colitis. In addition, inflammatory diseases such as allergic asthma. These patients are long-term immunosuppressant users.

Anticancer drug users suppress bone marrow function and decrease the number of white blood cells and reduce the ability of white blood cells to fight infection. Diabetes, heart failure, breathing problem and dialysis patients have increased susceptibility to infection. Diabetes patients have high blood sugar, heart failure patients have high risk to be susceptible to pneumonia, breathing problem patients always face a danger from infectious diseases and for dialysis patients' one of three major diseases which are life-threatening complications is infection. Elderly people have weaker immune systems than when they were young due to aging naturally.

Organ recipients as immunosuppressant users have to take immunosuppressant drugs every day to avoid rejection of the transplanted organs. Many people misunderstand about organ recipient that recipients can get "rose-colored life" with a donated organ (Caplan and Coelho 1999). Actually, organ recipients can have a second life with donated organ but it also starts a battle with organ rejection, so they have to take immunosuppressant drugs forever (Lock 2002).

Dialysis patients who are mostly kidney organ recipient candidates (Himmelfarb and Ikizler 2018), are waiting for organ donation with dialysis to survive for up to a couple of decades or more (three decades or four decades (Cooper and Cooper, 2014). They commute dialysis with waiting for organ donation, also dreaming about the life without dialysis treatment (Yasuoka 2015). Because dialysis is an artificial kidney and wash their blood by medical machine, it harms patients' blood vessels with suffering life-threatening damage (Offer 2007).

Elderly persons who live in elderly homes have been battling with various strategies to protect elderly persons from clusters of COVID-19 (Matusmoto 2011).

Immunosuppressant Users

Organ recipients' daily life is tough than we imagine, because organ rejection is the biggest barrier for them after transplant of organs. Just after operation, they have to overcome acute organ rejection with strong immunosuppressant medical care. After survival, organ recipients have to avoid chronic organ rejection with immunosuppressant drugs every day until rejection of organ or death of transplanted organ itself (this means that recipient's death or re-transplant). Thanks to the immunosuppressant drug cyclosporin, organ recipients can survive, and many kinds of immunosuppressant drugs have been discovered to save recipients' lives. However, human beings cannot avoid chronic organ rejection as a normal reaction by the human body, it has been occurring five years' after of organ transplant on average (great individual variation among recipients). So immunosuppressant drug postpones rejection of the transplanted organ from recipients, however they can survive several years in average. In addition, immunosuppressant drugs have severe side effects and organ receiver's body is always in an immunological disorder situation. It means that organ recipients (immunosuppressant drug users) have high risk of infection (Yasuoka 2019).

Organ recipients always protect themselves from infection through protective vaccinations, prohibit or recommend not to eat raw food (it depends on kinds of transplanted organs), wearing masks, avoiding crowded places, the cold and dry environment and so on. Most of organ recipients feel what else do we need to do more in COVID-19 pandemic?

In spite of organ recipients' daily life in the fight against infectious disease, most organ recipients feel anxiety about their safe life and they don't know what they should do and how to protect their body during COVID-19 pandemic as a matter of life or death. According to the recipients' association (Japan Transplant Recipients Organization website 2020), their safeguard against the COVID-19 are to strengthened daily protection against infection, warm themselves (bodies), and "In the case, if doubt exists, call your doctor, if you have something". Many feel that "Is there something new as a strategy?" These are within the bounds of common sense. Most organ recipients know about them and they are practicing in their daily life already. They expect more information and feel that they need more revolutionary ideas or strategies for COVID-19 pandemic (Loupy, Aubert, Reese, Bastien, Bayer, Jacquelinet 2020).

"Please watch my heart transplanted friend's video…I would like to talk about COVID-19 which creates disorder in society now. There are not only weakened immune system elderly people but also internal disability persons such as organ recipients whom people can't be recognized by appearance. I'm also used to be a kidney recipient and now dialysis patient. Our immune system are weaken and other physical functions are poor due to dialysis caused kidney failure. Please for your cooperation such as wearing mask or stay home." (narrated by a kidney recipient and he shared us a heart recipients' video by facebook).
<https://www.facebook.com/profile.php?id=100009595178034&fref=hovercard&hc_location=chat>

Organ Recipients' Stress

Many organ recipients feel stress during the COVID-19 pandemic strongly because they usually have a risk of infection, so they pay attention avoiding infectious diseases carefully in their daily life. What is worse, there is no particular strategies to avoid COVID-19 for organ recipients. However, it is obvious that organ recipients are high risk people, so their stress and anxiety have been increasing day by day. A survey found organ recipients' stress levels were high: no stress (6%); a little stress (10%); stress (27%); very stressed (39%); very strong stress (18%) (Resource: Japan Transplant Recipients Organization website 2020).

In total 94% of organ recipients feel stress, especially 57% of organ recipients feel strong stress/very strong stress. During COVID-19 pandemic, organ recipients are forced to live a very stressful daily life. Ironically, stress decreases organ recipients' immunological capacity, so this situation leads to a vicious cycle for them. During COVID-19 pandemic time, it is so stressful for everyone, however, pandemic stress brings about death to organ

recipients. The Japan Society for Transplantation (The Japan Society for Transplantation website 2020) encourages organ recipients' health care, however, it is necessary for organ recipients to come up with much more specific measures.

Dialysis Patients

Dialysis patients are also forced into very tough days too. Before 1980, most kidney failure patients depended on dialysis to survive, in other words, dialysis was the last-ditch effort at survival. But now, dialysis becomes a bridge medical treatment to wait for organ donation. Kidney organ recipient candidates are actually kidney failure patients and they cannot live without dialysis every another day (3 days/week). Dialysis patients have weakened immune system due to long term dialysis therapy, because there are a few organ donations in Japan. Dialysis have various complications and patients are battling with dialysis disequilibrium syndrome, blood-pressure variation, bleeding tendency, shunt troubles and complications caused by long-term dialysis. Re(re)transplant candidates are used to being a dialysis patients and they were lucky enough to be able to receive a donated organ and became an organ recipients once (or twice).

Several years after the first transplant, unfortunately (or naturally), they faced transplanted organ's chronic rejection and remove the rejected organ out of their body and these patients also have a compromised immune system due to taking immunosuppressant drugs over an extended period of time. After chronic organ rejection, they have to be back to dialysis again and wait for another organ donation, that is, "retransplant". Most of kidney organ recipients have to repeat this course with fighting side effects and complications to their last breath. In addition, thanks to recent medical advance, re-re-transplant is available now. Kidney organ recipient candidates have to repeat dialysis patients and immunosuppressant drug user patients forever. As a result, their immune system gets weakened (Kliger, Cozzolino, Jha, Harbert, Ikizler, 2020).

Another high risk for dialysis patients is their dialysis facilities problem and it is possible to spark COVID-19 clusters inside dialysis hospitals/facilities. Because dialysis treatment is provided for the patients in a large room where many patients have to lie still in their bed for four hours per day and three days per week. Such a long time, they have to spend together sharing one room. It is high risk for a COVID-19 cluster for the dialysis patients during receiving dialysis treatment. In addition, considering commuting dialysis hospital/facility every other day is also high risk for patients. It is impossible for them to "Stay Home" and there are uncountable chances and risks to catch the COVID-19 more than healthy people to survive with dialysis therapy. Because dialysis is mass treatment generally, so Japanese Association of Dialysis Physicians (Japanese Association of Dialysis Physicians 2020) demands special attention for all dialysis hospitals/facilities. Fortunately, there are no COVID-19 clusters in dialysis hospitals/facilities yet (updated 2020/04/14). Another reason that dialysis patients are high risk persons in during COVID-19 pandemic is high risk people need dialysis therapy. About 50% dialysis patients have diabetes, who are potentially severe against COVID-19. Also dialysis users are 70 years old in average and two third patients are over 65 years old, so they are also high risk elderly people too.

Dialysis Treatment

There are two kinds of dialysis (blood dialysis and peritoneal dialysis), however most of patients depend on blood dialysis now. The three major cause of death of dialysis patients are ①heart failure, ②infection, ③cancer. The major infectious diseases which dialysis patients are susceptible to pneumonia, shunt infection and urinary tract infectious disease (Refer to an example picture:
https://www.jinlab.jp/basic/img/thumbnail/other_3disaster_2ontime.jpg).
The particular factors predisposing to infection of dialysis patients are low nutrient conditions due to dietary restriction and nutrition leakage with dialysis, stagnating urine (decreased urine output and anuria), and infection of internal shunt.

There are 334,505 dialysis patients in Japan, and they have increased about 5,000 since 2019 (Japanese Society for Dialysis Therapy website 2020) and their crude death rate is 10.1%. In spite of their careful daily activities, a blood dialysis patient developed COVID-19 in Tokyo on 25 March, 2020. Then the Japanese Society for Dialysis Therapy released an announcement for medical staffs to protect COVID-19 cluster in dialysis hospitals/facilities. They called for: "Make a thorough distinction droplet infection and contact infection precaution additionally, with standard precaution. Direct measurement of body temperature of dialysis patients every day and grasp the health condition of them. Guidance to dialysis patients, in the case patients have a fever over 37.5°C or breathing problems, they have to make a phone communication before visiting dialysis facilities etc." All dialysis hospitals/facilities have been trying to do the best to avoid COVID-19 clusters every day.

Elderly People and Elderly Homes

Elderly people also have a high risk to be associated with severe infectious disease, and the elderly care system isn't equipped to cope with COVID-19 pandemic in Japan, as a rapid super-aging society (Backhaus 2017). Especially, elderly homes face COVID-19 clusters and actually the outbreak of the COVID-19 clusters in elderly homes has been announced every week. As of April 2020 about 550 elderly persons who live in elderly homes caught COVID-19, and 60 person died. It means that about 10% elderly persons passed away due to COVID-19 cluster until the end of April. Specialists pointed out "there is a danger that there will be more and more infected elderly persons and the death in elderly homes in Japan too".

Personally, I'm a caregiver daughter for my mother who stays in elderly home now. My mother's elderly home has been struggling through various strategies since February 2020 and gradually safety guards have been strict. My mother's elderly home's strategies are: closed to visitors, elderly persons cannot go out except to hospitals; elderly persons have no recreation. However, these strategies are safer for elderly persons, the governmental "Stay Home" Policy risks decline in elderly person's motor function while being physically separated from the outside world

and producing bedfast elderly people seriously (Lock 2013).

According to NHK (Japan Broadcasting Corporation website 2020), 26 COVID-19 clusters broke out in Japan by 31 March 2020, and they have been increasing day by day (See: (https://www.minnanokaigo.com/news/yamamoto/lesson38/)). The cause may be families bring some change of clothes, and full-time caregivers assist changing of clothes for them. Not only elderly persons but also caregiver staff catch infections too. There are many chances to touch a potential route of infection for caregiver staffs to assist elderly persons such as meals, recreations, baths and toileting (and disposal). The elderly homes who got infection clusters have a high mortality rate, 8.0% of those aged 70-79 years, and 14.8% for those aged 80 years and above (Data from https://www.mhlw.go.jp/english/index.html, Ministry of Health, Labour and Welfare website 2020). In addition, elderly persons have tendency to quickly become severe after infection of coronavirus and progress to death.

It is also easy for elderly persons to spread infection from one elderly person to other elderly persons right away. Once COVID-19 cluster happens at an elderly home, it has to temporary close as soon as possible to protect other residents inside the elderly home. Personally, I'm a caregiver for my mother, and she lives in an elderly home now and I always visit my mother with her favourite sweets every Saturday regularly. However, when I visited her just before leaving for the US in February, her elderly home prohibited all foods from outsiders. On 28 February, the Sapporo (Hokkaido) governor had started the first "Declaration of state of emergency", I learned it during the conference in the USA. When I came back to Sapporo and I wanted to see my mother, her elderly home prohibited all outsiders visit even family members, especially overseas travellers like me. So I couldn't give her favourite Ghirardelli chocolates yet and she missed me so much. Exceptionally, I can meet my mother, only when I take her to hospital, so I made a strategy as a caregiver daughter for my mother to reduce her isolation, keep physical ability and protect her dementia stable to adjust her elderly homes' strategies for COVID-19 cluster.

Figure 1: Pepper the robot
(http://eijyukai-akiyamaen.jp/post/wp-content/uploads /H28.8pepper①.jpg)

My strategies as a caregiver to avoid COVID-19 cluster are to call my mother in elderly home every Saturday, to take her to hospital every time, to bring her favourite sweets/drinks on hospital day and have together. I also take my laptop and show her picture. The "Stay Home" policy for elderly people may progress dementia, which is related to isolation, poor communication and social connections.

No Infection Risk Caregiver; Ai Robot (Pepper)

There are many high risk people in the world during the COVID-19 pandemic. We have to prepare not only the first wave of COVID-19 pandemic but also the second wave, and the third wave, and ever further until we will be able to prevent COVID-19 infection with a vaccine. However, nobody knows when. We also think about other ways which protect us from COVID-19 in parallel to vaccine development. Taking advantage of the COVID-19 pandemic, use of AI robots have been accelerating (Figure 1)

AI robots attract attention from all over the world, because they can perform various works such as disinfection and cleaning, delivery service and conversation. It is benefit for us to prevent the spread of infection and decrease person-to-person contacts. Actually, there are already some robots which are working in hospitals for patients and in elderly homes in Japan.

Conclusions

The COVID-19 pandemic has revealed various high risk people and things in our daily life, and they are much more diverse than I imagined. In this paper, I focused on three categories of people: organ recipients, dialysis patients and elderly persons who are at high risk for infection, however, there are so many other high risk persons and things around them in their reality worlds. Organ recipients (immunosuppressant users) who are always in a fight against infectious diseases, face strong threat and stress during pandemic. Dialysis Patients (mostly kidney recipient candidates and in waiting lists) are constantly threatened with infection, and commute to dialysis hospitals three days per week to survive. Elderly persons (residents in elderly homes) have high risk of bedfast and dementia due to less physical activities and lack of communication.

These people are all battling with stress, fear and isolation. Also we have to pay attention to various caregivers who provide round-the-clock care for patients and elderly people in hospitals and elderly homes all around the world. Although COVID-19 has been making our daily life chaotic and many people have been forced into having a hard life, we can feel human love by various kinds of caregivers who work for others, that is, "Love of life". It is necessary to conduct more bioethical research concerning issues facing people at high risk for infection of coronavirus during COVID-19 pandemic time.

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Gasping for breath: Is air pollution or moral blindness the unseen killer? A review

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Abstract

Air pollution causes millions of deaths globally every year. The cause is largely, but not solely, from fossil fuel combustion in the electricity generation and transport sectors as well as various agricultural and waste management practices. This pollution in the form of ground level ozone, particulate matter and acidic gases such as nitrogen oxides and sulfur dioxide causes respiratory, cardiovascular and neurological problems in humans. These health concerns tend to have a greater impact on more vulnerable sectors of societies, including street vendors, agricultural workers and school children. There is a growing body of evidence that the pollution has equally devastating impacts on other organisms including plants, which may harm whole ecosystems. As humans are integral to rather than independent of nature, then this will have further reciprocal effects on us. A survey of people in rural central Thailand indicates that people are largely unaware of the main causes of and, to some extent ambivalent of, the risks associated with air pollution. An absence of policy to address this through mechanisms such as taxation akin to tobacco, alcohol or the UK 2017 sugar tax and compulsory environmental education programmes could be viewed as evidence of moral blindness. In light of some events of the Covid-19 pandemic, the importance of developing united policies to cope with worldwide air pollution is never been more apparent. There is good news in that data on local air quality is becoming increasing available in user friendly apps, which creates an opportunity to develop participatory education programmes that could emphasise personal responsibility, to address both the twin pandemics of air pollution and environmental moral blindness.

***Keywords*:** Air pollution, Global Burden of Disease, Moral Blindness, SDGs, Participatory Education

Introduction

Air pollution-related diseases claim approaching seven million lives each year[1]. Furthermore, in 2018, studies linked air pollution to a wide range of diseases and disabilities from millions of cases of diabetes to lower intelligence levels. The World Health Organization (WHO) Director-General Tedros Adhanom Ghebreyesus referred to air pollution as "the new tobacco". The WHO has long called air pollution a public health emergency, attributing 7 million deaths (including 600,000 child deaths) to exposure to unhealthy air, which 90 per cent of the world's population breathes, UNEP (2019). It has also been linked to increased death rates from COVID-19 in some countries[2].

The combustion of coal causing smog in major cities like London and vehicle emissions being the primary cause of photochemical smog in cities like Los Angeles has been well documented since the middle of the last century. By

[1] The Global Burden of Diseases, Injuries and Risk Factors (GBD) figure of 6.7 million air pollution related deaths is quoted in the editorial of *The Lancet*, Lancet Neural (2018) 17: 103

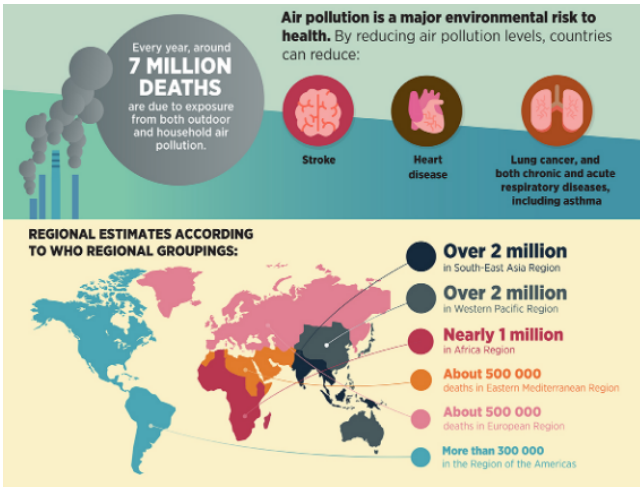
[2] This is reported from various studies in the UK and USA and are reviewed in Conticini *et al* (2020) who recognize that there is a correlation between air quality and higher death rates. They conclude that this is likely due to air pollutants such as $PM_{2.5}$, SO_2 and NO_x impairing defence of upper airways. They call for further research.

the end of the 20th century legislation such as the US Ambient Air Quality Standards had identified six criteria pollutants: PM_{10}, ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide and lead as well as nearly a further 200 Hazardous Air Pollutants (HAPs) that need control, Turns (2006). The growing awareness of the economic impact of air pollution has meant that combatting it has risen in sustainable development agendas. For example, it was emphasized as thematic sustainable development priority by UNESCO member states, Wals (2009). A focused review for the Forum of International Respiratory Societies Environmental Committee by Schraufnagel *et al* (2019) concludes that: *"Air pollution is largely an avoidable health risk that affects everyone, although the most vulnerable—the ill, the elderly, children, and the poor—face disproportionate risks. Urban growth, expanding industrialization, global warming, and new knowledge of the harm of air pollution are among the factors that raise the degree of urgency for pollution control and stress the consequences of inaction. Fortunately, reducing air pollution can result in prompt and substantial health gains".*"

The agenda of the Sustainable Development Goals (SDGs) is an action plan to ensure a healthy and sustainable planet for people and other living organisms. The European Environment Agency (2017) report on air pollution illustrates how twelve of the SDGs are connected with air pollution. Tackling some goals such as SDG 3 health and wellbeing, SDG 7 clean and affordable energy, SDG 11 sustainable cities and SDG 13 climate action will directly mean addressing air pollution. Other goals will be more easily achieved if there less air pollution: as pollution reduces crop yields this will impact on SDG 2, zero hunger; SDGs 14 and 15 relate to natural ecosystems that are affected, which will be discussed later. Even SDG 4 to ensure inclusive and equitable quality education opportunities for all relates to air pollution, as in some cities schools are closed when air quality, due to $PM_{2.5}$ and other pollutants, is excessively low. Worse still some schools are located in close proximity to roads that carry heavy traffic. High levels of pollution affect the health of students and hinders their capacity to learn, King (2019).

Scale of the problem

Ambient air pollution causes millions of premature deaths every year. Exact estimates vary yet worldwide studies by Lelieveld *et al* (2020) and *The Lancet Commission on Pollution and Health* (2017) both agree that, for all types of pollution, this is over 8 million per year. A headline from the WHO (2018) report *Air pollution and child health: Prescribing clean air* was: "More than 90% of the world's children breathe toxic air every day." This paper reviews the extent that air pollution has major human health and some environmental impacts, outlines some of the causes of outdoor air pollution and then discusses the barriers and suggests ways forward to improve air quality. The focus is on outdoor air pollution and the application of ethical principles to clarify the rights and responsibilities of various agents. It is essentially a review paper and useful primer for further research into the need and potential benefits of environmental ethics education to tackle one of the most pressing global health concerns. It aims assist in some small part to reduce the moral blindness that surrounds the problems of air pollution and similar environmental issues.



Air pollution the silent killer from WHO[3]

Cities

Over twenty years ago Rogers (1995) wrote that cities produced around 75% of global pollution. Since the last decade of this century more than half of the global population lives in cities[4], so the problems of urban air pollution are even greater. As urban traffic is a major source of air pollution and the concentration is closer to the source and has greater impact on the health and wellbeing of the inhabitants it must be a priority to address this avoidable health burden. Many of these cities are in the northern hemisphere notably eastern Europe across Asia, and particularly South Asia: Wang *et al* (2017) report serious winter particulate pollution in Ulaanbaatar, Cichowicz and Wielgosinski (2018) relate changes levels of air pollution in selected German and Polish cities to changes in global industry, services and trade and the AIRQUAL IQ*Air* website regularly identifies many cities in India[5] as being the in the worst 20 cities for air quality globally. The IQ*Air* 2019 World Air Quality

[3] https://www.who.int/airpollution/infographics/Air-pollution-INFOGRAPHICS-English-1.1200px.jpg?ua=1 Accessed 2-3-20

[4] UN News 2014 *More than half of world's population now living in urban areas, UN survey finds* [Accessed online 2-4-20 available from https://news.un.org/en/story/2014/07/472752-more-half-worlds-population-now-living-urban-areas-un-survey-finds]

[5] BBC world service podcast *The Real Story: India's Pollution Problem* puts this figure as being 15 of the worst 20 polluted cities as Indian. They attribute only 15% of this urban pollution to agricultural sources.

Report lists nineteen Asian capital cities having the poorest air quality.

Indoor / outdoor pollution

This paper deals primarily with the issues related to outdoor air pollution. However, many of the principles that WHO (2000) reference to determine a right to healthy indoor air are equally relevant to outdoor air pollution. Legislation and public awareness of the right to clean air indoors has been significantly improved in many developed countries since that time. Some of the pollutant chemicals are the same in both indoor and outdoor pollution, although indoor air pollution largely relates to products from tobacco smoke, radon build-up from radioactive underlying rocks and / or building materials as well as carbon monoxide from incomplete combustion of organic fuels. In less developed and rural communities indoor air pollution can be caused from solid fuel burning and even mosquito coils that release substantial levels of formaldehyde and $PM_{2.5}$, Tharaphy and Chapman (2010). With regards to outdoor air pollution, the scale, causes and effects are much broader compared to indoor air pollution. Lelieveld *et al* (2015) calculated that at least 3.3 million premature deaths per year worldwide could be attributed to high levels of outdoor $PM_{2.5}$. They found that this was complicated by varying particulate toxicity, but premature deaths were more prevalent in Asia. Jerrett (2015) comments on further findings from Lelieveld saying that the high levels of pollution in parts of Asia require significantly more attention than relatively lower levels in other parts of the world. $PM_{2.5}$ is just one fraction of outdoor, but its visibility as well as it causing some relatively immediate health effects and noticeable reductions during the COVID-19 pandemic has given it greater media profile recently in comparison to other pollutants such as ozone and nitrogen oxides.

Causes of air pollution

The WHO website emphasizes that outdoor air pollution has causes, from both natural and anthropogenic sources. Maduna and Tomasic (2017) further classify emissions depending on whether they are from point, line, surface or diffuse volume sources. Some of the anthropogenic causes are outlined below. Point sources includes factories and power plants, whereas roads are line sources. The usefulness in classifying in this way is that the impacts of pollution to wind patterns and climate conditions can be more reliably be assessed or predicted. The fractions of each sector of the global economy that is ultimately responsible for causing air pollution in different regions depends on the type of pollution as each fuel and the combustion conditions produce unique blends of waste gas products. For this paper the substances of main concern are carbon monoxide, sulfur dioxide, nitrogen oxides, ozone and particulate matter. Carbon dioxide and methane are also gases that cause environmental concern due to their being greenhouse gases, but the focus of this paper is on more the direct effects on the health humans and other organisms.

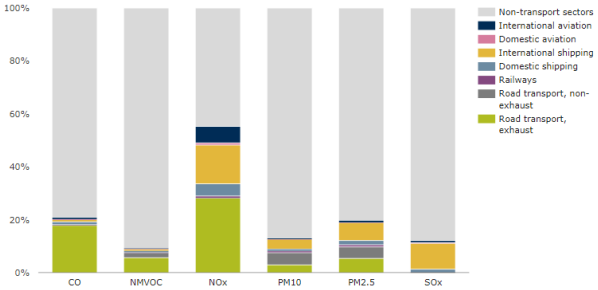


Figure 1: Air pollution within the transport sector from European Environment Agency (2019)[6]

Figures 1 and 2 illustrate the contributions from various sectors. Aviation transport, although having a high carbon footprint per passenger mile, actually only accounts for 3% of the global air pollution, whereas road transport accounts for 20% of $PM_{2.5}$ pollution.

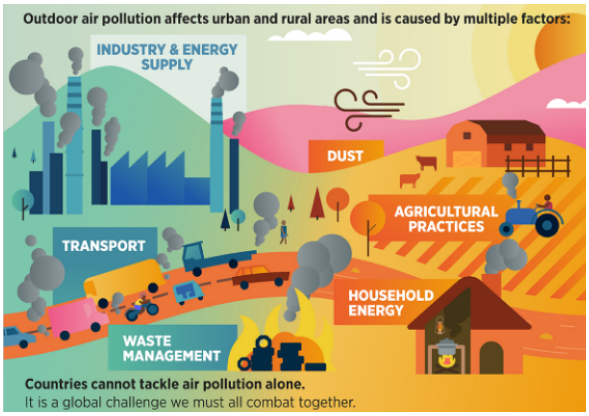


Figure 2: What are the sources of air pollution? From WHO website[7]

Traffic and transport

According to Lelieveld (2020) toxicology reports indicate that particles from diesel engines are more toxic than those from petrol engines and that both are more harmful than biomass burning. Air transport requires very high levels of fuel consumption and releases waste gases directly into the high atmosphere where many molecular and radical species are involved in secondary reaction pathways that produce a further spectrum pollutant and non-pollutant chemicals, however as shown in Figure 1, apart from NO_x it accounts for little of the total.

Household energy and electricity generation

The global "consumption" and use of domestic electricity is still rising exponentially as more and more economies become more affluent. Yet the majority of this electricity is not generated from clean or renewable technologies. The generation of electricity is still heavily reliant upon

[6] European Environment Agency: Contribution of the transport sector to total emissions of the main air pollutants [Accessed online 25-7-20. Available from: https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-air-pollutants-8/transport-emissions-of-air-pollutants-8]

[7] https://www.who.int/airpollution/infographics/Air-pollution-INFOGRAPHICS-English-4-1200px.jpg?ua=1]

fossil fuel including coal combustion. The sulfur in the coal produces sulfur dioxide, which in addition to nitrogen oxides is a major contributor towards acid rain. The cause, effects and abatement measures relating to acid rain have been known for many years and in more developed countries a great deal of technology and legislation have been successfully implemented to address this.

Agriculture and crop residue burning

Although some agricultural practices, notably forest clearances by "slash and burn" and waste residue or stubble clearances receive attention in the press, Lelieveld *et al* (2015) found that agricultural sources are the second-largest contributor to global mortality from $PM_{2.5}$. This is due to releases of ammonia from livestock and fertilizers that lead to atmospheric formation of ammonium nitrate and sulfate particles. He also called for greater research on the contributions by agricultural practices. Jerrett (2015) comments on the potential import of Lelieveld's findings saying that; "much more attention needs to be paid to agricultural sources, by both scientists and policymakers". More recent work by Lelieveld *et* al (2020) reports that over 5% of mortality is due to biomass burning. The burning of crop residues, slash and burn agriculture and forest clearance frequently makes headline news in South Asian and South-East Asian media, especially when this is seen to worsen air quality in large cities [8]. The area influenced by agricultural processes depends on many factors according to Prato and Huertas (2019), but they found that when comparing carbon monoxide, nitrogen dioxide, PM_{10} and $PM_{2.5}$ from sugarcane burning in the USA, it was the $PM_{2.5}$ that had the greatest area of influence due to its low mass and longevity in the atmosphere. $PM_{2.5}$ is of great cause concern to impacts on health. Dioxins are also a concern from agricultural waste burning, Canadian Commission for Environmental Cooperation (2014), more research needs to be done to access their impact globally.

Forest fires and Transboundary issues

Notman (2019) observes that it was 40 years ago that Paul Crutzen had identified biomass burning as a significant source of trace gases in the global atmosphere. Notman reports that the 2017 Californian fires released ten million kg of fine particles into the atmosphere. The fires in Australia in 2019 – 2020 were covered widely and the global media and brought images of devastation along with stories of economic and environmental tragedy. Yet less attention was paid to the long term health impacts of fires such as how far reaching or long term these effects might be. Peat fires produce significant levels of carbon monoxide and other species that have been linked to health issues, Neitzel *et al* (2009), Weinhold (2011), Page and Hooijer (2016) and Cassou (2018). Johnston *et al* (2016) point out that the diversity of the constituent mix in landscape fires depends not only on the substrate, but also on the water content and the temperature intensity. Recent studies using satellite evidence have clearly shown the extent of which aerial particulate matter has no respect for national or geographical boundaries. For example Chakrabarti *et al* (2019) used satellite and health survey data to estimate the burden of disease from crop fires in India and within a few months BBC News reports were questioning whether this was the cause of poor air quality in Pakistan.[9] Extance (2020) relates that now there is the potential to track sources of pollution through remote isotope ratio mass spectrometry, which provides evidence rather than mere hearsay. He illustrates how this technology has been used to distinguish between local and transboundary $PM_{2.5}$ pollution in Korea that originated in China.

Types of air pollution

A large number of texts provide thorough accounts of different compounds in the air pollution mix. A useful summary is available in Maduna and Tomasic (2017). In this paper however I focus more of two main constituents that both have significant impacts on health, namely ozone and particulate matter (PM), which is present in smoke in various sizes. The size is of relevance in as much as it affects the time the particles remain airborne and how deep they can penetrate into the lungs, alveoli or pass into the blood stream. PM has serious effects on human health and also on global climate change, with increasing evidence of its contribution to arctic melting, Baron *et al* (2010). $PM_{2.5}$ small size, large surface area and long residence time in the air, which makes it likely to adsorb contaminants such as metals that could lead to brain damage; King (2019). These can not only come from diesel exhausts, but also brake, tyre and road surface abrasion and wear making $PM_{2.5}$ considerably more toxic than would otherwise be so.

In addition, various chemical species including levoglucosan, methoxyphenols (MPs) and polycyclic aromatic hydrocarbons (PAHs) add to the complexity and provide signatures to the carbon soot mix; Neitzel *et al* (2009) and Weinhold (2011). Agricultural burning has been estimated to be responsible for 20% of particulate matter and 50% of PAHs released into the wider global environment, Kambis and Levine (1996).

Ozone is formed from various atmospheric reactions involving the photolysis of nitrogen dioxide, carbonyl and hydroxyl radicals. Agricultural burning can also be a significant source of dioxins, CEC (2014). The rate of ozone

[8] Biswas, S. (2018) reported for the BBC that Delhi's smog was the result of India's farming revolution. Ellis-Petersen (2019) wrote in *The Guardian* that vulnerable Indian farmers claim to be scapegoats for urban smog. Confounding factors include demand for cheap food, poor enforcement of environmental protection laws, and contributory pollution form traffic and factories.

[9] Is India's crop burning polluting Pakistan's air? Reality Check: BBC News 8 November 2019 [Accessed online 20-2-20. Available from: https://www.bbc.com/news/world-asia-india-50333985]

production depends on both the concentration of hydrocarbons and NO_x. The complicated chemistry has meant that as some legal frameworks, such as the US 1970 Clean Air Act, were based upon limited understanding and focused on hydrocarbon emissions then they had less impact on air quality than was anticipated; Jacob (1999).

Gadde *et al* (2009) say that open burning of crop stubble results in the emissions of harmful chemicals like polychlorinated dibenzo-p-dioxins, other dioxins and PAHs. These air pollutants have both carcinogenic and toxicological properties. Many are stored in fatty body tissue and accumulate over time.

Other harmful or toxic gases include carbon monoxide, sulphur dioxide SO_2 and various nitrogen oxides NO_x. The acidic oxides are major contributors to acid precipitation causing harm to a number of terrestrial and aquatic ecosystems.

Problems caused – human health

While air pollution is often ignored as a health risk factor, the 2018 Lancet Commission on pollution and health estimated that approximately nine million excess deaths worldwide can be attributed to degraded environmental conditions, and that approximately half of these are due to significant ambient (outdoor) air pollution. The main causes of death are lung and heart disease, lung cancer, and stroke as shown in figure 3. Lelieveld *et al* (2019) estimates 8.79 million in 2015. This agrees well with the global estimate of 8.9 million by Burnett *et al* (2018). To put this into perspective, the WHO estimates that the excess death rate from tobacco smoking is 7.2 million per year; hence air pollution is now rated as the larger risk factor.

Lung cancer and other lung diseases such as emphysema, asthma and bronchitis are all strongly linked to air quality. There is growing evidence that higher levels of air pollution also inhibits the growth of children's lungs, which leads to poorer health in later life and a reduction in life expectancy. The lungs are the most vulnerable organ in the body to damage from all types of air pollution, but they are not the only organ to suffer.

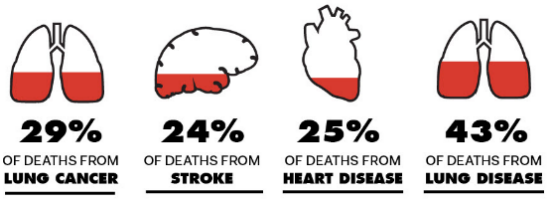


Figure 3: The fractions of fatalities caused by air pollution[10]

The WHO infographic in figure 3 states that 24 % of strokes are related to long term exposure to poor air quality. However, the brain is also subject to more direct harm from several pollutants. BBC Science editor David Shukman (2019) reports that there is the possibility that $PM_{2.5}$ is small enough to be transported to and enter nerves in the brain and thereby cause plaques to develop, which are associated with dementia. King (2019) provides an illustration that being close to a congested road could expose children to 100 million magnetite nanoparticles per cubic metre. These can go directly to the brain through the olfactory nerve. King also draws attention to suggested links between exposure air pollution during pregnancy and the development of autism in children.

Lelieveld *et al* (2019) found that within Europe the figures for death by ischaemic heart disease far exceeded other specific fatalities related to air pollution. In fact, these together with cerebrovascular disease account for approaching 40% of the 650 000 plus deaths they attributed to air pollution in Europe. The detailed study accounted for other contributory factors.

In addition to physiological disease are people's general wellbeing. Few studies have been undertaken to determine links between mental health and air pollution[11], but recently Vienne (2020) published results from a 17-source database that combined individual survey data, air pollution data at the city and country level, climate information and macroeconomic indicators, in Latin America. One of her statistical analyses showed that on average, an increase in 1 $\mu g/m^3$ in the mean annual concentration of PM_{10} there is an associated reduction of self-reported happiness level. Rocha *et al* (2020) found associations between air pollution and Alzheimer's disease, dementia and migraines amongst other neurological conditions, from 52 PubMed articles. Khan *et al* (2019) demonstrate that in both the US and Denmark there is a clear association between pollution and psychiatric disorders including bipolar, schizophrenia, depression and epilepsy.

Moral pollution

Lu *et al* (2018) review evidence that indicate the ability to predict unlawful and unethical activity in environments with higher levels of air pollution. They demonstrate that as poor air quality raises anxiety levels, then this in turn can lead to behaviours which are intended alleviate anxiety. They note that various alternative mechanisms for this link need further research, such as the broken-windows theory by Keizer *et al* (2008), which argues that moral concerns are diminished in degraded environments. A further alternative theory that lower light levels in smog induces a sense of anonymity that lowers inhibitions against engaging in unlawful or unethical behaviour as shown by Zhong, Bohns and Gino (2010).

[10] https://www.who.int/airpollution/infographics/invisiblekiller2_all4_2018.jpg?ua=1

[11] A caution is raised that to date although there is a growing body of epidemiological evidence, there is little direct evidence of causal links between neurological disorders and air pollution, in the editorial of *The Lancet*, Lancet Neural (2018) 17: 103. A possible pathway for toxins to reach the brain is via nerves from the nasal cavity.

Pressure on health care systems

The global Covid-19 pandemic has seen unprecedented pressure on many national healthcare providers around the world. The annual impact of air pollution already had a tremendous cost and consumed an enormous proportion of national budgets. An initial study in four European countries demonstrates that there is a correlation between nitrogen dioxide exposure and deaths from Covid-19, Carrington (2020). Another study in America showed an association between $PM_{2.5}$ and deaths from the virus, Wu *et al* (2020). Neither of these studies claimed that there was a direct causal link, but there is a possible indication that long-term exposure to high levels of various pollutants weakens people resilience to subsequent infections. Furthermore, as the population demographics in many countries shows aging populations there will be a growing burden on healthcare to treat and care for patients suffering from long-term exposure with progressive illnesses such as mental health, lung and cardiovascular diseases. As further pandemics are also likely in the future, it would be prudent to take action now to minimalise the effects of air pollution and plan and prepare so that health care systems have sufficient capacity.

Problems for nature beyond humans

King (2019) discusses reports that autopsies on dogs from heavily polluted streets Mexico City revealed that were found to have brain inflammations and protein clumping that are indicative of Alzheimer's disease in humans. Canaries were traditionally used to test for toxic gases in coal mines. Many ornithologists are encouraged by reports such as Drewitt (2015) who describes the resurgent growth of peregrine numbers in city centres in the UK as they feast on abundant pigeon populations. In this time of hearing more and more reports of declining numbers of predators due anthropogenic activities this is surely good news. Yet if these awesome birds are exposed to damaging high levels of pollution directly and through the consumption of polluted prey, then sadly this resurgence may be short-lived. Sanderfoot and Holloway (2017) provide a review of literature regarding the effect of air pollution on avian species. They note that several studies comparing the populations of the same species in polluted and less polluted environments does indicate a pattern, however they acknowledge that several confounding factors such as habitat degradation and food availability make it impossible, at this stage, to conclusively prove that air pollution is the main driving factor in population declines. Their review does nonetheless report in vivo physiological studies on birds' lung tissue that do strongly indicate pollutant damage. Ejaz *et al* (2014) recorded increases in toxin levels of vital organs in some birds. This could potentially lead to bioaccumulation in predators or scavengers. It is often assumed that amphibians are modern day indicators of pollution as they possess highly permeable skin. However, Kaplan (2009) reports in *Nature* that amphibians, surprisingly, often appear more resilient to air pollution that would be expected.

The effects of ozone on plants has been known for many years and lichens are well known pollution indicators. Rich (1964) refers to studies on germinating seeds as far back as the late mid-19th century. Rich lists well over fifty species that had already been identified to suffer from ozone. Over the last half of the 20th century to date the growing list of and extent of this damage to agriculturally important crops has been identified. Van Dingenen *et al* (2009) provide two models to make predictions of global staple crop losses by 2030 due to surface ozone. Both models show significant impacts that would make achieving SDG 2 more of a challenge.

Less work has been done to identify the effect of air pollution on whole ecosystems but Lovett *et al* (2009) studied the impact of fur pollutants, sulfur, nitrogen, ozone, and mercury in eight North American ecosystems and concluded that: "Effects of air pollution were identified, with varying levels of certainty, in all the ecosystem types examined. None of these ecosystem types is free of the impacts of air pollution, and most are affected by multiple pollutants." The US Environmental Protection Agency (2017) says that the impact on the photosynthetic ability of plants slows their growth, makes them more prone to insect damage and ultimately leads to decreases in biodiversity, contributing to changes in habitat quality and ecosystem cycles.

How does ethics help?

In extreme moral blindness individuals cannot perceive an ethical issue. In the case of air pollution, it seems that whole societies if not morally blind are taking a blind eye or are experiencing a form of analgesia to the situation. Bauman and Donskis (2013) refer to this as adiaphora – implying an attitude of indifference or moral numbness. Cliffe (2017) compares attitudes towards tax on sugar with acceptance of tax on alcohol, which is a much lower health risk in the UK. Taxation is an accepted approach to tackle the global smoking epidemic. Does an absence of specific tax allocation on fossil fuels suggest moral blindness or visual impairment by governments? Or is it merely that taxes are politically unpopular and that energy providers are a powerful lobby? The range of sources and causes of air pollution indicates that no one sector or industry is solely responsible. Governments alone cannot realistically enforce changes that are essential to improve air quality. It is therefore largely down to individual choices and actions. As de Paula and Cavalcanti (2000) argue: *"Therefore, it is important that individuals are aware of themselves and others. That is to say, they evaluate the effects of their actions in relation to those whom they live with, to society as a whole and to the natural environment."*

This raises a key to moral agency and ethical decision making – it cannot be made in isolation from, or independent of, other people and organisms who have moral interests even if they do not have agency. An

assumption is that all people are able to make the required evaluations –requiring not only fully available information, but a prerequisite is having higher order thinking skills. This makes it vital that educational programmes and programmes provide opportunities for students and participants "to open their eyes" to environmental ethical issues through exercises to develop their ability to critique, appraise and make justified recommendations through participatory activities such as group discussions or data gathering and analysis. The use of guiding ethical principles is a useful approach to aid discussion and a systematic approach to unpack complex and controversial issues. It is also a requirement to make informed ethical choices that people have access to and an understanding of the wider scientific information, as well as socioeconomic and political factors that are relevant. This means that comprehensive educational programmes must be developed.

Principles

Twenty years ago a WHO (2000) working group produced a report, based on nine principles of human rights, ecological sustainability and biomedical ethics, arguing the case for a right to healthy indoor air. These principles included:

- Right to human health
- Respect for autonomy
- Non-maleficence
- Beneficence
- Social justice
- Accountability
- Precaution
- Polluter pays
- Sustainability

In the COMEST (2004) report on ethical use of water reframed some of these principles in terms of solidarity between upstream and downstream communities, water as being a common good, stewardship, participation and empowerment. Liu *et al* (2011) apply principles from the UDBHR (2005) to develop refined principles such as the duty of care bestowed upon people who are fortunate to live in the vicinity of abundant water sources. Arguably this could be applied to people who live in rural areas with little traffic or industrial air pollution; a duty to not pollute as they are living in a "privileged" position.

Polluter pays – this may be possible to enforce for point source pollution emitters such as factories or through taxation on vehicle emissions or fuels, but it would be nearly impossible in the case of wild and forest fires. The issues of corruption and poor law enforcement additionally confound this approach. In a similar way to plastic bag littering: is the responsibility of the producer or the consumer? Several countries do enforce car emissions controls, but there is still scope for these to go much further if global air quality is to reach acceptable levels, as has been shown to be possible during the COVID-19 lockdowns around the world that have been accompanied by improvements in air quality.

Preemptive action – Notman (2019) recalls how the 2009 wildfires in Australia promoted a change in policy to start more deliberate fires to reduce the fuel load. This however, had a negative effect on air quality. With climate change in mind, this becomes a viscous circle as drought periods renders large areas tinder dry increasing the likelihood of extensive wildfires. Further preemptive action would be to ensure infrastructure is in place for electric vehicles, mass transport systems and clean renewable electricity generation systems to reduce reliance on fossil fuels.

WHO (2017) reports that tobacco kills in excess of 8 million people per year – comparable to Lelieveld *et al* (2020) figure for ambient air pollution. WHO argues that bans on advertising and pictorial health warnings have proven to be significant deterrents. There is potential for extending this to combat air pollution such as displaying prominent images at fuel stations, on electricity bills or on fertilizer packaging for example. Bennett (2020) encourages students to explore, through computer modeling, how trees can be used to reduce urban pollution. This has added environmental ethical benefits as students develop a greater understanding of our relationships with the biota around us. The potential for trees to combat air pollution is discussed by Barwise and Kumar (2020), Yang *et al* (2015) and UK Department for Environment, Food and Rural Affairs (2018). As trees take decades to grow this is a form of preemptive action in terms of planning. UNEP (2019) produced a report on 25 science based solutions to improve air quality in Asia. Many of these are preemptive such as legislation regarding fertilizer use, land clearance and energy efficiency standards.

Figure 4: Who is most impacted by air pollution? From WHO website[12]

Remedial action – in this situation governments must be prepared to have health systems with the capacity to cope with what is a growing burden of disease from poor air quality. The long term nature and progression of many of

12 https://www.who.int/airpollution/infographics/Air-pollution-INFOGRAPHICS-English-3-1200px.jpg?ua=1 Accessed 2-3-20

the associated diseases, does allow a timeframe for countries to be prepared. Maybe this will be one of the lessons from the COVID-19 pandemic, that although a pandemic was forewarned for several little preparations had actually been done. The 2019 UNEP report for Asia identifies industrial process, vehicle and post combustion emission controls as being of the greatest and most achievable immediate benefit.

Environmental justice issues – outdoor air pollution often has greater impacts of poorer and more vulnerable people, as shown in the WHO infographic in Figure 4, in society such as farm workers, street vendors, and those who do have access to clean energy. There is a vast and growing body of evidence to support this such as Serya *et al* (2019) who identify poorer respiratory health in female street vendors in Egypt and Kongtip *et al* (2010) who reported on a pilot survey of similar workers in Bangkok. This is closely related to the principle of not putting people at risk from harm or health and safety at work protection. Firefighters are on the frontline when combatting wildfires that may be started accidently, as part of controlled burning or either deliberate acts of arson. For example, in April 2020 the *Bangkok Post*[13] reported that there had been seven deaths of people fighting forest fires in the North of Thailand already this year. However, this does not reflect the longer term health risks to these workers. Neitzel *et al* (2009) found higher levels of low molecular weight methoxyphenols (MPs) in urinary samples from firefighters. They correlated these findings with CO, $PM_{2.5}$ and MP exposure to wood smoke in controlled burns. They noted that the MP mix was different in angiosperm and gymnosperm combustion, consequently the toxicity depended upon the fuel. As outlined above many individuals, and generally more vulnerable groups, are exposed to high risks from air pollution during travel to or at work yet they do not readily have the health monitoring and protection afforded to employed workers. This highlights how in practice it is often the polluted rather than the polluter who pays.

Non-maleficence - King (2019) highlights the findings of a study of approximately 3000 school children in Barcelona published by Sunyer *et al* (2015), which reported that those in proximity to greater levels of traffic pollution had slower cognitive development. King lists evidence of a link to Alzheimer-like amyloid plaques, attention deficit-hyperactivity disorder, autism in addition to respiratory illnesses such as asthma. Worse still is that there is growing body of evidence that links later developmental is detrimentally impacted by in utero exposure to increased levels of air pollution. Surely, it is of paramount importance to protect innocent unborn and young school children from the harms propagated and sustained by the actions of adults.

Sustainability - The cost of air pollution in economic terms amounts from increased health care, the reduction in crops, the added costs of "cleaner" technology. However, sustainability as a principle encompasses more than just economics – it demands that current practice does not impinge on the potential needs of future generations. Therefore, care for the natural environment is essential as we are inextricably linked with nature and natural cycles. Air pollution that harms other organisms will impact on food chains and webs, this in turn may alter some cycling processes and ultimately lead to whole ecosystem declines. The consequences of some gases causing acidic precipitation are already well documented and in many ways technological and legal measures have been taken to address this. However, prolonged exposure to $PM_{2.5}$ is far less clear. The impact on human health is only recently becoming known, but further studies must be performed to see how this harms a wider range of other organisms and what happens as these particles are transferred through food webs and ecological energy pathways. Bioaccumulation could well lead to unforeseen complications in the same way as pesticides are now well known to do. If these particles can reach the heart and brain, are they also able to enter gamete cells?

Solutions and barriers

Since the 1950s many governments introduced legislation to combat photochemical smogs largely caused by burning coal for domestic purposes. This legislation gained public support as the public were well informed of the acute health risks and benefits of legal protection. There is growing body of reports that the general public are losing trust in politicians and wary of scientists being unbiased or impartial when presenting data or employing models. In a survey in rural Thailand Waller (2020) found that only 1% and 2% of respondents were in support of raising fossil fuel taxes or using electric vehicles respectively. Yet 25% were in favour of planting more trees in cities and 20% community education programmes regarding air pollution. Therefore, key to successful strategies, advocated by WHO in Figure 5, is education to gain raise awareness of health risks with comprehensive and detailed information sharing. Other strategies involve technical developments in transport, power generation and waste management sectors as well as taxation and reform of agricultural practices and domestic fuel efficiency improvements.

William Logan (2012) observes that during the 1996 Olympics in Atlanta traffic flow into and out of the city was restricted, resulted in a reduction of emergency hospital admissions. Following the competition events the traffic was allowed back in and the level of hospital admission rose accordingly. Schraufnagel *et al* (2019) also reports that a significant number of studies have shown that, once various environmental policies were put in place, air

[13] "Youth dies in bid to douse wildfire" *Bangkok Post*, 23 April 2020 accessed online 23-4-20 available from https://www.bangkokpost.com/thailand/general/1906105/volunteer-dies-in-bid-to-douse-wildfire

pollution fell. When air pollution was reduced at national, local or even domestic levels there were health benefits that were "almost immediate and substantial", and continued long term. The key for gaining public support for such initiatives is through raising awareness and education of the health and pollution links.

Air quality is a universal and fundamental entity for a healthy environment. Marks (2012) reviewed the effectiveness of three different approaches to address climate change and finds them all wanting. He argued that the hegemony of capitalism rendered human rights and development approaches important, yet saw potential capacity in adopting a revised view of human security as greenhouse gas emissions, as like particulate emissions, are trans-boundary issues. The human security perspective highlights environmental threats to from environmental degradation. Marks refers to several reasons for adopting this perspective, amongst which is that this approach could be more likely to engage cooperation between states and policy makers than demanding rights or measuring up different degrees of development.

Figure 5: Strategies for tackling outdoor air pollution[14]

However, there is scope and value to investigate the extent to which human rights are restricted by the impact of air pollution. The right of the unborn child to a healthy life. The rights of women subjected to poor indoor air quality from solid fuel cooking, which limits their ability to maintain good health. The economic impact on street vendors and their right to work. The rights of children to meaningful education and protection from harm. Right of access, by less advantaged communities, to affordable medical care. As previously stated, WHO proposed the application of nine principles to inform policy and promote healthy indoor air. However, the 2018 version of the WHO *Exposure to household air pollution for 2016* webpage states that: *"Globally, 41% of the world population is exposed to household air pollution resulting from cooking with polluting fuels and technologies in 2016."*[15]

This suggests that the time is right to revisit what are the barriers to achieving greater progress in improving air quality, suggest how these barriers can be overcome and to explore the potential of alternative solutions. The media have the potential to play a major role in raising awareness and in education. However, stories may sensationalise, mislead, misinform, or cherry pick prominent events or locations[16] and not relate the wider global scale of the problem. Media reports may focus on populist opinions, such as hill tribe agriculture causing air pollution.

Access to data

2020 saw the launch of the world's largest air quality data platform by UNEP, UN-Habitat and the Swiss company IQAir[17]. Access to data, particularly positive trends, is a source of great encouragement. For example, initial despondency following the Chernobyl tragedy of 1986 has been turned to one of hope as it has been shown the diversity of life that is now thriving within the exclusion zone. In the words of Wood and Beresford (2016), "When humans were removed from an area, nature has a remarkable ability to reclaim that space." The timely launch of the IQAir system has enabled regular discussions in the media of reductions and subsequent rises in air pollution during and post lockdown restrictions, Watts and Kommenda (2020) and Newburger (2020). This was accompanied by some reports in increased wildlife activities during lockdown, although whether this can be attributed to short term air quality improvements rather than the reduction in human activity has not been confirmed. Nonetheless, access to detailed, accurate and real time data is vital for researchers, quality education and policy makers alike.

Political considerations

Wolinsky (2006) argues that there could be a case to say that if UNESCO and WHO had worked more collaboratively on the UDBHR it may have carried greater standing. His diagnosis may be given some credence in the light of predictions of countries disregarding Article 3 when taking measures to curb disease epidemic, such as the Covid-19 pandemic. Wolinsky winds up his analysis by identifying the overall benefits of the UDBHR, but greater

14 https://www.who.int/airpollution/infographics/Air-pollution-INFOGRAPHICS-English-6-1200px.jpg?ua=1Accessed 2-3-20

15 WHO (2018) *Exposure to household air pollution for 2016* [Accessed online 27-2-20. Available from: https://www.who.int/airpollution/data/HAP_exposure_results_final.pdf?ua=1]

16 The BBC (2017) reported that rising air pollution at Buddha's birthplace in Nepal is causing alarm for monks and pilgrims as it is 10 times the safe level. Accessed online 30-4-20. Available from: https://www.bbc.com/news/av/science-environment-39865269/air-pollution-at-buddha-s-birthplace-is-10-times-the-safe-level

17 This was announced on 10 February 2020 on the UNEP website. [Accessed online 3-3-20. Available from: https://www.unenvironment.org/news-and-stories/story/whats-air-world-urban-forum-2020-launches-worlds-largest-real-time-air]

synergy between UN divisions (UNESCO, UNDP, UNEP, WHO and FAO) is surely needed to promote more rapid improvement in air quality. This is after all the aim of SDG Goal 17: Partnerships for the Goals. The role of WHO in the COVID-19 epidemic has been questioned by many political leaders. However, many of these leaders, who generally have short term political interests, have tried to shift blame away from themselves. This illustrates the vital need for unified action on pervasive global and persistent issues such as air pollution. Blame shifting is also seen in the media as farmers, in some countries like India, Cambodia or Thailand are often reported as being the main offenders as air polluters[18]. Apportioning blame largely on rural communities is a distraction and diversion of the real issue. Policies must be regionally based, with specific targets to reduce all sources and every type of pollutant in a holistic and integrated approach. It also illustrates a limitation of the short term rule of elected leaders as often they are concerned with immediate results to impress voters rather than long term action and less popular strategies such as increased taxation.

Congestion charges and alternative transport systems

Pandita (2004) explored how a civic society organisation was instrumental in producing reports, convening meetings between various experts and raising public awareness of the severity and impact of urban air pollution in India during the late twentieth century, which lead to court judgments that in turn induced changes in legislation of transportation systems as well as compulsory environmental education programmes, Wals (2009). In many countries vehicle use changes have been introduced under other initiatives such as congestion charges, subsidies on clean biofuels or greater taxes on diesel as part of strategies to promote renewable energy, infrastructural support for electrical vehicles and expansion of mass transit systems that have all been rolled out as part of development programmes rather as explicit health agendas to tackle air pollution. Yet many urban planning projects do aim deliberately to improve health and general wellbeing, such the expansion of green spaces, Baines (2014) and cycle lanes or building schools away from busy roads, King (2019). If revenues from congestion charges or additional fuel surcharges were used to fund mass transport initiatives or community education programmes this may gain a degree of public support or at least acceptance. Noree *et al* (2015) propose a similar approach to support national healthcare in Thailand by taxing medical tourism.

Education curricula

Dodds (2007) observes that over the last century many governments developed nationalistic curricula for school education. This does not mean that universal values were not taught, but it does illustrate that ultimately that ultimately citizens are programmed to consider national rather than global issues first. But even within countries educational quality and experiences vary within regions. For example, Umavijani (2019) claims there are large gaps between urban and rural healthcare in Thailand, and makes recommendations that education and training through government initiated traditional broadcasting and contemporary social media should be used for information sharing to help people take preventative measures. A possible benefit of the Covid-19 school closures is that due to online learning there has been a possible leveling of the access to quality education for students attending different schools, if an assumption is made that all had equal access to the internet.

Education of disadvantaged communities

Dorevitch *et al* (2008) identified limited internet access by less advantaged people as a barrier to long term participation in a community air quality education programme. UNESCO (2019) still states that rural poverty as a particular barrier to participation in adult learning and education. Buchanan and Russo (2015) provide evidence that if collective action takes place then some participants will to some extent compensate for non-compliance of others regarding energy conservation. However, if people can identify clear and achievable positive impacts on their lives this does help to increase participation. In Thailand, for example, a high level of compliance to government lockdown restrictions, could be attributed in no small part, to information sharing at village and community levels by locally elected council and administration officers. The benefits of community education programmes must be made clear from the outset to promote and sustain involvement through to completion. Furthermore, the show casing of model communities that have had substantial improvements in health, nature conservation and even economic benefits should be endorsed to encourage uptake of "courses" by providers in other locations. Neitzlel *et al* (2009) reported problems in collecting real time urinary data to monitor air pollution. Now however, with more readily available apps and greater mobile coverage in the 2020s the conditions are more conducive for public engagement, which may encourage more disadvantaged communities to participate in data gathering and engage in education events.

Economic energy policies

WHO (2017) concludes that taxes are effective in reducing tobacco use. One of the MPOWER measures, adopted by many countries to address the global tobacco epidemic, is to increase taxation on tobacco. When it comes to taxing there is an ethical issue of whether it is a regressive tax

[18] In a survey of 466 respondents in rural lower north and north eastern Thailand 57% stated that they believed agricultural and forest burning were the main cause of $PM_{2.5}$ air pollution, and 19% said that enforcing legislation against this should be one of the top three priorities to improve air quality, Waller (2020)

that has disproportionate impact on the wellbeing of economically vulnerable people. Chitiga *et al* (2012) found that in South Africa overall fuel taxation was progressive. However, some fuels for specific purposes such as transport and paraffin use in homes was regressive. Mkenda *et al* (2012) had similar findings in Tanzania, where taxation on basic fuels like firewood and kerosene was regressive but progressive on more luxury fuels such as electricity, or diesel and petrol. Kosonen (2012) found similar results in Europe. Regressive taxation on transport does not induce public endorsement of congestion charges mentioned earlier unless the revenue from them is used transparently to good effect in improving mass transport systems.

WHO (2017) recognises that tobacco users need help to break their dependency. Similarly, for farmers to embrace alternative agricultural practices in poor rural areas, they need assistance in the form of education, development and conservation funding: not being imposed with further taxation. However, there may be a case that if tied to economic subsidies to trail and adopt new practices then a tax added to inorganic fertilizers could be used to fund the aforementioned programmes.

Technological

The wider acceptance of the use of face masks has been a positive outcome from Covid-19, but the efficacy of some masks needs to be improved and the limited benefits need to be fully understood. They are, at best, only able to address the effects rather than the causes of pollution. The development and use of electric vehicles, especially if the electricity is generated via renewable technology such as wind turbines and solar cells would ensure a massive reduction in air pollution from fossil fuels. Meanwhile it is essential that flu gas scrubbers or desulfurization, vehicle exhaust catalytic converters and reducing coal and diesel consumption will all bring immediate benefits. Farming practices can also be improved such as limiting the application of fertilizer and applying at the optimum times as well as increasing the use of composting or alternative processing rather than burning residues. Barwise and Kumar (2020) review the use of what they term Green Infrastructure - trees - as air pollution barriers and Yang *et al* (2015) rank various species, finding the silver maple, London plane and honey locust as having above average ability at $PM_{2.5}$ removal. These were also found to be in the top ten of most commonly planted urban trees in 60 cities across the world. There is scope for more research into the capacity for other tree species to improve urban air quality, and to determine which will survive and thrive best in local climatic conditions.

Legislation

Many nations have laws that address air quality, for example the UK banned stubble burning in 1993. This and legislation regarding coal combustion and flu gas emissions were drawn up as UK was criticized as being the "dirty man" of Europe and a major contributor towards the acidification of Scandinavian lakes and forests. Important as national legislation is, this illustrates the need for regional and international legislation to combat this invisible killer. With satellite technology and improvements in chemical sampling and analysis technology this makes holding offenders to account more possible. The next step is to enforce the laws. Notman (2019) notes two significant issues relating to forest clearance in South East Asia for palm oil plantations. Firstly, that banning laws are variably (at best) enforced and that as the forests are on peat soils that these produce greater quantities of smoke compared to non-tropical forest fires. The smoke from such forest fires crosses boundaries between Thailand and Cambodia, Singapore, Malaysia and Indonesia or India and Pakistan. This is clearly a regional issue and tackling it needs a cooperative approach. Cheong *et al* (2019) conclude that:

> Epidemiological studies on the disease burden and socioeconomic cost of haze exposure would also be useful to guide policy-making and international strategy in minimizing the impact of seasonal haze in Southeast Asia.

What can be done now and at reasonable cost?

Alternative uses of crop residues include: mushroom farming, feedstock for biogas generation and oils from gasification or pyrolysis, cattle bedding material, paper making, construction material production, or re-incorporation into soils, which improves soil quality through raising soil carbon content, Kumar *et al* (2015). Some of these measures will produce a supplementary income for farmers if there is a local market, others may improve the long term viability of agricultural land. There is some good news for example; the deputy governor of Chiang Mai, Komsan Suwan-ampa has said[19] that there are plans in place for the education of local communities regarding agricultural, waste and forest fires causing air pollution in Northern Thailand, after Covid-19 restrictions are lifted. Education must not be restricted to rural communities – it needs to address all causes of air pollution and meet the needs of the whole of society. Urban programmes could be include participatory activities such as planting suitable trees that would allow students to feel empowered to take positive actions, have psychological benefits, improve wellbeing and promote cooperative sustainable behaviour within communities as well as improve urban air quality, as explored in Zelenski *et al* (2015) and Bennet (2020).

Conclusion

Several pressing environmental concerns receive wide attention – global warming or climate change, biodiversity loss, deforestation, plastic pollution, ozone depletion and acid rain are typical examples of issues that are regularly discussed in the media and addressed to some degree by

[19] "Toxic haze alert for 4 provinces" *Bangkok Post*, 17 April 2020 accessed online 23-4-20 available from https://www.bangkokpost.com/thailand/general/1901515/toxic-haze-alert-for-4-provinces

many governments and explored in numerous education curricula. Although various reports such as the GBD and *The Lancet Commission on Pollution and Health* (2017) have been widely available, a survey of rural general public in Thailand shows significant gaps in knowledge of and some ambivalence towards air pollution. Recent events of the global COVID-19 pandemic have raised the profile of air pollution as reductions were observed in lockdowns and correlations with death rates to pollution levels were reported. Yet the deaths from that pandemic and even the prolonged HIV/AIDS pandemic, are so far, dwarfed by the year on year accumulated deaths due to ongoing air pollution. So now the time is ripe to sustain momentum into further monitoring, research, participatory education, and policy development with accompanying economic and legal enforcements to address both pandemics: air pollution and environmental moral blindness. In the medium term these actions will help towards reaching a number of the SDGs and in the longer term will contribute towards making sustainable practices become routine.

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Further online resources

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WHO infographics https://www.who.int/airpollution/infographics/en/

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