

Transiting to the New Normal – Evidence and Insights to Address COVID-19 and Post-COVID-19 Challenges

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Breakout Session 3: How Can We Manage the Impact of COVID-19 on Mental Well-Being?

By Dr Ganesh Kudva Kundadak, Assistant Professor Sharon C. Sung, Dr Yang Yinping, and Professor Joanne Yoong (Moderator)

Dr Ganesh Kudva Kundadak is an Associate Consultant Psychiatrist from the Institute of Mental Health. Dr Ganesh is also an Executive Committee member of the Singapore Psychiatric Association (SPA) and is part of the World Psychiatric Association Early Career Psychiatrists Chapter.

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*Dr Yang Yinping leads the Affective Computing Group and the Digital Emotion Programme at A*STAR's Institute of High-Performance Computing (IHPC). Dr Yang recently won a place in the Inaugural 100 Singapore Women in Tech List in September 2020 as a female leader recognised in Singapore's tech sector. For this presentation, she was accompanied by Ms Therese Quieta, who is a Senior Research Engineer and Innovation Lead at the Social and Cognitive Computing Department at IHPC.*

Professor Joanne Yoong is a Senior Economist at the University of Southern California. Professor Yoong is also the founder of Research for Impact, a Singapore-based social enterprise working to make behavioral and social science research accessible, inclusive and transformative for all.

COVID-19 AND MENTAL HEALTH: MANAGING THE IMPACT by DR GANESH KUDVA KUNDADAK

Dr Ganesh gave an overview of the impact of COVID-19 on mental health, as well as some measures we can undertake in response, to bolster mental resilience.

COVID-19's impact on mental health

- In April 2020, Dr Ganesh was part of an international group investigating the possible mental health impacts of the COVID-19 pandemic. Modelled on the infection rate of Severe Acute Respiratory Syndrome (SARS), it was predicted that for every peak in infection cases, there would be two corresponding spikes in mental health cases.
 1. The first spike is associated with an increase in fear, helplessness, anxiety, and adjustment difficulties due to new threats. Over time, societal resilience would likely kick in, and people adjust to the "new normal".
 2. As the number of infection-related deaths peaks, a second corresponding spike in mental health cases is anticipated. This is associated with feelings of grief, Post-Traumatic Stress Disorder, depression and suicidal behaviours in response to the surge in death and loss.

- There are three ways in which COVID-19 can impact our mental health:
 1. Direct impact on those who are infected: 33.6% of COVID-19 patients developed neurological and psychiatric complications in the six months post infection¹. Those suffering from more severe infections are at greater risk of developing more psychiatric complications.
 2. Worries over illness contagion: 53.8% of community respondents in China reported moderate-severe psychological impact² associated with a decrease in life satisfaction and positive emotions, and an increase in depression, anxiety, and sensitivity to social risks.
 3. Impact of quarantine measures and working-from-home: This may result in boredom, anger, loneliness, and a reduced ability to exercise self-control. The longer the quarantine period, the longer the impact.
- The Behavioural Immune System³ is a set of behaviours utilised to minimise infection risks. Its usage varies depending on the individual's perceived vulnerability to the disease, e.g. young adults in the USA had assessed themselves to be less vulnerable to the disease and held 'corona parties' with the aim of catching COVID-19. While some adaptive responses are desirable to reduce the probability of contracting the illness (e.g. increase in vigilance, safe distancing behaviours), there are downsides to an active behavioural immune system. For example, an increase in stigmatising behaviours towards people of Asian origin in the global West; and chronic stress and anxiety due to the avoidance of social interaction. Having an active behavioural immune system may also be associated with negative attitudes about vaccination (though this is debatable).
- The relationship between working-from-home and mental health is complex⁴ and is influenced by:
 - Demands of the home environment;
 - Level of organisational support in terms of whether they are prepared to accommodate more flexible work schedules;
 - Social connections in terms of whether they can be maintained within and outside of work; and
 - Other factors, including physical exercise, presence of children or distractions at home while working

Singapore's response

- In Singapore, mental health measures were undertaken as part of a multi-pronged approach to managing the impact of and spread of the virus:
 - Healthcare measures: Vaccination and contact tracing capabilities were increased to reduce case numbers. Adequate supplies of medications and oxygen were procured, while healthcare and Community Isolation Facilities were ramped up to meet the healthcare demands of patients who had contracted the virus;

¹Taquet et al. "6-month neurological and psychiatric outcomes in 236 379 survivors of COVID-19: A retrospective cohort study using electronic health records", vol 8 issue 5 (May 2021): 416-427.

<https://www.sciencedirect.com/science/article/pii/S2215036621000845>

² Wang et al. "Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China.", Int J Environ Res Public Health, 17,5 (2020):1729. Doi: <https://doi.org/10.3390/ijerph17051729>

³ Schaller et al., "Implications of the behavioural immune system for social behaviour and human health in the modern world", 2015. <https://royalsocietypublishing.org/doi/full/10.1098/rstb.2014.0105>

⁴ Oakman et al. "A rapid review of mental and physical health effects of working at home: how do we optimise health?". 2020. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09875-z>

- Socio-Economic measures: Various measures including the COVID-19 Budgets were rolled out by the government to mitigate the socio-economic impact; and
- Mental Health measures: This included the creation of a National Care Hotline, spreading awareness on mental health through a comic book: *Caring for our Mental Wellbeing during COVID-19*⁵, as well as continued efforts to de-stigmatise mental health (through the Beyond the Label campaign). Psychiatrists also stepped up to offer pro-bono services to Healthcare workers in this time.

The future

- The COVID-19 pandemic has not conformed to prior projections. Since last year, multiple peaks in the number of COVID-19 cases have broken out across the globe. With more aggressive variants, societies must now contend with the new reality of COVID-19 being endemic in the long haul. Dr Ganesh outlined in further detail, some measures that could be undertaken to reduce the mental health effects of COVID-19:
 - For individuals. Individuals can engage in mindfulness and meditation practices, or self-help Cognitive Behavioural Therapy techniques. Having a balanced lifestyle e.g. healthy diet, adequate sleep, exercise, and regular social contact, will also help boost mental well-being (though working-from-home arrangements might complicate this as many boundaries between work and rest are blurred). Individuals should also guard against disinformation or excessively negative news. It is also important to know and be open to seeking out available avenues of help when needed.
 - For families. Having a clear distribution of domestic roles and a solution-focused approach to solving problems are important in reducing incidences of conflict. Families should also set aside time for leisure or family time. As family members are often harsher and more critical with each other, Dr Ganesh recommends that families foster open and positive communication habits, especially when they are living in close contact with each other.
 - For companies. A hybrid working-from-home/working-from-office model has shown to be most optimal for mental health⁶. This allows for effective infection control while permitting some level of social contact. Companies should have clearly designated roles but still be adaptable to accommodate changes caused by the pandemic e.g. parents needing to engage in child-minding during work hours. They should also be aware of the signs of mental distress in employees and be able to perform *psychological first aid* on them when needed.
 - At the national level. It is important to foster a culture of civic mindedness in citizens and lend greater support to vulnerable groups who are most badly affected. As the number of domestic abuse cases rises, authorities need to intervene promptly to protect the safety of victims. Mental health services need to be prepared to meet the growing demand in the near future. At a broader level, Dr Ganesh recommended adopting a spirit of flexibility and openness in response to uncertainty. We need to be ready to embrace change rather than to view it with fear.

[Link to slides](#)

⁵ Singapore Psychiatry Association. *Caring for our Mental Wellbeing During Covid-19*, 2020.

<http://www.singaporepsychiatry.org.sg/free-e-book-caring-for-covid19-heroes/>

⁶ Oakman et al. "A rapid review of mental and physical health effects of working at home: how do we optimise health?". 2020. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09875-z>

IMPACT OF COVID-19 ON THE SOCIAL AND PSYCHOLOGICAL WELL-BEING OF SINGAPORE HEALTHCARE WORKERS by ASSISTANT PROFESSOR SHARON C. SUNG

As the battle with the COVID-19 pandemic continues, the welfare of frontline healthcare workers has become critical in ensuring the success and sustainability of COVID-19 relief efforts. In this presentation, Assistant Professor Sung shared the research findings on the struggles of frontline healthcare workers in the pandemic and what different stakeholders can do to help.

COVID-19's Impact on mental health

- The prolonged nature of the pandemic and the associated uncertainties have significant implications on mental health. A study conducted by a human resource firm showed that 44% of Singaporeans had indicated that COVID-19 has had an adverse impact on their mental health⁷. However, COVID-19 has catalysed more conversations on the necessity of mental health for the general populace and has also worked in favour of de-stigmatisation efforts.

Impact on healthcare workers:

- In the fourth wave of the pandemic, healthcare workers were found to face psychological trauma, mental illness and burn out. A recent article⁸ reported that frontline healthcare workers were pushed to the limits by the prolonged COVID-19 fight and the unpredictability of the disease.
- A cross-sectional survey of ~3,000 healthcare workers conducted by National University Health System⁹ in May/June 2020 found that:
 - 86.8% of healthcare workers reported job burnout (meeting threshold for either disengagement or exhaustion)
 - 40.7% reported significant anxiety
 - 31.8% reported significant depression
 - 23.3% reported both depression and anxiety

Compared to a similar survey done in February/March 2020, there were higher rates of depression, anxiety, and burnout three months into the pandemic. Higher burnout scores were associated with female gender, individuals with higher educational levels, individuals with higher initial depression and anxiety scores, those who have been on shifts lasting greater than eight hours and those who had been redeployed. Nurses, those who were redeployed to high risk areas, and those who perceived the quality of their training to be poor, were also at greater risk for burnout.

⁷ Profile Asia, COVID-19 Impact on Mental Health in APAC, 2020.

<https://www.profileasia.com/blog/2020/05/covid-19-impact-on-mental-health-in-apac>

⁸ Oh, Tessa. "The Big Read: Frontline healthcare workers pushed to limits by non-stop, never-ending COVID-19 fight". Channel News Asia. 17 May 2021. <https://www.channelnewsasia.com/singapore/covid-19-the-big-read-frontline-healthcare-workers-1373811>

⁹ Tan et al. "Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore". Annals of Intern Medicine, vol 173, 4 (2020): 317-320. Doi: [10.7326/M20-1083](https://doi.org/10.7326/M20-1083)

- A longitudinal survey of about 1,400 healthcare workers conducted by Duke-National University of Singapore (Duke-NUS) in March – August 2020¹⁰ found that:
 - 33% of healthcare workers reported elevated levels of perceived stress
 - 24% reported job burnout
 - 13% reported significant anxiety
 - 10% reported significant depression

These rates continued to increase by 1-2% per month during the subsequent six months. Conditions such as teamwork and feeling appreciated at work buffered against the negative outcomes. People who had higher resilience scores pre-pandemic also demonstrated lower ratings of perceived stress, anxiety, depression, and job burnout over the follow-up period¹¹.

Needs of Healthcare Workers:

- To understand the needs of healthcare workers with more granularity, a Duke-NUS student conducted a qualitative survey on 612 healthcare workers in March – May 2020¹². Participants provided free text responses to the question “Please share any suggestions on how institutions, departments, or teams such as yours could better assist healthcare workers during a disease outbreak.” The survey response was organised in themes reflecting the Maslow’s Hierarchy of Needs:

1. Safety Needs –The need for emotional security was ranked the highest need. They included:

- (i) Clear information channels to reduce anxiety;
- (ii) Assurance of support for healthcare workers should the staff contract the virus;
- (iii) Leaders to show recognition and support to the staff psychologically and emotionally; and
- (iv) Leaders to be more understanding and empathetic towards parents engaging in child-minding activities during work.

2. Physiological Needs – Physiological needs were also ranked highly, they included:

- (i) Having more variety of food options;
- (ii) Having more frequent break times to replenish hydration and for toilet breaks;
- (iii) Having a better roster that allocated hours more fairly, as opposed to making workers do 12-hour shifts; and
- (iv) Being in the same ward as their colleagues as redeployment adds on undue stress.

3. Social Needs – Many of their needs for social support and connectedness were not met due to social distancing and remote working regulations. Examples of needs in this area were:

¹⁰ Teo I, S.S., Cheung YB, Wong MHM, Abu Bakar Aloweni F, Ang HG, Ayre TC, Chai-Lim C, Chen RC, Heng AL, Nadarajan GD, Ong EHM, Soh CR, Tan BH, Tan BKK, Tan BS, Tan MH, Tan PH, Tay KXK, Wijaya L, Tan HK., “Burnout, anxiety and depression in healthcare workers during the early COVID-19 period in Singapore” Singapore Medical Journal, in press.

¹¹ Sung SC, Lei Y, Chen AM, Chay J, Tewani K, Yeo LF, Tan HK, Teo I. “Psychological Resilience among Healthcare Workers during the COVID-19 Pandemic in Singapore”. SingHealth Duke-NUS Scientific Congress. 2021: Singapore

¹² Poh, LW. 2021. “Understanding the needs of healthcare workers in Singapore during the COVID-19 outbreak: A qualitative analysis”. (Unpublished doctoral master's thesis). 2020. Duke-NUS Medical School: Singapore

- (i) Support groups via e-chat or video chats on a weekly basis to bolster social connection; and
 - (ii) More proactive engagement by senior leadership to check-in on staff's well-being.
4. **Esteem Needs** – While many healthcare workers wanted to be acknowledged for their work, they also needed monetary incentives.
 5. **Self-Actualisation Needs** – Workers also drew personal learnings on coping with the pandemic and advocated for larger system change in advancement towards a better future.

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SOCIAL MEDIA EMOTION ANALYSIS FOR UNDERSTANDING PUBLIC RESPONSES TO COVID-19 by DR YANG YINPING & THERESA QUIETA

In the past six years, Dr Yang and her team have experimented with technology to conduct more accurate and sensitive 'emotional listening' for the digital and social media space. A*STAR's affective computing group developed and utilises a combination of (1) multidimensional emotion analytic machine (CrystalFeel); (2) social media research platform (Heartbeat); and (3) integrative social listening platform (Resonance Social), to better extract and understand affective information from naturalistic data (e.g. social media posts, audio and video content).

Social intelligence is the ability to empathise, to understand others at the emotional level and communicate and make decisions effectively¹³. Dr Yang shared that this is a high-order intelligence for both humans and machines. Dr Yang further elaborated that the team's vision was to build better, empathetic machines that can comprehend emotions to enable more informed decision making. She went on to provide examples of her group's work in this area.

The science and technology behind social media emotion analysis research

- Currently, AI systems are predominantly non-empathetic systems. They are:
 - Focused on pattern recognition, and process relatively low level and objective information (e.g. extracting named entities, objects in images, generating factual answers to simple questions);
 - Lacking in the ability to understand or respond to high-order, subjective information (e.g. emotions, latent concerns, values);
 - Predominantly able to conduct visual/facial expression analysis of emotions, which is inaccurate as visual expressions do not always correspond to felt emotions; and
 - Mostly monolingual (English) in nature, inherently represent Western cultural norms and lack socio-cultural diversity (e.g. Asian norms and values).
- To ensure that the research was holistic and well-rounded, the team drew from multiple disciplines, including computer science, data science and analytics, and social and behavioural sciences.

¹³ Daniel Goleman. *Social intelligence: The new science of human relationships* (London, UK, Arrow Books, 2007);

Goleman, Daniel. "What makes a leader?" *Harvard Business Review*. January 2004 & Goleman, Daniel. *Emotional intelligence: Why it can matter more than IQ*. (New York, USA, Bantam Books, 1995).

Measuring emotions

Why measure?

- Emotions are central to the human experience and reflect the deeply held values, beliefs, and norms of society. However, for a period, the study of emotions has often been stigmatised in the sciences for its illegitimacy.
- Dr Yang asserted that one reason emotions are important to understand and measure is that they have a close relationship to adaptive needs in human evolution¹⁴. For example, Fear is a self-protection response to a perceived or actual danger or threat, and Anger is associated with the need to “destroy” the source of the threat; the feeling of Joy is associated with reproduction; Sadness, the emotion of “loss”, connotes a situation of deprivation¹⁵.

How to measure and the challenges faced

- Natural language understanding is complex due to the varied ways we use and construct words to express our emotions. For example:
 - The word-level meaning of an emotional word may be very different from its sentence-level meaning. Examples: “Fear nothing!”, “I hardly feel happy these days”
 - There are emotional expressions without emotional words used. Examples: “I have no more choices...”, “Woohoo, all tasks done!”
 - Low vs high intensity emotions are very different experiences, but hard to distinguish. Example: “No thank you...” (low intensity) vs. “I hate this!” (high intensity)

Using affective computing tools for better social sensing

- Prior to COVID-19, Dr Yang and her team have been focusing on developing a series of tools that are aimed at accurately analysing emotions and presenting such important information to more users who may or may not be tech savvy. These tools include: multidimensional emotion analytic machine (CrystalFeel¹⁶); (2) social media research platform (Heartbeat¹⁷); and (3) integrative social listening platform (Resonance Social¹⁸), to better extract and understand affective information from naturalistic data (e.g. social media posts, audio and video content).
- In March 2020, A*STAR’s Institute of High-Performance Computing (IHPC) was invited by National Research Foundation (NRF), Singapore to work with Nanyang Technical University (NTU) to conduct a study¹⁹ on social sentiments in relation to COVID-19 Pandemic. Utilising CrystalFeel advance sentiment, emotion analysis, word cloud, and heartbeat visualisation, they found that:
 - Social sentiments peaks were clearly correlated with key COVID-19 developments – affirming social media as a sensitive source for ground-sensing.
 - Fear was a prevalent and dominant emotion globally and locally. However, emotions of anger had been growing significantly even amidst effective local containment efforts. There was a worrisome increase in sentiments which blamed foreigners, government etc. for the situation.

¹⁴ Plutchik, Robert. “[A general psychoevolutionary theory of emotion](#)” in *Emotion Theory, Research, and Experience*. Ed. by R. Plutchik, & H. Kellerman, (New York, USA: Academic Press, 1980), 3-33.

¹⁵ Plutchik, Robert. *The Emotions: Revised Edition* (University Press of America, 1991).

¹⁶ More information available here: <https://socialanalyticsplus.net/crystalfeel>

¹⁷ More information available here: <https://www.a-star.edu.sg/ihpc/ihpc-tech-hub/smart-nation-and-digital-economy/features/snde/heartbeat>

¹⁸ More information available here: <https://www.a-star.edu.sg/ihpc/ihpc-tech-hub/features/snde/resonance>

¹⁹ The COVID-19 Science Report was circulated with heads of public agencies on 11 March 2020

- Identifying extreme negative and positive emotions also helped to reveal salient emerging topics at critical moments with granularity.
- Together with NTU collaborators, IHPC published an early social media analytic report²⁰ regarding the global sentiment trend on Twitter.
 - They found that the dominant emotion worldwide has shifted from 'fear' (during the early spread) to 'anger' (when WHO declared the situation a "pandemic") to 'joy' (when vaccines were developed).
- IHPC is currently developing a new study in collaboration with related public agencies to analyse the key social media trends (reflecting Singapore's emotional responses and mental health) over a time series of 19 months, mapping it to important public service announcements. This can help us better understand how media coverage and public announcements correlate to social sentiments.

[Link to slides](#)

²⁰Lwin, M.O., Lu, J., Sheldenkar, A. (corresponding author), Schulz, P.J., Shin, W., Gupta, R., and Yang, Y. "Global Sentiments Surrounding the COVID-19 Pandemic on Twitter: Analysis of Twitter Trends". JMIR Public Health and Surveillance (2020). <https://publichealth.jmir.org/2020/2/e19447>