



# Covid-19 pandemic impact on Dementia

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# Introduction: Covid - 19

- ▶ A novel coronavirus, severe acute respiratory coronavirus 2 (SARS-CoV-2) was detected late 2019.
- ▶ It has been identified as the cause of COVID-19, a respiratory illness of varying severity.
- ▶ March 11, 2020, with COVID-19 affecting 113 countries or territories, the World Health Organization declared COVID-19 to be a pandemic of “alarming levels of spread and severity.”



# Dementia

- ▶ Globally, more than 50 million people have dementia, and one new case occurs every 3 s.
- ▶ Dementia has emerged as a pandemic in an ageing society.
- ▶ The double hit of dementia and COVID-19 pandemics has raised great concerns for people living with dementia.



# Items in common

- ▶ Severe illness of COVID-19 predominantly occurs in older people and in individuals with underlying medical comorbidities.
- ▶ Dementia including Alzheimer disease (AD) is a common cause of morbidity and mortality in the aging population.
- ▶ the majority of people with dementia were living with one or two additional chronic health conditions
- ▶ The risk factors for dementia -- age, obesity, cardiovascular disease, hypertension and diabetes mellitus — are also risk factors for SARS-CoV-2 infection and for severe COVID-19.



# Pandemic impacts on Dementia

- ▶ During normal times, individuals with dementia are among the most vulnerable persons in society, depending on family or professional caregivers for their day to day survival.
- ▶ This pandemic further exacerbates their vulnerability, due to both the morbidity and mortality from COVID-19 and the indirect effects of the pandemic on the social supports and the health care system on which they depend



- ▶ There is evidence for a bidirectional relationship between viral infections and dementia:
- ▶ people with dementia have an increased risk for infection
- ▶ while a poor immune response to infection places individuals at increased risk for cognitive decline



# Epidemiologic evidences

- ▶ patients with dementia were more vulnerable to SARS- CoV 2 **infection**
- ▶ Patients with dementia and COVID-19 had significantly worse **outcomes**
- ▶ This risk is even higher in **Black** patients with dementia, according to a new study funded in part by NIA and published in *Alzheimer's & Dementia*
- ▶ The risk of death in patients with COVID-19 increases significantly with **age** and the mortality risk in **men** is twice that in women.



# Why Individuals with Dementia are at High Risk for COVID-19



1. known COVID-19 risk factors (e.g., cardiovascular diseases, obesity, type 2 diabetes) overlap with those for dementia,
2. the damaged BBB in patients with dementia predisposes them to bacterial and viral infections,
3. individuals with Dementia may be unable to follow the recommendations from public health authorities to reduce the transmission of COVID-19:
  - ▶ They have limited **access** to accurate information and facts about the COVID-19 pandemic.
  - ▶ They might have difficulties in **remembering** safeguard procedures, such as wearing masks, hand hygiene, monitoring for and reporting symptoms of COVID-19; maintaining physical distance; and self-isolating
  - ▶ or in **understanding** the public health information issued to them.



Courtesy, Pamela Dean



- ▶ advanced age had no additional effect on the risk of getting COVID-19 among patients with dementia after adjusting for medical conditions, sex, and nursing home stay.
- ▶ We speculate that older people, including older patients with dementia, although they have weakened body systems and function compared to younger people, may be more likely to stay at home, less likely to go to work and socialize, which creates exposure to virus.



# Neurological manifestations of COVID- 19

- ▶ range from headache, loss of smell, confusion, strokes, brain hemorrhage to cognitive decline.
- ▶ SARS- CoV 2 can infect neurons and affect brain function through organ failure elsewhere (e.g., heart or lung), so hypoxemia can cause cerebral edema and brain malfunction.
- ▶ chronic hypoxia, metabolic dysfunction, systemic inflammation, and immune dysregulation affect on brain function.
- ▶ in dementia condition, the blood-brain barrier (BBB) is damaged, which allows certain bacteria and viruses to access the brain more easily and patients more susceptible to direct infection



# Cognitive manifestations of COVID- 19



SARS-CoV 2 infection will :

- ▶ accelerate cognitive decline in patients with dementia
  - ▶ or lead to long-term cognitive impairments
  - ▶ trigger dementia in infected people.
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# Dementia triggering by Covid 19

- ▶ Prior studies have suggested that infections by Chlamydia pneumoniae, herpes virus, or spirochetes could then potentially trigger, or worsen, neurodegeneration
- ▶ scientists should anticipate significant long-term neurological effects of SARS-CoV 2 infection in triggering or worsening dementia in survivors of COVID-19 and expect higher prevalence of dementia in patients with COVID-19 compared to the non-infected population in the future



# Covid-19 impact on Dementia

- ▶ Depending on the severity of their illness,
- ▶ Based on this severity, individuals with dementia live in various settings and rely on the availability and accessibility of various resources

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# MCI & mild dementia in covid pandemic

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- ▶ Patients physically more independent and,, with a more active life, enriched with a variety of social contacts and cognitive stimulation, are those most affected by the negative effects of confinement
  - ▶ patients with mild dementia still able to completely understand the need of quarantine, and therefore able to adopt adequate strategies to face the stress,
  - ▶ Whereas people are turning to technology to stay socially connected and access services including health care, individuals with mild dementia may have less trouble in using technology.



- ▶ individuals with milder dementia have minimal care needs and live in the community. Which is under several limitations during pandemic.
- ▶ environmental enrichment and physical activities are two most important protective factors which are limited by increased isolation and disruption of group activities and may lead to **faster cognitive decline**.
- ▶ Depression as dementia risk factor is more prevalent in these patients increase due to quarantine and isolation.
- ▶ Increased risk for covid-19 infection due to:
  - 1- they may be unwilling or unable to comply due to apathy or depression.
  - 2- they are less likely to drive a personal vehicle, instead relying on mass transit or transportation services that increase their exposure and risk of infection.



# Covid impact on more severe dementias

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- ▶ As discussed above, features of moderate to severe dementia such as severe memory impairment, and BPSD such as wandering, and agitation may thwart attempts to promote the actions recommended to reduce risk of transmission.
  - ▶ In the other direction, imposition of increased hand hygiene, isolation, or restriction of visitors and activities may worsen cognitive symptoms or BPSD, increasing further care needs and risks.



# Long-Term Care (nursing homes)

- ▶ In these settings, personal protective equipment (PPE) could not be done due to social place and patient dependency. it may be rationed for confirmed or suspected cases or even become unavailable.
- ▶ Patients in nursing home had shown varying responses to all of the changes resulting from COVID-19.
- ▶ Some with drew, became increasingly apathetic, lost weight, and engaged in limited amounts of functional and physical activity. Others experienced increased anxiety, distress, confusion, and motor restlessness
- ▶ When COVID-19 affects LTC homes, it can have a high attack rate and case fatality rate—for example, a case fatality rate of 33.7%–34 fatalities among 101 affected residents—has been reported in a Washington State LTC.



# COVID-19 Impact the Diagnosis and Clinical Management of dementia

- ▶ Increased demands on health system may also result in the diversion of resources away from patients with chronic diseases, including those with dementia.
- ▶ As primary care providers and specialists are not available to work up neurocognitive disorders.
- ▶ Attending a clinic for one or more appointments and visits for blood work and neuroimaging expose frail individuals to risks that may exceed the benefits of timely evaluation and regular monitoring.



# Clinical Follow-up

- ▶ In many jurisdictions, outpatient physicians have transitioned to providing virtual care, and follow-ups by telephone or video- conferencing.
- ▶ These modalities may not be adequate to perform the physical and neurological examinations or some of the cognitive tests required when diagnosing MCI or dementia or monitoring their progression.



# Medication Management of dementia

- ▶ Patients who are stable on medications may be impacted if the supply of their medication is disrupted due to missed visits, disruption of pharmacy pickup or delivery, or supply chain problems.
- ▶ Initiating a new medication during the pandemic may be associated with higher risk,
- ▶ Rare but serious adverse events associated with medications used in the treatment of dementia –e.g., bradycardia, gastrointestinal symptoms, falls, fractures, cardiovascular events, or strokes carry higher morbidity and mortality if access to urgent care is impeded



# Nonpharmacologic Management

- ▶ Common nonpharmacologic interventions for dementia in general, and BPSD in particular, involve social and physical contact such as social groups, exercise groups, and pet therapy.
- ▶ A limitation on resources and a need for physical distancing will not merely suspend these interventions, result in increased isolation, a lack of physical exercise, decreased social engagement, and a suspension of purposeful activity.
- ▶ While confined at home, many people are now using technology to socialize and even exercise in group; individuals with dementia may not be able to use electronic tools and software



# Dementia impact on covid-19 severity

- ▶ As well as being at increased risk of contracting COVID-19, older adults with dementia are also more likely to have more severe disease consequences than those without dementia.
- ▶ A large community cohort study conducted in the UK has shown that the risk of serious COVID-19 (defined as a requirement for hospitalization) was three- fold higher for individuals with a diagnosis of dementia than for those without dementia<sup>4</sup>.



# Pathophysiologic evidences

- ▶ some evidence suggests that more specific mechanistic aspects of dementia and pre-existing brain pathology can increase the risk of neurological complications from COVID-19
- ▶ In particular, a study of the UK Biobank cohort showed that the risk of COVID-19-related hospitalization was more than twofold higher among individuals who were homozygous for *APOE*  $\epsilon 4$  than among individuals with the most common *APOE*  $\epsilon 3/\epsilon 3$  genotype



- ▶ One possible mechanistic explanation for this association is that increased **blood–brain barrier permeability** associated with *APOE*  $\epsilon$ 4 leads to more extensive CNS inflammation in response to SARS-CoV-2 infection
- ▶ in line with this hypothesis, *APOE*  $\epsilon$ 4 is known to exacerbate **microglia-mediated neuroinflammation** and subsequent neurodegeneration.
- ▶ In addition, *APOE*  $\epsilon$ 4 is associated with increased **cytokine production** in response to inflammatory stimuli, which could intensify the already aggressive inflammatory response associated with COVID-19, resulting in a so-called cytokine storm
- ▶ The cytokine storm has been directly associated with lung injury, multi-organ failure and severe COVID-19 outcomes, including death



# Covid impact on Mortality rate

- ▶ Initial reports from the Centers for Disease Control and Prevention (CDC) show that excess mortality due to all causes was very high in 2020 compared with previous years, especially among older adults.
- ▶ Preliminary reports from the CDC indicate that there were at least 42,000 more deaths from Alzheimer's disease and other dementias in 2020 compared with the average of the five years before 2020. approximately 16% more than expected
- ▶ Among people over age 85 who died of COVID-19, Alzheimer's disease was listed as one of multiple causes of death for 8% and vascular or unspecified dementia was listed for 20%.



# Impact of COVID-19 on dementia Research

- ▶ This pandemic also threatens the “patients of tomorrow.”
- ▶ dementia has become one of the most active areas of both basic and clinical research, attracting major industry, government, and philanthropic funding in the Western world.
- ▶ As of March 31, 2020, a search on [clinicaltrials.gov](https://clinicaltrials.gov) using the key words “dementia” or “Alzheimer’s disease” reveals 592 active studies. A recent published study of the same registry identified only 156 trials.
- ▶ all research activities as well as dementias, in which participants are exposed to a potentially lethal covid infection without the possibility of any direct benefit are suspended unless they can be continued entirely remotely.
- ▶ Dementia research investment decreased due to shifting the resources to covid pandemic.



# COVID VACCINE & DEMENTIA

- ▶ **Should people living with Alzheimer's and other dementias get the COVID-19 vaccine?**
- ▶ Vaccines are an important step in protecting the health and safety of long-term care residents and staff, and the Alzheimer's Association strongly encourages their use.
- ▶ It is important that individuals and families consult with health care providers about any questions related to an individual and the vaccine





# Specific dementia syndromes in COVID-19 era: **FTD**

- ▶ the clinical manifestations of BVFTD FTD including disinhibition loss of empathy & apathy will likely make patients less able to comply with the social and personal distancing requirements than AD.
- ▶ Semantic knowledge deficits in patients with primary progressive aphasia (PPA) may also reduce their ability to understand the concept of a pandemic and the rationales behind the various pandemic control measures, more than AD.
- ▶ Perseverative, stereotyped, or compulsive behaviors may result in habits such as frequent touching of the nose or mouth or wandering out of the home environment, thus increasing risk of transmitting the infection.



# DLB & COVID

Awareness of quarantine varied significantly among dementia subgroups and DLB patients showed the highest degree of partial and total degree of awareness and insight.

- ▶ People with DLB are at increased risk of developing delirium if they develop an infection compared with AD.
- ▶ orthostatic hypotension is more common in DLB than other dementias. THIS MAY INCREASE RISK OF FALLS which is also higher for people with DLB than for other dementias. As we know one of covid presentations can be autonomic dysfunction. Which can increase the risk of falls.
- ▶ Reduced social stimulation, a lack of daytime routine, and less physical activity may exacerbate excessive daytime somnolence, common feature of DLB,



- ▶ Recurrent complex visual hallucinations and Delusions are common feature of DLB. may also increase as a result of anxiety or agitation, in conjunction with overheard or poorly understood conversations, or news reports that include unfamiliar scenes, such as people wearing mask personal
- ▶ These symptoms should be differentiated from covid delirium.
- ▶ People with LBD have significantly more visual complaints when compared to people with AD, including misjudging objects, difficulty reading, and increased double vision and thus could struggle to interact with the virtual medium.



# Vascular dementia & covid-19

- ▶ There were substantial differences in dementia subtypes available in the database with respect to **risk of COVID-19**, with the greatest risk associated with vascular dementia
- ▶ comorbidities and other COVID-19 **risk factors** increased the risk for COVID-19 in patients with vascular dementia
- ▶ In vascular dementia, cognitive impairment is attributable to cerebrovascular pathologies and alteration in cerebral blood vessels with damage to **BBB**.

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