Unfortunately, the behavior of openly spitting in the public is continuing in India and maybe in several other parts of the world. Further attempts should be made for early intervention by educating children about it through school and family interventions (through parental education). Public awareness and involving religious or spiritual leaders to condemn this unhealthy behavior may be useful in its prevention. Understanding the psychology behind the spitting behavior can help in its effective prevention and subsequent risk of community transmission of COVID-19.

Declaration of Conflicting Interests
The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The authors received no financial support for the research, authorship, and/or publication of this article.

Sujita Kumar Kar, Praveen Pandey, Nitika Singh
1Dept. of Psychiatry, King George’s Medical University, Lucknow, Uttar Pradesh, India

Address for correspondence:
Sujita Kumar Kar, Dept. of Psychiatry, King George’s Medical University, Lucknow, Uttar Pradesh 226 003, India. E-mail: drsujita@gmail.com

HOW TO CITE THIS ARTICLE: Kar SK, Pandey P, Singh N. Understanding the psychological underpinning of spitting: Relevance in the context of COVID-19. Indian J Psychol Med. 2020;42(6): 577–578

Repurposing Selective Serotonin Reuptake Inhibitors for COVID-19: Rationale and Concerns

With a global count of more than 28 million cases and 921,801 deaths till September 14, 2020, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV2) remains a challenge for health professionals. Though more than 500 trials (clinicaltrials.gov) are ongoing, none of the agents has been officially approved to treat the infection. Despite the preliminary favorable results of certain antiviral drugs, the research is curtailed by the risk of their toxicity and methodological flaws. Though psychotropics are placed far away from antimicrobial and antiviral drugs in the taxonomy, antimicrobial and antiviral properties of various psychotropics have been documented. With this background, we would like to discuss the potential role of selective serotonin reuptake inhibitors (SSRIs) in SARS-COV2 pathology. Among those infected, only 5%–15% progress to severe acute respiratory syndrome. This is mediated through dysregulated immune response involving activation of nuclear factor kappa B (NF-kB), signal transducer activator of transcription (STAT 3), and inflammatory cytokines. This eventually establishes an inflammatory feedback loop, leading to a state of hypercytokinemia, known as “cytokine storm,” which is implicated in multiple organ dysfunction. Though agents with a potential action at virus-entry-level can help in preventing

References

1. James I and Jackman L. Treating problem behaviours in dementia by understanding their biological, social and psychological causes. In: Ames D, O’Brien JT, and Burns A (eds) Demen tí. 5th ed. Boca Raton, FL: CRC Press, 2017. pp. 244–256.
2. Aouda F, Hay F, Soh N, et al. Prevalence of chew and spit and its relation to other features of disordered eating in a community sample. Int J Eat Disord 2018; 51: 968–972.
3. Moś DM. Saliva secretion disorder in a schizophrenic patient—a problem in dental and psychiatric treatment: a case report. Ann Gen Psychiatry 2014. Epub ahead of print March 10, 2015. DOI: 10.1186/s12991-015-0052-4.
4. Gomberg HL. A note on the phallic significance of spitting. Psychoanal Q 1981; 50: 90–95.
5. Coomber R, Moyle L, and Pavlidis A. Public spitting in “developing” nations of the Global South: H armless embedded practice or disgusting, harmful and deviant? In: Scott J, Sozzo M, Carrington K, Hogg R (eds) The Palgrave handbook of criminology and the Global South. Cham: Palgrave Macmillan, 2018, pp. 493–520.
6. Bhatia MS. Compulsive spitting—a culture bound symptom. Indian J Med Sci 2000; 54: 145–148.
7. World Health Organization. Modes of transmission of virus causing COVID-19: Implications for IPC precaution recommendations, https://www.who.int/news-room/ commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations (2020, accessed June 30, 2020).
8. Fini MB. Oral saliva and COVID-19. Oral Oncol 2020; 108: 104821.
9. Xu J, Li Y, Gan F, et al. Salivary glands: Potential reservoirs for COVID-19 asymptomatic infection. J Dent Res 2020; 99: 989.
10. Phelamei S. Does spit transmit COVID-19? Here’s what you should do after contact with someone else’s saliva. Times Now, May 3, 2020, https://www.timesnownews.com/health/article/des-spit-transmit-covid-19-heres-what-you-should-do-after-contact-with-someone-elses-saliva/561221 (May 3, 2020, accessed June 30, 2020).
11. Upadhyay A. “Coronavirus also spreads by spitting,” reminds Actor Bhumi Pednekar as she launched an anti-spitting campaign to fight COVID-19. April 6, 2020, https://swachhindia.ndtv.com/coronavirus-also-spreads-by-spitting-reminds-actor-bhumi-pednekar-as-she-launched-an-anti-spitting-campaign-to-fight-covid-19-45597 (April 6, 2020, accessed June 30, 2020).
12. Ministry of Home Affairs. MHA Order Dt. 17.5.2020 on extension of lockdown, https://www.mha.gov.in/sites/default/files/MHAOrderextension_1752020_0.pdf (2020, accessed June 30, 2020).
the infection, there is a vital need to investigate therapies that reduce dysregulated immune cascade. If successful, this could substantially reduce mortality.

Though there has been no systematic study of the antiviral property of SSRIs on SARS-COV-2, their antiviral property—especially that of fluoxetine—for Hepatitis C, Enteroviruses, and Coxsackievirus has been reported. As STAT3 plays a vital role in the inflammatory loop, drugs that inhibit this pathway need consideration. Sertraline and paroxetine have been shown to attenuate mitogen-stimulated increases of STAT3 and Cyclooxygenases-2, which is also implicated in SARS-COV2 immunopathology. This action has been reported to be more pronounced than that of dexamethasone, another keystone in SARS-COV2 treatment. Secretion of cytokines is a crucial step in organ damage, and SSRIs have been known to reduce their levels. Likewise, Interleukin-6 (IL-6) being a major cytokine of the inflammatory loop, there has been ample number of studies showing a reduction of IL-6 levels with SSRI treatment. Furthermore, SSRIs may have a potential role in regulating the release of tumor necrosis factor—α, IL-6, IL-10, and Interferon-γ—since they require intracellular serotonin that is transported through a serotonin transporter—the target site of SSRIs.

Interestingly, the SARS-COV2 targets sigma receptors that mediate autophagosome–lysosome fusion in the endoplasmic reticulum. In line with this finding, preliminary research on molecules with sigma receptor activity displayed antiviral properties. With this background, fluvoxamine, a potent sigma-1 receptor agonist with immunomodulatory properties in animal studies, is being employed in trials to investigate the potential antiviral property (clinicaltrials.gov). In addition, we know that stress by itself can produce alterations in the immune system, which may increase the risk of infection. In animal models, fluoxetine has been shown to reverse stress-induced immune dysfunction. However, further studies are needed before we can translate it into clinical practice.

Considering the mentioned factors and owing to their relatively better safety and tolerability profile, SSRIs merit further investigation for their role in treating SARS-COV-2 infection. Encouraging preliminary evidence is available from research using in vitro human cell culture models as well as hospitalized patients with COVID-19, all of which point to a beneficial role for SSRIs in treating the condition through mechanisms such as reducing virus entry and propagation. Nevertheless, researchers have also highlighted the potential risks with SSRIs in SARS-COV2, such as impaired coagulation, risk of arrhythmias, liver injury, and cytochrome-mediated drug interactions, which can potentially limit the use of SSRI in such patients. Future research must balance these safety considerations against potential benefits of SSRIs in SARS-COV-2 and identify the right candidates who may benefit optimally from add-on SSRI.

Declaration of Conflicting Interests
The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Address for correspondence:
Karthick Navin, Dept. of Psychiatry, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, India. E-mail: drmknavin@gmail.com.

Submitted: 26 Aug. 2020
Accepted: 15 Sep. 2020
Published Online: 2 Nov. 2020

References
1. Alexander PE, Debono VB, Mammen MJ, et al. COVID-19 coronavirus research has overall low methodological quality thus far: Case in point for chloroquine/hydroxychloroquine. J Clin Epidemiol 2020; 123: 120–126.
2. Cederlund H and Mårdh PA. Antibacterial activities of non-antibiotic drugs. J Antimicrob Chemother 1993; 32: 355–365.
3. Catanazzo M, Fagiani F, Racchi M, et al. Immune response in COVID-19: Addressing a pharmacological challenge by targeting pathways triggered by SARS-CoV-2. Signal Transduct Target Ther; 5. Epub ahead of print December 2020. DOI: 10.1038/s41392-020-0191-1.
4. Hoxha M. What about COVID-19 and arachidonic acid pathway? Eur J Clin Pharmacol Epub ahead of print 25 June 2020. DOI: 10.1007/s00228-020-02941-w.
5. Talor M, Gil-Ad I, Lonmiński L, et al. Immunomodulatory effect of selective serotonin reuptake inhibitors (SSRIs) on human T lymphocyte function and gene expression. Eur Neuropsychopharmacol 2007; 17: 774–780.
6. Hennestad J, DellaGioia N, and Bloch M. The effect of antidepressant medication treatment on serum levels of inflammatory cytokines: A meta-analysis. Neuropsychopharmacology 2011; 36: 2452–2459.
7. Gordon DE, Jang GM, Bouladou M, et al. A SARS-CoV-2 protein interaction map reveals targets for drug repurposing. Nature 2020; 583: 459–468.
8. Núñez MJ, Balboa J, Rodrigo E, et al. Effects of fluoxetine on cellular immune response in stressed mice. Neurosci Lett 2006; 396: 247–251.
9. Zimmnik M, Kirschner L, Hilpert H, et al. The serotonin reuptake inhibitor Fluoxetine inhibits SARS-CoV-2. Preprint, Mol Biol. Epub ahead of print 14 June 2020. DOI: 10.1101/2020.06.14.150490.
10. Schloer S,Brunotte L, Goretzko J, et al. Targeting the endolysosomal host-SARS-CoV-2 interface by clinically licensed functional inhibitors of acid sphingomyelinase (FIASMA) including the antidepressant fluoxetine. Preprint, Microbiology. Epub ahead of print 27 July 2020. DOI: 10.1101/2020.07.27.222836.
11. Hoertel N, Sanchez Rico M, Vernet R, et al. Association between SSRI antidepressant use and reduced risk of intubation or death in hospitalized patients with coronavirus disease 2019: A multicenter retrospective observational study. Preprint, Infect Dis (except HIV/AIDS). Epub ahead of print 14 July 2020. DOI: 10.1101/2020.07.09.20143339.
Mental Health Impact of COVID-19 on Police Personnel in India

India reported the first case of coronavirus disease (COVID-19) on January 30, 2020. The government, since then has advocated wearing masks, physical distancing, avoiding public gathering, shutting down malls and theatres, isolation of positive cases, and quarantine of high-risk individuals as major preventive measures against COVID-19. Police were among the first responders to the COVID-19 disaster and are popularly listed among the “corona warriors,” along with health care personnel.

Police personnel in India are generally trained in dealing with natural and man-made disasters, though pandemic control is not emphasized as a subject during the training of the police. Consequently, the COVID-19 pandemic required many police personnel to assume responsibility for the emergencies that were not part of their regular work profile. The primary responsibility of implementing the lockdown through restricting public movement and ensuring physical distancing was shouldered by the police force during the pandemic, through the enforcement of the Epidemic Disease Act, 1987, and the Disaster Management Act, 2005. Police personnel was mobilized for a variety of tasks—to monitor check posts, monitor COVID-19 infection hotspots, and ensure lockdown as well as containment. In addition to this, police personnel also carried out a variety of unconventional duties, including creating social awareness, clarifying fake news, daily inspection of people in isolation or quarantine, assisting the health department in contact tracing activities, helping migrant workers to enter shelters, and helping the needy persons to access medical and other essential services.

Lack of awareness and specific knowledge of COVID-19 prevention and inadequate or inappropriate use of personal protective gear like mask and gloves substantially increase the risk of exposure to COVID-19 among police personnel. Table 1 shows the impact of COVID-19 on police personnel in India and Table 2 shows the infection rate in the police force in comparison to the general population as of August 31, 2020. It appears that police personnel are 8.78 times more likely to get affected by COVID-19 compared to the general population. In order to reduce the risk of transmission of COVID-19, the police departments have made risk mitigation plans like modifications in their human resource allotment (working with a small team, desk job for the vulnerable population rather than fieldwork) and use of technology in the services.

The unconventional responsibilities, demanding working conditions, and the ambiguity in the role of the police may result in job stress and burnout and have been established in earlier studies as a source of occupational stress among Indian police personnel. The concern about being infected from the community and workplace may also be a potential source of fear among police personnel. Furthermore, concerns about carrying the infection to the family members may also be a source of psychological distress. Additionally, fear of quarantine

| Table 1. The Impact of COVID-19 on Indian Police Personnel (as on August 31, 2020) |
|-------------------------------------------------|
| Number of police personnel who tested positive   | 71,832 |
| Number of police personnel quarantined           | 25,013 |
| Number of police personnel who died              | 428   |
| Number of police personnel injured in attacks    | 260   |
| Top five states/division (personnel tested positive) |
| Maharashtra                                     | 14,792 |
| Central Reserve Police Force (CRPF)              | 7,144  |
| Telangana                                        | 5,684  |
| Border Security Force (BSF)                      | 4,983  |
| West Bengal                                      | 4,500  |
| Top five states/division (personnel quarantined) |
| Maharashtra                                     | 8,000  |
| Border Security Force (BSF)                      | 7,981  |
| Madhya Pradesh                                  | 2,000  |
| Uttar Pradesh                                   | 1,970  |
| Kerala                                          | 1,166  |

Source: Indian Police Foundation website.