

COVID-19: Hospital Acquired Infections Management, the use of Artificial Intelligence in Medical Care and Broader Implications on E-Learning

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Abstract

The news of a virus outbreak from China hit the world just like another mild outbreak as was witnessed with the Hong Kong SARS 2003 outbreak. However, this has been a different case because the world is locked down with most businesses closed, airports shut, countries suspending movement cross-border movements and learners staying out of school. It is an hour of reckoning with an imminent need for total policy change in every sector, be it education, healthcare or business. The COVID-19 which originated from Wuhan China has put the scientific and medical community at the forefront as champions in the fight. Scientists have responded rapidly with research while medical professionals are testing pilot drugs as healthcare professionals attending to the patient's needs. The outbreak has highlighted the need for policy and practice change in every sector. This paper suggests the need for reconsidering approaches to managing hospital-acquired infections by focusing on the welfare of frontline nurses and physicians with reference to ophthalmologists. Besides, with Artificial Intelligence helping with faster patient triage, medical staff can identify at-risk situations earlier enough to avoid cross-infections as well as prioritize those in urgent need of intensive care. Secondly, the evidence of online learning is not good news since with parents staying with their children at home, e-learning has emerged as the new paradigm shift in education, which could also benefit nursing and medical education and training. COVID-19 has equally highlighted the essence of parental involvement in children's learning and why policies should be enacted to enhance this involvement. Learning institutions have equally played a role in disaster response as makeshift care management centers thereby becoming a new arena of disaster response. Not to mention, care for the elderly and the vulnerable minority is identified with a concern over healthcare disparity increasing the disease spread.

Keywords: COVID-19, Infections Management, Artificial Intelligence, E-Learning.

Introduction

Infectious diseases tend to historically shape the world and inspire evolution in life including how policies are enacted, businesses conducted, and people socialize. Pandemics have become common with the ever-increasing world population (Seah, Su & Lingam, 2020). Besides, international trade and travel enhance the spreading of any novel pathogen. Another concern is the evolving nature of microbial pathogens with new pathogens emerging. Few examples, like the West Nile virus, HIV, Influenza, and H1-N1, among others, are biological pandemics that shaped the response to diseases and policy formulation. The beginning of the new millennium saw a novel SARS-COV,

responsible for around 8,500 cases and a mortality rate of 774, notwithstanding an estimated \$90 billion economic loss (Bennet, 2013).

Novel and evolving communicable infections continue to affect the world, with substantive evidence showing how these recombinant infectious agents could land in the hands of the wrong people for use in bioterrorism threats (Khanna, & Honavar, 2020). This has prompted concerted efforts to convince microbiologists to apply scientific knowledge in responding to the threats. Notably, the recent pandemic from Severe Acute Respiratory Syndrome (SARS) coronavirus has not only highlighted how these evolving pathogens can easily spread throughout the world but also the degree to which the global community can marshal resources and skills to identify the emerging causative agents as well as control the spread (Bennet, 2013). This has become the role of swift reaction inquiry mechanisms, especially those applied by the SARS Accelerated Vaccine Initiative (SAVI) (Finlay, See, & Brunham, 2004), which has shown how timely response research could be useful in addressing new infectious diseases.

The recent COVID-19 is not any typical viral outbreak because it has been far-reaching. Since February, countries have locked their borders; flights are grounded, the oil sector worse hit by low prices, stock-markets trading at their historical-lows and learning institutions closed as students are locked in quarantine or curfews in some countries. This pandemic has also triggered the discussion and practice consideration of the need for fast and efficient healthcare management since the world's healthcare system is now overwhelmed with the virus. Sadly, frontline medical staff and healthcare providers have contracted the disease, and some lost their lives. The death of the Chinese doctor whistleblower, Li Wenliang, if anything to go by, shows how the medical sector needs to rethink about the plight of its staff (Lu, Wang & Gao, 2015). This deliberation is only possible when the care management and response to pandemic incorporates the latest technologies to enhance clinical decision-making. Artificial Intelligence (AI) has yet again proved its usefulness in patient triage, treatment simulations, and identification of the possible disease trajectory.

This paper highlights how COVID-19 has impacted infections management with the emphasis on ophthalmology practice, triggered the need for the integration of AI in healthcare management and the implications on education sector by prompting a change from conventional classroom teaching to e-learning (online learning), the role of parental engagement in child's learning and the necessary educational policy changes to enhance proper coordination between parents and teachers for a proper autonomous home-learning outcome for children. The implication of the education sector in public health crisis response is also highlighted.

The Implications of COVID-19 on Medical/Healthcare Practice

Impact on Hospital Acquisition Infections Management

COVID-19 has uncovered the need for a change in medical and healthcare practice. Although the pathophysiology of the virus is not well-known, countries have been considering every measure based on past experiences with MERS-CoV and SARS-Cov (Lu et al., 2015). The virus spreads primarily through droplets and any other body secretion. However, healthcare workers within ophthalmology practice are more susceptible to infections (Lu et al., 2015). Ophthalmology is such a unique and wonderful profession but has been exposed to the possible effects of COVID-19.

Although these professionals at all times record greater success in care management, this pandemic has exposed their vulnerability to unprecedented infections.

Ophthalmologists are a high-risk group because of their direct contact with patients, especially when they are doing eye inspections (Khanna, & Honavar, 2020). Managing healthcare-acquired infections is changing in the face of coronavirus outbreak. For this endemic, most of the ophthalmology professionals or communities have suggested the avoidance of any treatment, unless emergent and urgent care needs, in a bid to reduce the disease transition, cut the rate of development of new cases, and conserve the much-needed medical supplies for emergency departments (Zhang, Xie, Xu, & Cao, 2020). Besides, this department has realized the crucial need for risk assessment and postponing outpatient visits, along with elective surgical procedures possible to be delayed (Romano et al., 2020).

A significant insight from this pandemic is that tears have become a medium of infection. This is shown from the research and clinical trial documenting that the SARS-CoV's viral RNA is detectable through reverse-transcription polymerase chain reaction (RT-PCR) from an infected individual's tears (Romano et al., 2020). Although this insight appears anecdotal, there is substantive evidence highlighting the role of tears in spreading the virus (Wang, Wang, Ye & Liu, 2020). Tears are fluids that instruments and ophthalmologists come into contact with daily. If research findings provide substantial evidence to confirm this assertion, then there is the intrinsic need for advanced expansion of personal protective equipment (PPEs) and decontamination procedures for the ophthalmology treatment areas. The insight has received considerable support from existing research indicating that SARS patients who tested positive for this viral nucleic acid reported positive results from their samples (Wang et al., 2020). Furthermore, prior research has similarly revealed the prospects of clinicians to contract the viral infection when only their eyes are not protected because the disease is transmitted through mucous membranes, including the eye's conjunctiva (Xia, Tong, Liu, Shen, & Guo, 2020). From case reports, many ophthalmologists have infected through normal or routine treatment and diagnosis procedures.

Most research has only focused on how COVID-19 and other SARS affect the respiratory system, but the least emphasis is on other regions like ocular and gastrointestinal tissues. The emerging evidence that COVID-19 is transferred through tears brings into a new area of focus on the implications of the disease on ocular tissues (Xia, Tong, Liu, Shen, & Guo, 2020). Research from the SARS-CoV 2003 outbreak showed and highlighted that there was a connection between the transmission of the disease and sewage system; later results presented more evidence confirming that stools of infected patients contained traces of the virus, even survived through the sewage system in the absence of adequate disinfection (Xia et al., 2020). This second wave of the SARS virus confirms the need for a research paradigm shift from the extensive focus on the respiratory system to the ocular and gastrointestinal tract.

The nature of the threat posed by COVID-19 has triggered a call for bringing back the prevention strategies used in previous cases or viral outbreaks. As such, recommendations are being put across for bringing back strategies as well as practices that proved useful and essential in curbing the SARS-2003 epidemic (Zhong et al., 2003). Mainly, for the ophthalmic practice, the focus is on triaging patients based on produced surveillance case definitions. For example, the WHO organization introduced a case classification scheme in 2003, whereby patients were triaged into

suspect, general, and likely groups. Besides, Ophthalmology measures in Hon-Kong as a nation worse hit by the 2003 SARS, had issued a guideline to have full PPE for all cases irrespective of medical status (Seah et al., 2020). The pandemic equally saw the rise of hand hygiene measures as well as stockpiling of PPE, including N95 masks, gowns, gloves, and goggles were considered (Romano et al., 2020). Furthermore, the novel coronavirus is bringing about profound changes and transformations in medical practices, especially preventing transmission and infections. Some have recommended the improvement of sterilization and decontamination protocols of equipment and clinical rooms (Seah et al., 2020). Coronaviruses can survive in external environments for a longer period (Romano et al., 2020). For the ophthalmic practice, non-urgent operations should be considered as a way of reducing viral transmission.

Healthcare policy in COVID-19 management is also changing with this outbreak. For instance, authorities have suggested that hospitals must now have plans for reducing non-urgent elective activities besides finding the most viable approach or solutions for urgent care (Romano et al., 2020). Risk management, including a response plan, is essential for freeing beds for the affected patients, staff for training, recovery facilities, as well as theatres for dealing with COVID-19 patients. The pandemic, as such, has triggered a paradigm shift on how optometrist addresses clinical cases. For one, there is an overarching endorsement for reducing and limiting clinics to urgent cases (Romano et al., 2020). The changing situation entails the clinicians rescheduling outpatient appointments and surgical procedures to meet the urgent care needs.

The Rise of Artificial Intelligence in Medical/Healthcare Practice

For the Epic's index, machine learning is applied as a type of artificial intelligence to provide a sneak peek of the risks confronting each patient, with assigned scores from 0 to 100 (Ross, 2020). In this case, a higher score is an indication of a patient having a higher risk of decline. This Artificial Intelligence model had been in use before the viral outbreak but became more useful with the COVID-19 pandemic. The scaling or rating system helps detect patients in need of extensive and closer monitoring, whether a patient assigned in an outlying facility should be transferred into an ICU department or not.

There are other examples like the University of Michigan, with a larger patient number because of the case cluster in the state, reporting the effectiveness of this scale in evaluating and monitoring patient's cases (Ross, 2020). For example, in the first 48 hours of hospitalization, the system identified 9% of patients with lower scores and moved them to a facility with lower-patient risks as they were categorized as unlikely to experience or suffer life-threatening events (Ross, 2020). For those who scored higher, they were registered for closer monitoring as the likely patient triage to need ICU care.

These few insights and examples have shown the need for AI in medical and healthcare management for quicker and efficient decision-making. For healthcare management, the virus has stressed the requisite for integrating AI in healthcare management, especially in decision-making, which may reduce the overreliance on clinical judgment as a process subject to the availability of physicians (Ross, 2020). As such, IA is similarly being used to address staff shortage, speed up diagnosis, and screening of patients.

Another area of consideration is that AI has been used in lung imaging of the COVID-19 patients, a move geared towards fast and accurate detection of pneumonia. This insight equally helps in identifying those patients in need of extensive supportive care and individuals to be closely monitored (Buschman, 2020). COVID-19 has brought a change in radiology with physicians now relying on AI in augmented lung image analysis. Again, a machine learning algorithm is being used in medical diagnosis and enhances the ability to identify pneumonia from chest X-rays. This means that radiology is never going to be the same after the COVID-19 as the disease has presented the opportunity to test and affirm the efficacy of AI in faster and accurate imaging in radiography. The capability of this technology is the provision of X-ray overlays using color-coded maps to confirm the probability of pneumonia.

COVID-19 has presented the need for speeding up technological innovation for early detection of dangerous diseases like pneumonia and how AI capability can be harnessed to affirm this realization (Buschman, 2020). Furthermore, AI imaging is used to address the limitation of medical supplies. This is because it permits physicians with limited experience, who are not radiologists, to read X-rays a quicker, more so for hospital-based and frontline emergency physicians (Buschman, 2020). The goal of AI is to come up with a decision-support tool that leverages the capabilities of predictive analytics in flagging future COVID-19 severity. This is an invention and capacity that allows proper and accurate healthcare management of COVID-19 cases within resource limitations. The current AI tool has shown that changes in major features, including alanine aminotransferase (ALT) as a liver enzyme, hemoglobin levels, and reported myalgia, are accurately predicted based on the disease severity (Buschman, 2020).

The emergence or spread of COVID-19 has correspondingly uncovered the essentiality for protecting medical professionals and healthcare workers. However, AI is triggering a paradigm shift in healthcare management. This technology is touted as support for predicting the next locations of the outbreak. Blue Dot, a Canadian company, used the AI insight to report the disease outbreak in late December (McCall, 2020). Few examples include Insilico Medicine, a company based in Hong Kong that provided evidence on how AI algorithms designed six new molecules for halting the replication of the virus (McCall, 2020). The same caution is being redirected towards protecting healthcare staff. For instance, AI is being identified as a solution for protecting the healthcare staff. This comes as a concern from Li Wenliang's death, a medical doctor in February 2020, earlier castigated by the Chinese authorities for sounding a cautionary appeal concerning the infection (McCall, 2020). His death showed concern for the plight of clinicians responding to the pandemic.

The high infectiousness of the disease has raised concern over the level of infection among the medical staff. As such, AI application has been an alternative solution since its design uses algorithms for permitting greater affordances in early detection of lesions, highlighting the possibility of pneumonia, measuring shape, volume, as well as density (Buschman, 2020). Physicians then use this information to compare the lungs from the image and provide a quantitative report. This allows for quicker judgment about the condition. AI takes less than 10 seconds to read the image in comparison to the 15 minutes needed for reading a CT scan (McCall, 2020). Although this has not received peer-review, the application of IA in protecting the welfare of frontline workers and every hospital staff shows how COVID-19 has made the medical

professionals realize that AI can be used as a proactive tool in quick decision-making. Timely decision-making surmounts to early detection.

The Implications of COVID-19 on Education Policy

More Parental Engagement in Children's Learning/Education

COVID-19 has hit the education sector hard as most schools are closed, and learning disrupted. However, it has outlined the significance of parental participation in their child's schooling. Families play a central role in education and widely agreed as part of significant inputs in a child's learning and development. COVID-19 has seen a surge in homeschooling, and with the virus expected to continue, this paradigm shift may disrupt the education system. The COVID-19 has already presented the opportunity for parents to become part of their children's development and engaged in their learning. Parents are taking up the role of a teacher and a parent, adapting to this new crazy routine, but at least, they should understand that they need to support their children academically. Parents have had to adjust to this new development. For instance, they are making concerted efforts towards maintaining communication with teachers and keeping constant with instructors to consult and learn about their children's weaknesses. Technology is support for this opportunity as they can engage with teachers through emails and phone calls, can arrange virtual meetings with teachers to monitor and evaluate the child's progress.

Parents play a supplementary role in improving children's math learning through simple math practice or solving counting problems in a child's everyday life (Ceka & Murati, 2016). Besides, a parent can illuminate history lessons for children by taking them to trips to museums and monuments. Research highlights the critical role that parents play in a child's learning and education. The events brought about by the novel coronavirus will make educators and governments to revisit research outlining the need for building "sustainable, effective, high-quality early childhood programs that can be readily accessed by families with young children" (Snell, Hindman, & Wasik 2020, p. 447). The researchers also noted that crucial for high-quality early education or learning is the institutional support for family engagement in learning activities as well as supporting members to extend learning into homes.

Furthermore, the upcoming educational policy changes will be influenced by the research that has continuously outlined how parental engagement enhances children's academic and school outcomes (Ceka & Murati, 2016). Family immersion in children's education is linked with profound benefits in learning or academic results, including task persistence, learning motivation, positive behavior, literacy and language skills, attention as well as social skills (Mendez & Swick, 2018). The COVID-19 will push educators and policymakers to address the problem and concern about families being less connected to with their children in learning and the limited chance for connecting or completing learning that occurs at school with home learning (Snell et al., 2020). Furthermore, this is an opportunity for educators to step up their efforts geared at increasing family engagement in schools.

At the end of COVID-19, more changes will occur in the education sector, with parental engagement being integrated into the curriculum. Educators and instructors will revisit the evidence-based practice and empirical justification delineating how parents have a unique and

integral role to play in a child's education. For instance, Yamamoto, Holloway, and Suzuki (2016) noted that involving parents in children's education guarantees more engagement in homework as they become highly committed to schooling and record better learning or academic outcomes. Parents are also role models for their children. When they are concerned about their children's learning, the attitude is taken up by these young learners to indicate the importance of education. This, in turn, inspires as well as empowers children to persevere and commit to the educational expedition. Parental involvement in a child's learning is also part of ensuring that children receiving a high and quality education.

COVID-19 has emphasized the need to visit and evaluate the research on supporting parents to have opportunities for engaging with their children in learning. Liao, Cheng, Chang, and Chan (2017) identified significant factors including "the frequency of parent-teacher contact, the quality of the parent-teacher interactions, parents' participation in educational activities at home, and parents' participation in school activities" (Liao et al. 201, p.108). However, these factors will be enhanced by digital technology opportunities. Notably, technology, as being used in other countries to support digital learning, will become central in strengthening the engagement between parents and teachers. Much emphasis and focus are set to be directed at the promotion of parent participation and involvement in school events. Regimes in various nations have created agencies that link teachers, parents, and school commissioners like the Parent-Teacher Association in the USA (Liao et al., 2017).

Integrating Technology in Education: Paradigm Shift to E-learning and Distance Learning

UNESCO, for instance, is supporting the continuity of education by fostering and investing in the global education coalition for assisting countries to scale up best distance learning practices as well as reaching out to children or youth who are most affected (UNESCO, 2020). Besides, the body has invested in technical assistance to enhance quick preparation and deployment of all-encompassing distant education resolutions, hi-tech and low-tech technology for continued learning along with non-tech approaches. For the ministry of education officials, UNESCO has provided webinars for a chance to share information about the efforts that countries are making to provide inclusive education in different areas.

The outbreak, mainly, has been the best opportunity and chance for applying technology in distance learning (Guo, & 2020). For example, China continued with education despite the closure of schools as learning was shifted to the internet as well as distance learning. However, other countries, especially the developing world, have been worse affected because they have less access to technology, and their school systems (including policies), were not ill-prepared (UNESCO, 2020). Access to technology and bandwidth internet varies across different households. Possession and ownership of these technologies depend on the income levels of households, even in middle-income countries. Therefore, coronavirus pandemic has highlighted the essential need for policy change and the introduction of programs that can quickly help in targeting those in dire need of e-learning technologies. In so doing, COVID-19 has stressed the significance of technology in education and how the e-learning model should be part of every education system and supported through effective policies both at the national and local levels.

Educational interventions, as such, are crucial in supporting the prevention and recovery of public health while at the same time redressing the impacts that a pandemic has on student's learning. COVID-19 has already outlined the role of the education sector in public health as most have been changed into makeshift centers for crisis management (UNESCO, 2020). Governments have realized the importance and will factor this into planning, especially disaster coping, as well as recovery phases. Education centers have been highlighted as playing a crucial role and responsibility in disaster response and receiver. Another issue worth noting with the COVID-19 pandemic's impacts on education is that education plays an essential role in protecting children and the youths (Guo, & 2020). Hopefully, the situation is expected to enhance the children's or youth's skills in distance learning or more profound digital mastery.

In developing countries, schools are playing a pivotal role in disaster management and response. This is because they are the only established and advanced governance structures that can be utilized as makeshift centers. Besides, educated individuals, especially in the least developed regions like Sub-Sahara Africa, are proving helpful in contact traces along with the communication of campaign advocates (Guo, & 2020). All these examples and insights confirm how the education sector is playing a pivotal role in disaster response. This realization will be internalized into the government's planning and policy formulation by making the education sector a significant stakeholder or critical player in the disaster management plan.

China, in the wake of the outbreak, rolled out its "School's Out, But Class's On" campaign aimed at creating large-scale and normal e-learning or online education (Zhou, Wu, Zhou & Li, 2020). The government also based this shift to online platforms by clarifying what to teach and how they teach or the instructional design that integrates organic classroom teaching and online instruction or teaching after school. After the virus, most countries will realize the importance of combining online guidance from the school teachers as well as assistance or the integration of the self-learning at home by the student (Zhou et al., 2020). More efforts will be directed at strengthening support and guidance for home-based learning and education, or curriculum context and content will specifically focus on developing the ability of students to learn autonomously.

Accordingly, COVID-19 has delineated how the education sector is ripe for significant reforms, especially the need for redesigning teaching models. The teaching environment is set to change with an emphasis on cloud teaching, online instruction, and children embracing home-based autonomous learning instead of the conventional classroom listening (Zhou et al., 2020). Models of teaching are changing from the conventional teacher-centered approach to education and learning to the student or learner-centered approaches. Instructors also have to change their goal to focus on student development (Guo, & 2020). However, the selection of the best digital education resources based on the discipline as well as the student's developmental needs, with appropriate regulation of the learning process are some of the new areas of emphasis or focus that COVID-19 will inspire or bring about in the education sector (Zhou et al., 2020).

Effects of Covid-19 on Senior Citizens: Nursing Homes and Elderly Care Facilities

Life Care Center from Kirkland, a nursing home, was caring for around 120 residents with 180 member staff (Barnett & Grawbowski, 2020). Despite this facility receiving the highest 5-star

ratings from the Nursing Home Compare website for federal government, it has been on the forefront for the failure to offer and device a program for infection control. The deficiency, however, would be considered less serious as such was categorized as a “minimal harm.” Finally, the facility has been later labeled a “ground zero” for the COVID-19 pandemic. By mid-March, 30 deaths out of the 46 in Washington were reported from the facility (Barnett & Grawbowski, 2020). This triggered the transfer of many of residents to the hospital. The remaining were isolated or put into quarantine in respective rooms. Another problem is the no-visitor policy, an implication that the residents have not been in contact or spent time with families and friends. The facility exposed the problem of slow testing and poor communication with resident’s families. Infections of the staff members also meant most are now quarantined at home. This crisis has badly exposed the effects of COVID-19 on elderly care facilities.

Senior citizens have been the worse hit by the recent COVID-19 outbreak because they have “atypical” symptom, a situation that complicates measures and efforts to enhance timely and appropriate response. The three major symptoms signifying the disease include insistent cough, fever, and shortness of breath but the elderly are not portraying any signs despite their vulnerability (Barnett & Grawbowski, 2020). Physicians have reported an observation about seniors seeming “off” or not acting normal after contracting the disease. The reported symptoms among seniors include unusual sleep or eating disruption, confusion, being apathetic and even losing orientation of the surroundings (Barnett & Grawbowski, 2020).

From the European Region, top 30 countries have largest senior populations (Kluge, 2020). Besides, a concern is that over 95% of the reported COVID-19 deaths have occurred in individuals of 60 years or older, as more than 50% of these deaths reported from 80 year-olds and above (Kluge, 2020). The physiological changes among older citizens make them susceptible to this infection because they always have underlying health conditions. The World Health Organization (WHO), for instance, has recommended a focus on support and protection of older adults living alone. Besides, there has been an imminent call by the government and any relevant authority in all communities to support the elderly by delivering interventions. Such interventions and measures must consider healthcare needs of the elderly population, while at the same time creating a treatment or response plan that treats and considers this population with respect.

The World Health Organization has given priority to the elderly population and recommended support for them, families, as well as caregivers as a crucial part of a comprehensive response to this COVID-19 pandemic (Kluge, 2020). Particular concern is about health and welfare of the elderly in quarantine and isolation as these individuals requires safe access to basic supplies, nutritious food, medicine, and money to support both social and physical health care. To achieve and realize this gain, it is fundamentally necessary to ensure accurate dissemination of information as crucial for the elderly, including clear messages and resources on staying mentally and physically healthy during this pandemic as well as what they should consider and do when they fall ill.

While in isolation, maintaining health lifestyle for the elderly population has become crucial. Another consideration for the elderly is that they depend on the support from carers and communities to stay active, maintain routines, eat nutritious, and balanced diet. Furthermore, their mental health care must be considered, especially ensuring that the elderly have stayed connected

with others because they lack digital connectivity. Therefore, social and health care workers have a role to play in providing long-term targeted care for the elderly. This is a major concern because care providers are apparently working under challenging conditions, whether in nursing homes or facilities.

The care management approach and plan for older people has to consider their weak immune system, a population with high vulnerability to infectious diseases. Furthermore, COVID-19 is associated with mortality rate among individuals with pre-existing health and medical conditions including diabetes, lung disease, heart disease, kidney disease, typical of the elderly population as it weakens their ability to fight infectious diseases. The elderly population is also a critical population because in most countries, they are enrolled in institutional settings like retirement and nursing homes, or at times living with families in crowded situations that predispose them to higher risks of infection. The elderly population has equally been predisposed to this condition because they have mobility and isolation changes. This isolation is a barrier to accessing information about the current developments on the disease (including what they should be doing), and not able to get food need when stores are closed or out of stock. In most societies, seniors have higher affinity or likelihood of living in poverty, a situation that renders it a challenge for them to get basic life needs for personal care. As such, for any healthcare intervention, poverty is considerably a challenge that limits the opportunities for intervening and helping the elderly population.

The Situation in USA

In late February, Americans watched with dismay as COVID-19 began wreaking havoc in nursing homes, with the outbreak reported at a facility in suburban Seattle as the residents were perishing one by one (Stockman, Richtel, Ivory, & Smith, 2020). Almost eight weeks after this incident, lethal outbreaks have shockingly continued in these care facilities. For instance, *The New York Times* gave a national tally of at least 7,000 higher that had been known previously (Stockman et al., 2020). Most of these facilities include memory care facilities, long-term rehabilitation centers or facilities, senior and retirement communities, assisted-living facilities and nursing homes have been the worse-hit (Nania, 2020). Another profound concern is that the cluster of these nursing homes have been associated with the historical violation of safety guidelines, have limited amenities and confronted by staffing problems (Stockman et al., 2020). Particularly, challenges include oversight failures to prevent COVID-19. Besides, these elderly care facilities are the most overlooked in the US healthcare system and currently plagued with the lack of protective gear and virus tests (Stockman et al., 2020). The pandemic is also affecting a sector that has staff with less extensive training in comparison to hospital staff; therefore, the struggle in slowing infectious diseases. Another worry is about the poorly paid workforce that typically navigates between multiple jobs, but this movement is a risk for infection to the residents.

The crisis in US nursing homes as well as long-term care facilities is attributed to the federal health authorities placing them at the lowest level priority in comparison to hospitals. Hence, they have to face longer turnaround times before receiving test results and, as such, a major barrier to slowing the spread of COVID-19 (Stockman et al., 2020). Lack of federal government prioritization is severely affecting these facilities. Furthermore, nursing home facilities have to stand the brunt of structural shift since hospitals seeking ways of keeping costs down are now sending more of their vulnerable patients to nursing homes. The growing population implies more infections at these

long-term care facilities as 380,000 do die on a yearly basis from these facilities (CDC, 2020). Staff hiring and retention is likewise a major problem for these facilities.

Seemingly, one in every ten nursing homes has reported COVID-19 cases with the count soaring in the month of April. Most of these hard-hit states only bowed to pressure from watchdog groups, journalists, and families. For instance, a report from The Washington Post already provided a list of over 1,300 nursing homes with thousands deaths, even spiraling further into counting (Cenziper, Jacobs, & Mulcahy, 2020). However, the reporting of these cases has been incomplete because states that have many nursing homes barely report their numbers, or even released the names of healthcare facilities hit by the virus. Furthermore, the Centers for Medicare & Medicaid Services announced that nursing homes are obliged to the new reporting guidelines and requirements mandating them to inform residents, affected families, as well as the federal governments on COVID-19. This rule provides the Center for Disease and Control Prevention with the mandate and powers to collect relevant information. In New York for instance, over 300 nursing homes have been flagged as having positive cases, but the state only released 74 names of facilities at the moment (Cenziper et al., 2020). Therefore, facilities are underreporting COVID-19 cases; only a fraction of the reported cases is a true reporting of COVID-19 deaths and infections in nursing homes.

Underreporting of elderly cases indicated as COVID-19 positive undermines any effort geared towards addressing their healthcare needs. This is because, without accurate information, there emerges an inherent risk of hospitals releasing relatively fragile patients into nursing homes with reported cases and equally a concern for families who may not have the opportunity to take out their relatives from these crowded and overwhelmed facilities. State inspectors have had to step in to order immediate infection control training within nursing homes. The crisis reported in states like Oregon involved staffers not wearing personal protective equipment or washing their hands (Cenziper et al., 2020). In another report from New Mexico, the government, through state attorney general, noted with concern managers not requiring staff members to enforce social distancing or wear gloves before entering these facilities despite reported 13 deaths (Cenziper et al., 2020).

The COVID-19 pandemic and its effects on the elderly population has outlined the integral need for providing information and knowledge, which plays a pivotal role in managing and responding to this pandemic (Nania, 2020). The healthcare response team should have the knowledge of where they should urgently focus resources. Again, challenges with poor or limited reporting is because nursing homes cannot provide the necessary information if they do not have testing facilities and equipment (Cenziper et al., 2020). They are currently overwhelmed as staffing is limited, equipment not enough and testing is slow.

Locking down of nursing homes seemed to have not had an impact in containing the viral spread and protecting the elderly because with deadly outbreaks that exploded in April, the US situation shows how healthcare professionals and staff did not take necessary precautions to contain COVID-19. Virginia, Ohio, New Jersey, Maryland, and Tennessee have recorded the worst infection rates (The Guardian, 2020). However, reports highlight issues with the gap in preventing the virus like the lack of screening of aides, nurses and doctors as well as other facility workers. The testing kit was not an actual testing but only screening of the healthcare worker's temperatures

or asking them health questions (The Guardian, 2020). This, in turn, allowed infected but asymptomatic people to access the facilities.

The healthcare crisis at nursing homes has escalated the problem with chronic staffing shortage at these facilities since most of the workers or staff are staying at home or self-quarantining. Furthermore, the crisis is worsened by the lack of widespread testing of staff and patients as the facilities continue to face chronic or dire shortages of masks as well as other protective gear (Nania, 2020). This is an emergency situation that highlights the negligence in national policy for elderly care. The response against the COVID-19, as such, is not considerate about the elderly population as the most vulnerable.

Overcrowding in the hospitals and home care facilities has equally highlighted the limitations and challenges of elderly care with this pandemic. The response to this pandemic has been poor as highlighted by some states forcing nursing homes to accept patients recovering from COVID-19 thereby raising serious fears of the disease or outbreak spreading to other residents. An example is New York issuing an advisory that forbade nursing homes from refusing to accept residents based on suspected diagnosis or confirmed cases with California informing its nursing homes to take the similar measures (The Guardian, 2020). However, states like Massachusetts have highlighted excellent response to the situation by announcing plans for designating nursing homes to act as center centers for the confirmed Covid-19 patients. Poor response from many states on the elderly population has exposed healthcare disparities affecting this population, especially sending them to nursing homes with limited equipment, less and inappropriate units as well as fewer staff is a precursor for disaster. A recent crisis was the Life Care Center facility as a nursing home where 40 elderly people died near Seattle (The Guardian, 2020). From government inspection, it was reported that the infections could have come from employees working while they were infected or sick. Center for Medicare and Medicaid Services has suggested an intervention for the nursing homes to halt visitors as well as non-essential workers, and cancel both group and communal dining activities while embracing or engaging in active screening of both staff and residents for respiratory and fever symptoms (The Guardian, 2020).

These recent developments have highlighted the need for policy change and procedures for visitations into these nursing homes (CDC, 2020). For one, policies restricting visitations are being recommended and only limited to essential care reasons like end-of-life situations. Communication with families has similarly changed to sending them information advising against visiting. Alternative methods for visitation including video conferencing are being suggested for facilitating communication and this is left to the facility's management. Visitor screening is endorsed on a case-by-case basis, but the individuals must be wearing on protective gear like masks with guidelines stressing the need for hand hygiene (CDC, 2020).

COVID-19 and Minority Health

COVID-19 has exposed the vulnerability of the minority communities and racial or ethnic health disparities in America. Since the beginning of the infection, there is evidence confirming that Hispanics and African Americans are disproportionately affected by the virus (Nania, 2020). For example, the black community, African Americans, constitutes a higher share of the COVID-19 confirmed cases as well as deaths in comparison to the entirety of the US population. This is also evident in states with minority communities like Hispanics, especially New York, a state hardest

hit by the pandemic, succumbing to this disease than any race or ethnic group (Nania, 2020). Another insight is that in Chicago, half of the diagnosed cases are black and interestingly, the African Americans community is only a third of the state's total population (Nania, 2020).

The high infection rates and fatalities among minority group are associated with the prevailing health inequalities facing minorities like the African American communities. Healthcare disparities are associated with higher hypertension and diabetes rates as the underlying conditions responsible for the higher deaths as well as barrier to care (Nania, 2020). The effect that the disease condition has had on the minority populations is highlighted by the American Psychiatric Association (APA). The body called for resource appropriation to ensure that these groups are receiving the necessary treatment for recovering from the illness (APA, 2020). It has been a major call for local, state, and federal government's health authorities to consider the disparity as well as guarantee provision of proper treatment along appropriate care for minority groups. COVID-19 has also raised the need for supporting physicians along with the healthcare providers in these communities. The disparity among the minority communities is also bringing about problems over mental health. The stress associated with the disease and condition is a concern.

The best care during this pandemic should integrate mental health as part of the recovery plan for the minority populations. Minority communities like the black population is feeling the effect of the historical and institutionalized disparities embedded in structural racism and institutionalized oppression (APA, 2020). For this population, intervention or response should be culturally-informed to address the specific trauma of the community while at the same time using the nursing profession to advocate for these structural problems. A major practice change has been imminent for minorities, especially a call for having minority-based expert groups to develop roadmaps for implementing necessary steps to address COVID-19 whereby the inequality in health has led to mortality and morbidity of Native Americans, African Americans, and the Hispanic Communities. COVID-19 is exposing the wide-spread discrimination in the US healthcare system as testing nationwide has been limited for the minorities. Less incentives and measures have been directed to reporting and categorizing cases based on race with many localities reporting data that does not exhaust every race (Calma, 2020). This is deeply rooted in the care management system because in every therapeutic intervention, especially those moving from simple to most complicated, minorities always end up receiving poorest quality care and the attention is less intensive in comparison to the majority white race. Therefore, with COVID-19 testing being out of reach for the minorities, silent spread among the communities is a major concern for public health.

Conclusion

COVID-19 has had a field day with the healthcare sector by highlighting areas that needs to be considered in terms of policy and practice change. For instance, it suggests the need for reconsidering the approaches to managing hospital acquired infections by focusing on the welfare of frontline nurses and physicians, especially ophthalmologists. A new case of consideration is the role of ophthalmologists since tears is also a medium of infection. In so doing, these professionals have become crucial in preventing the infections but their health is also at risk because they risk infections. Hence, ophthalmology will change with this virus concerning how cases are evaluated, especially triaging of the patients based on severity, focusing on urgent cases and also considering the best preventive measures like the necessary PPEs. Also, with the Artificial Intelligence helping

with faster patient triage, medical staff can identify the at-risk situations earlier to avoid cross-infections as well as prioritize those in urgent need of intensive care. Secondly, the evidence of online learning is not good news since with parents staying with their children at home, e-learning has emerged as the new paradigm shift in education. COVID-19 has equally highlighted the essence of parental involvement in children's learning and why policies should be enacted to should and enhance this involvement. Learning institutions have equally played a role in disaster response as makeshift care management centers thereby becoming a new arena of disaster response. It comes with no surprise that the elderly are the worst hit by this pandemic as the most sidelined and ignored, maybe a time of a change to prioritize their health, train care providers in nursing homes and also allocate adequate healthcare resources. This extends to the minority populations whose historical health disparity has seen a surge in their mortality rate.

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