PJP

CASE REPORT

TRIPLE RIPPLES: THE NEUROPSYCHIATRIC AFTERMATH OF COVID-19 INFECTION

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ABSTRACT

This case illustrates the myriad neuropsychiatric symptoms associated with the direct and indirect exposure to COVID-19 infection. The disruption in our daily routines, the uncertainty brought on by the then novel and unknown condition, the specter of death and the "horror" stories that spread through the grapevine during the lockdown shook the foundations of our existence. To make matters even worse, the government protocols required those infected to move away from the comfort of the familiar and the emotional support of family and friends.

This situation paved the way for the development of Post-Traumatic Stress Disorder in this patient.

The patient is a 46-year-old, female, married, Roman Catholic, graduate of Bachelor of Secondary Education and currently works as a teacher. She was born in the year 1977, in Pampanga where she resides.

CHIEF COMPLAINT
Patient: "Di ako mapakali"
SOURCE AND RELIABILITY
Patient: Good

PRE-MORBID HISTORY
Patient described herself as outgoing, easily pleased, diligent and enjoys her solitary time. She claimed to have uninterrupted sleep, good appetite and able to do her activities of daily living independently.

HISTORY OF PRESENT ILLNESS
Six months prior to consult, a neighbor with whom the patient claimed to be close, contracted COVID-19. She witnessed the said neighbor being picked up by an ambulance and was brought to a hospital. The patient received news later on that the neighbor was intubated and admitted to the Intensive Care Unit (ICU).

Given that they had some interactions prior to being admitted, the patient felt anxious and began to ruminate on the possibility that she too would develop symptoms as well. Whenever she had these thoughts, she noticed that she would become cold and clammy. At night, she had difficulty initiating sleep because she kept thinking of the possibility that she might contract the virus as well. Patient claimed that she was still able to eat and was still able to do her activities of daily living. No medications were taken and no consult was done.

Five months prior to consult, her husband was diagnosed to have COVID-19 and was transferred to a nearby quarantine facility. The patient felt fearful for her husband and claimed that she began to excessively worry when her husband would regale her with stories of other people in the facility whose symptoms worsened or died. The patient's symptoms of anxiety such as palpitations, cold clammy skin and insomnia persisted. However, the patient noted that she developed hyperacidity and some occasional chest discomfort which was relieved by rest. Still no medications were taken and no consult was done. During the interim, the aforementioned symptoms continued even after the husband came home from quarantine.

Three months prior to consult, the patient developed flu-like symptoms and was later diagnosed to have COVID-19, Mild. Upon hearing this, the patient recalled the experiences of the of the neighbor and her husband. At night she would have distressing dreams about them dying or she passing away. At daytime, whenever she would hear COVID-19 related news she would feel anxious and thus began to avoid watching television and browsing through her social media accounts. Although her symptoms were mild, patient still felt excessively worried about her overall health. She read an article wherein it stated that fasting could help improve symptoms from the virus. The patient followed this but it only resulted to her losing some weight and aggravating her hyperacidity. Patient claimed that she would have panic attacks even while she was at rest.

Two months prior to consult, patient's flu like symptoms resolved but the insomnia, palpitations, hyperacidity and panic attacks persisted. This prompted her to seek consult with another internist and she was allegedly prescribed with an unrecalled dose of Clonazepam and Melatonin. However, she claimed that these afforded minimal relief. To address the hyperacidity, an endoscopy was done but it yielded unremarkable results. Later that month, the patient's father suddenly died of aneurysm and aside from mourning this sudden loss, this made the patient feel more fearful, "takot ako na mawalan ng mahal sa buhay." Her husband noted that the patient was easily irritated but tolerated her behavior. No other medications were taken and no additional consults were done.

One month prior to consult, the patient still had irritable mood. She was now unable to complete her household chores because of her panic attacks and excessive worry over hers and her family's health. She would still experience insomnia and had recurring distressing dreams about her neighbor and husband dying. The patient's family noticed that she would isolate herself in the bedroom when the topic of conversation was about COVID-19 or updates on sick or deceased loved ones. At work, she noticed that had difficulty focusing on her tasks. Still the previously prescribed Clonazepam and Melatonin afforded minimal to no relief.

Persistence of symptoms prompted consult

PAST MEDICAL HISTORY

The patient was diagnosed to have Dyslipidemia and Type II Diabetes Mellitus last 2018. She was maintained on Atorvastatin 10mg/tab 1 tablet at bedtime and Gliclazide 30mg/tab 1 tablet in AM, respectively. Other medications she took were multivitamins and vitamin C. Patient claimed to be allergic to ibuprofen, seafood and dust. She denied having previous surgeries done.

SUBSTANCE USE HISTORY

The patient is a non-smoker, denies drinking alcoholic beverages or taking illicit drugs.

OB-Gynecologic History

The patient had her menarche at 9 years of age. She claimed to have regular interval of 31 days, lasting for 4 days at a time. She would consume 3 pads, fully soaked and would experience associated dysmenorrhea. Patient claimed to have had her last menstrual period August 1, 2021.

Patient has two children. Both reached full term and delivered via normal spontaneous delivery at a hospital and was assisted by an obstetrician.

FAMILY HISTORY

The patient's father had an episode of myocardial infarction and later passed away due to thoracic aneurysm. Patient claimed that her father was an undiagnosed case of posttraumatic stress disorder as well. Meanwhile, her uncles from her father's side of the family were probably undiagnosed cases of depression and anxiety.

MENTAL STATUS EXAMINATION (MSE)

- Appearance: Patient seen and examined an adult female, looks appropriate for age, of medium built and average stature. She appeared well kempt and groomed, had fair complexion with her medium-length hair tied in a ponytail. She was clad in a long sleeved, floral shirt, grey jeans, prescription glasses and sneakers
- Behavior: No mannerisms or tics
- Attitude: Cooperative, conversant with relevant responses and able to maintain eye contact
- Mood and Affect: Anxious with congruent affect

- Speech: Normo-productive with normal rate and volume but spoke with an anxious tone with slight stuttering and spoke mostly in Filipino
- Perceptual Disturbance: Denied having hallucinations and illusions.
- Thought Content: “Halos sa lahat na lang ng bagay ninenerbyos ako. Lalo na kung balita ay tungkol sa COVID. Iniiwasan ko na manuod at makinig sa balita. Pag usapan sa bahay yung COVID, umaakyat na lang ako sa kwarto.” No apparent delusions. Denied having suicidal and homicidal ideations.
- Thought Process: Linear and goal directed
- Cognition: Oriented to 3 spheres, intact memory, and good concentration
- Judgment: Fair
- Impulse Control: Good
- Insight: Level III

PHYSICAL EXAMINATION
Vital Signs: BP 120/80 PR 94 RR 19 Temp 36.3^{0}C
SaO2 98% room air
Height: 5”6, Weight: 60kg
BMI: 21.35kg/m2
Abdominal Circumference: 65cm
General Survey: Conscious, coherent, not in cardiorespiratory distress
Skin: Fair, no rashes, no hematomas, no active lesions
HEENT: Pink palpebral conjunctivae, anicteric sclerae, no naso-aural discharge, no palpable cervical lymphadenopathies, no neck mass
Chest: Symmetrical expansion, clear breath sounds
Heart: Adynamic precordium, normal rate, regular rhythm, no murmurs
Abdomen: Flat, soft, and non-tender at all quadrants, no palpable mass
Extremities: Grossly normal, no bipedal edema, no palmar pallor, full and equal pulses, no joint limitation

Neurological Examination
Cerebrum: conscious, oriented to time place and person
Cerebellum: negative for Kernig’s and Babinski
GCS 14 (E4V4M6)
Cranial Nerves:
CN I - not assessed
II - 2-3mm pupils, both equally reactive to light
III, IV, VI - intact extraocular muscles
V - intact V1 – V3, intact temporalis and masseter muscle
VII - no facial asymmetry
VIII - intact gross hearing
IX, X - able to swallow, uvula midline
XI - able to shrug shoulders and turn head against resistance
XII - no tongue deviation in protrusion
Cerebellum: no tremors, no incoordination while walking
Muscle Strength: 5/5 on all extremities
Sensory: 100% on all extremities
Deep Tendon Reflexes: 2+ on all extremities

LABORATORY WORK-UP

Complete Blood Count	
Hemoglobin	146
Hematocrit	0.46
WBC Count	7.7
Segmenter	0.60
Lymphocyte	0.36
Monocyte	0.01
Eosinophil	0.03
Platelet Count	209

Blood Chemistry	
HbA1C	5.4
BUN	4.4
Creatinine	88
Uric Acid	485
Sodium	140
Potassium	3.8
Chloride	106
SGPT	18
SGOT	30

Urinalysis	
Color	Light Yellow
Transparency	Hazy
Specific Gravity	1.006
pH	6
RBC Count	0-2/hpf
Pus Cells	0-2/hpf
Bacteria	Few
Esterase	None
Albumin	None
Erythrocytes	None

ECG: Sinus rhythm with normal axis
Chest x-ray: Normal chest findings

ASSESSMENT

The patient is a 46-year-old female whose symptoms began 6 months prior to consult. It began when her friend had a complicated case of COVID-19 and her symptoms worsened when she had gotten ill with the virus as well. She initially had intrusive thoughts and recurrent memories of her experiences then later began to have distressing dreams as well. Her excessive worry and ruminations led to her panic attacks, irritable behavior and impairment in social and occupational functioning. On MSE, the patient appeared anxious and would stutter when recalling her stressors. There were no apparent signs of psychosis and work-up was unremarkable. Thus, assessment was Post-Traumatic Stress Disorder (PTSD).

MANAGEMENT
Patient was started on: Sertraline 50mg/tablet, ¼ tablet for 4 nights then increased to 1 tablet at bedtime thereafter; Quetiapine 25mg/tablet, 1 tablet as needed for insomnia and Alprazolam 500mcg/tablet, ½ tablet as needed for panic attacks. She was asked to undergo thyroid function test and given psychoeducation regarding her diagnosis and psychotropic medications' possible side effects.

CASE DISCUSSION
Neuropsychiatric Aftermath of COVID-19 Infection

INTRODUCTION

Adverse mental health consequences of COVID 19, including anxiety and depression, have been widely predicted, but not yet accurately measured.

A range of physical health risk factors have been put forth but psychiatric risk factors were initially unknown.

Early on concerns have been raised about its mental health effects and on patients with mental illness, yet a couple of years later, we still know little about the psychiatric sequelae of COVID-19, and the susceptibility of the mentally ill to COVID-19 (1).

In the past, pandemics have had an overwhelming impact on the mental health of those affected, both directly and indirectly.

For those who contracted the disease, they mostly dealt with the cost of medical care, social isolation, negative stigma and long-term health consequences.

For those who did not contract the disease, they mostly dealt with the anxiety surrounding possible infection and providing care to loved ones who were infected.

The indirect health impact of pandemics can further increase morbidity and mortality. Drivers of indirect health impacts include decreased access to routine care resulting from an inability to travel, fear, or other factors. Additionally, this fear leads to upsurge of the "worried well" seeking unnecessary care, further burdening the health care system.

The mental health of older adults, on the other hand, may be uniquely affected by pandemics through the magnification of their own distinct risk factors.

The effects of past pandemics were reviewed to predict how COVID-19 may affect depression and anxiety in older adults.

We will look into the 3 main pandemics in the past:
SARS and 1918 influenza outbreaks where depressive symptoms were associated with lack of emotional support, quarantine and financial insecurity

For the SARS Pandemic, there was likelihood of increased stress, depression and loneliness both during and beyond the pandemic crisis.

And some evidence suggested that during the Swine Flu outbreak, the absence of quarantine may have contributed to a lower prevalence rate of depression and suicide.

At this point, we know that past pandemics have demonstrated that neuropsychiatric symptoms may accompany acute viral infection, or may follow infection by weeks, months, or even longer in recovered patients.

Today, the coronavirus 19 pandemic is a significant psychological stressor. In addition to its tremendous impact on every facet of individuals' lives and organization and especially in all economic and social sectors worldwide. The fear of illness and the uncertainty about the future precipitated anxiety and stress related disorders, one of which is PTSD.

Several groups have rightfully called for the creation and dissemination of robust mental health screening and treatment programs for the general public and frontline healthcare workers. But with less attention given to the role of the virus itself; its effect on the central nervous system and neuropsychiatric outcomes; as well as the host immunologic response to infection.

EPIDEMIOLOGY AND ETIOLOGY

Currently, according to the United States Center for Disease Control (US-CDC) COVID 19 is most likely the third leading cause of death, after heart disease and cancer.

And frequently, COVID 19 infections will include neuropsychiatric manifestations, such as confusion, memory loss, hypogeusia, anosmia and anxiety.

So, what is the impact of COVID 19 on mental health? Reviews, pre-existing neuropsychiatric conditions were expected to worsen with COVID 19 infection and was associated with more neuropsychiatric conditions, including anxiety.

High rates of neuropsychiatric symptoms including fatigue and depression, have been reported among individuals affected by COVID 19, suggesting an effect of COVID 19 on the CNS, following infection especially in severe cases or ICU cases.

So COVID 19 is associated with an increase in the incidence of a firs time psychiatric diagnosis with no previous psychiatric history vs other health events. And the incidence of anxiety diagnosis 90-days post COVID-19 diagnosis was 4.7%.

And furthermore, a psychiatric diagnosis within the previous year was also linked to a higher incidence of COVID 19 diagnosis; thus indicating that patients with psychiatric illness puts them at risk to contracting COVID 19.

Females, according to the study on the Psychological Impact of COVID-19 pandemic in the Philippines (2), were more affected than males. However, in another study by Gomez et al on The Potential Impact of COVID-19 on Depression and Suicide Risk in Older Adults (3), males more than 75 years of age had the highest risk for suicide, with a rate of 39.9 per 100,000. Also, those who were less educated, single, childless, less than 18 years old, reported high levels of stress, anxiety, depression due to lower social and emotional support (3).

DEPRESSION & COVID-19

In a systematic review by Renaud-Charest, et al (4), depressive symptoms were present in 11-28% of the population that were infected. Meanwhile, clinically significant depression i.e. scores high in depression rating scales reported rates of depression ranging from 3-12%.

Gomez et al (3) in 2021 found that depression was the most common mood disorder, associated with a 1.7% probability of a first-time diagnosis for patients with COVID-19 compared to other healthcare events or health-related events.

The impact of COVID-19 pandemic on older adults showed that they were affected disproportionately among older people. Eighty percent of the older adults in the general US population experience depression with a 12-month prevalence of 5.4% for Major Depressive Disorder and adults age 65 years old and above are among the highest risk group for dying by suicide.

PREVALENCE RATES OF DEPRESSION

In the comparison of prevalence rates of depression, the following results were revealed:

1. Higher prevalence of symptoms of depression and poorer sleep quality but not symptoms of anxiety or distress compared with individuals without COVID-19 diagnosis.
2. In individuals diagnosed with COVID-19 but were never bed ridden were at a lower risk for depression and anxiety compared to those without the disease.
3. Patients who were bedridden for more than 7 days were persistently at higher risk of symptoms of depression and anxiety.

THE AFTERMATH - THE POST-COVID-19 SYNDROME

Visco et al (5) suggested that brain involvement of COVID-19 arises during the acute phase of the infection. Post-COVID-19 neurological syndrome (PCNS) is a side effect of COVID-19 infection that is being increasingly recognized. Consquently, cognitive and psychiatric functions need strict monitoring in COVID-19 patients who survive beyond the acute phase. And the most common neuropsychiatric complaints were dizziness, headaches, anosmia, amnestic dysfunction, dysexecutive syndrome, ataxia, tetraparesis, and sleep disorders.

The pathogenesis of long COVID-19 as elaborated on by Thye et al (6) can be due to the following different pathways:

1. Systemic Inflammation, which could increase the velocity of the evolution of neurodegenerative processes aggravating clinical signs and symptoms of neurological diseases already present at the time of infection.
2. Inflammation, which determines the endothelial alterations and migration of leukocytes across the blood-brain barrier.

About one-third of COVID-19 patients presented with depressive symptoms or clinically significant depression and particularly, these symptoms were noted during the first 12 weeks after the infection.

In another study (5), about 714 COVID-19 patients studied and found out that nearly 97% of them developed symptoms compatible with Posttraumatic Stress Disorder (PTSD) that may be attributed to long quarantine isolation and worsening quality of life. Thus, in our case, the prolonged quarantine isolation of 2-4 weeks can be one of the risk factors that precipitated the neuropsychiatric symptoms.

It has been repeatedly implied that biochemical substrates of depression related to COVID-19 is systemic inflammation, particularly, cytokine storm and increased inflammatory factors that contribute to the augmentation of permeability of blood-brain-barrier. Lorkiewicz and Waszkiewicz (7) found that this results in the reduction of tryptophan and serotonin circulating levels and augmentation of toxins such as kynurenine, quinolinic acid and 3-hydroxykynurenine. These substances facilitate neurotoxicity, neurodegeneration and reduction in neurogenesis and synaptic plasticity. Kynurenine in particular and its ducts carry out diverse biological functions including blood vessel dilatation during inflammation and regulating immune response.

RISK FACTORS - ACTIVE AND RECOVERED COVID-19 CASES

The following risk factors were associated with depressive symptoms and poor sleep: female sex, longer stay at hospital, higher number of comorbidities, and higher number of symptoms upon hospital admission. Gomez, et al (3), also described what we call “Double burden of exclusion” among older adults, which means an exclusion from both physical and digital contact.

The rates of depression increased with duration of the pandemic, resurgence of physical distance, stay at home orders, reduced physical activity and limited access to routine health care and/or home care visits, as there was decreased detection by social supports and health professionals.

BIOMARKERS OF POST-COVID SYNDROME

Lorkiewicz et al (7) in 2021, did a scientific review regarding major depressive disorder biomarkers that were present in COVID-19 patients and influenced the development of post-COVID syndrome or depression due to increased levels of the following:

1. Interleukin 6/soluble interleukin 6 receptor which was involved in disrupting hippocampal neurogenesis and has often been described as a biomarker for Major Depressive Disorder;
2. Tumor necrosis factor that significantly affected serotonin production;
3. Interferon gamma when administered centrally or peripherally induces anhedonia, memory loss, and social interaction disorders;
4. Interleukin 10 correlated to severity of depressive symptoms;
5. Soluble interleukin 2 receptor (sIL-2R), C-reactive protein (CRP), Monocyte Chemoattractant Protein-1 (MCP-1), serum amyloid a (SAA1) and metabolites of the kynurenine pathway, as well as decreased brain derived neurotrophic factor (BDNF) and tryptophan (TRP).

PSYCHOLOGICAL SYMPTOMS IN COVID-19 PATIENTS

In a study of Thye et al, in 20226, the psychiatric sequelae of COVID-19 included anxiety, depression, and posttraumatic stress disorder (PTSD); which was a similar phenomena to past coronavirus outbreaks due to the phylogenetic similarities between the pathogenic coronaviruses causing these infections.

Rogers et al (2020) (8) in their meta-analysis, discovered that SARS and MERS were linked with long term neuropsychiatric implications and that approximately one-third of SARS and MERS survivors had psychological conditions such as anxiety, depression, and PTSD that persisted up to 6 months after being discharged from the hospital.

A direct viral infection causes demyelination and dysregulation in neurons. Another mechanism is blood brain barrier destruction that allows infiltration of immune products and microvascular thrombosis as well as systemic inflammation triggering a cascade of immunological responses such as the cytokine storm. The risk factors for developing psychological symptoms are the following6: female sex, those who suffered discrimination, had a severe case COVID-19 infection, experienced many traumatic memories, and were socially isolated.

On the other hand, there were potential preventive and treatment modalities that psychiatrists could integrate in their clinical practice such as (6): administration of psychotropic medications and probiotics, which has been identified as one of the safest adjunctive treatments for alleviating psychiatric sequelae in post-COVID-19 survivors.

SYMPTOMATOLOGY

In a systematic review of COVID-19 impact on mental health (9), revealed that in the general population of China, Spain, Italy, Iran, USA, Turkey, Nepal and Denmark, symptoms of anxiety increased from 6.33% to 50.9%, cases of depression leaped from 14.6% to 48.3%, and post-traumatic stress disorder became prevalent from 7% to 53.8%

In another meta-analysis of severe coronavirus infection (SARS, MERS, COVID-19) by Rogers et al8, they noted that in one study, 26 in 40 patients with COVID-19 in an ICU set-up manifested with delirium while in another study, 40 in 58 ICU bound patients with COVID-19 had episodes of agitation. Lastly, in another study, 17 of 82 patients who presented with altered consciousness subsequently passed on.

In a multicenter study by de las Peñas (1), it was also observed that 80% of hospitalized COVID-19 survivors exhibited at least one post-COVID symptom up to seven months after hospital discharge; fatigue and dyspnea were the most prevalent.

ETHICAL CONSIDERATIONS

Although diagnosed to be clinically recovered from COVID-19, frequency of depressive symptoms 3 months following the infection ranged from 11 to 28% (4). In Wand et al's study (10), they discussed the Interpersonal Theory of Suicide and emphasized its two key factors: thwarted belongingness and perceived burdensomeness. Thwarted belongingness refers to the state in which an individual's need for social connectedness is unmet. Meanwhile, perceived burdensomeness is the state in which an individual feels they are a burden on their family members and friends. These factors were exacerbated by the pandemic and need to be addressed. For patients who are isolated in quarantine or health care facilities, strategies in management would include3: video conferencing platforms, educating caregivers on suicide preventive measures, and modified visitation protocols.

The clinical care of depressive patients combines an urgency of crisis with the deeply experienced and pervasive feelings of hopelessness and sadness among patients, raising many ethical issues related to the need for patient safety, the appropriate treatment of disease, and the restoration of individual self-agency. Although psychopharmacology is important in the management of depression, Paul Biegler (11) argues that insights patients gained from the therapeutic process promote autonomy. He showed that in depressive disorder, autonomy is routinely and extensively undermined and that physicians have a moral obligation to promote the autonomy of depressed patients. He concluded that medical practitioners have an ethical obligation to prescribe psychotherapy particularly, Cognitive Behavioral Therapy for depression.

UPDATES IN PSYCHOPHARMACOLOGY

Among the Selective Serotonin Reuptake Inhibitors (SSRI), Fluvoxamine has been found to be effective in patients with both COVID-19 and anxiety (12). Fluvoxamine binds with sigma-1 receptor on immune cells and suppresses the pathologic release of cytokines. It is given at 100mg three times a day for 15 days. At this dose, it was associated with a lower overall mortality vs control in an open-label, prospective cohort study (12) (HR: 0.58% p=0.027).

COVID-positive patients already on SSRIs were noted to have reduced mortality rates compared to COVID-positive patients who were not on chronic SSRI medications (Rauchman, et al, 201213).

SSRIs were observed to have rapid antidepressant effects with post-COVID major depressive episode (14). Response rate was 89% and 95% in patients with or without a previous psychiatric history, respectively. Clinical and demographic characteristics of the patients did not affect the response rate. Sertraline, Citalopram, Paroxetine, Fluvoxamine and Fluoxetine were used. The anti -Inflammatory effects of SSRIs may underlie their possible protective role in COVID-19.

Tricyclic Antidepressants (TCA) should be used with caution due to its anticholinergic properties.

Benzodiazepines may cause adverse respiratory problems, hence should be avoided in COVID -19 patients. In addition, back in 2019, the US FDA (15), warns against the use of gabapentin and pregabalin for patients with respiratory difficulties as there is a risk of respiratory depression.

UPDATES ON NON-PSYCHOPHARMACOLOGY

Technology-Based Interventions3

Individual / group video chats with friends and family, as well as religious services offered via video live streaming, could help increase social connectedness among older adults. Its use and dissemination of virtual peer support and social groups could foster social connection. Yet could become a barrier if the cost is prohibitive and difficult to operate for some age groups such as the very young and very old.

Education and Information Strobe (3)

On a wider scale, public messaging and public service announcements that focus on educating the public regarding COVID 19 as well as providing clear instructions as to what each can do in their homes to prevent getting infected or what to do when one does have COVID 19 symptoms, would facilitate cohesion and provide community togetherness. Support lines should be included with all messaging to facilitate connection with resources.

Public Health Education may help to mitigate the pandemic-related increased risk of depression and suicide among older adults by providing direct training to the mental health and non-mental health providers on suicide risk and may decrease the negative impact of myths about aging, pandemic, health, etc.

Learning new skills and feeling empowered to adapt to changes can be a powerful protective factor against the developing negative age -related perceptions or blunted self-esteem.

CONCLUSION

By reviewing the existing literature on historical pandemics, knowledge acquired can aid in better long-term mental health outcomes and interventions living through the COVID-19 pandemic.

Studies have indicated that one of the strongest risk factors for depression and suicide amongst older adults were social isolation and its consequent loneliness (1, 2 3, 4).

However, research have helped to identify protective factors and effective suicide prevention strategies.

The use of historical and current data can be integrated in practice, to intervene and curb the potential increases in clinical depression and suicide deaths.

Past successful interventions, for both the pandemic and depression, trauma and anxiety included the following (1, 16, 17), increased screening of mental health issues; stronger referral systems through community organizations; psychoeducation on the illness; problem-solving therapy; support lines and

roups; creative use of technology to foster connectedness; and reframing the need to quarantine as a necessary means to help others stay safe.

A multi-disciplinary and collaborative effort is imperative. The risk for isolation, loneliness, depression, and suicide, is evident across age groups and social status.

Hence, neuropsychiatric symptoms developed in this pandemic, and even future pandemics, can persist and must be urgently addressed.

Scientific understanding of the impact of COVID-19 continues to evolve rapidly.

There are emerging data concerning a wide range of neuropsychiatric sequelae following SARS-CoV-2 infection.

Due to the complexity of COVID-19 and its treatment, affected patients may require longitudinal follow-up most appropriately delivered by a multidisciplinary team approach.

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TRIPLE RIPPLES: THE NEUROPSYCHIATRIC AFTERMATH OF COVID-19 INFECTION

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“Rosy Footsteps” takes its inspiration from the best-selling novel by French Author, Aviator, and Aristocrat Antoine de Saint-Exupery, Le Petit Prince or The Little Prince. The story took inspiration from the author’s experience of being alone in the middle of the desolate and unforgiving Sahara Desert after his plane crashed in 1935.

Drawing that parallel, the same feelings and emotions where felt by our patient after she contracted COVID-19. The physical isolation very much like being on an island brought about by COVID-19 as symbolized by circular raindrops led to the patient developing psychiatric signs and symptoms of trauma, anxiety and depression, which are like ripples i.e. the effect and impact of a serious infectious illness that may often be ignored by the hospital staff.

The “Rosy Footsteps” exemplify the “nurturing, playful, and nostalgic color that takes people back to their childhood.” The roses represented the patient’s hope of recovery and return to baseline functioning after successful treatment of her COVID -19 infection.

This artwork was created using the Procreate App for iPad and was originally sized and rendered at 1284 x 2778 pixels.