Irish Medical Journal
Established 1867

Issue: Ir Med J; Vol 113; No. 6; P98

Planning for the Aftermath of the Covid-19 Pandemic

J. Jordan[1], S. O'Flanagan[1], É. Smith[2]

1. Faculty of Sports and Exercise Medicine (RCPI & RCSI), Royal College of Surgeons in Ireland, RCSI House, 121 St Stephen's Green, Dublin 2, Ireland.
2. National Rehabilitation Hospital, Rochestown Avenue, Dún Laoghaire, Co. Dublin, Ireland.

Introduction

We are yet to establish the long-term effects of the Covid-19 pandemic at both individual and population level. We anticipate a myriad of consequences including, but not limited to, psychological, physical, social and economic effects. We can reference previous public health outbreaks involving other human betacoronaviruses (Middle East respiratory syndrome (MERS) and Severe acute respiratory syndrome (SARS)) to aid our understanding of the potential aftermath of the pandemic.

The aim of this review is to assess the long-term impact of the SARS and MERS epidemics on individuals and the population at large in order to guide our approach to the long-term impact of the Covid-19 pandemic.

SARS/MERS and long-term psychological sequelae

In a study of SARS survivors, psychiatric morbidities continued to be clinically significant at 4-year follow up[1]. The most common morbidities were posttraumatic stress disorder (PTSD), depression, somatoform pain disorder, panic disorder and obsessive compulsive disorder. Similarly, in another 4-year follow up study of SARS survivors, 44% developed PTSD during the study period[2]. The effects of the SARS epidemic in Hong Kong reported reduced subjective levels of wellbeing amongst individuals with characteristics including unemployment, low education and chronic illness[3]. The psychological impact of quarantine can be wide-ranging, substantial and long lasting, and lead to high levels of stress and psychological distress[4]. We have learned from the MERS outbreak that risk factors for experiencing anxiety symptoms and anger at four to six months after release from isolation included inadequate supplies (food, clothes, accommodation), social networking activities (email, text, internet), history of psychiatric illnesses, and financial loss[5].

Healthcare workers directly involved in the care of SARS patients reported higher levels of burnout, psychological distress and PTSD compared with healthcare workers who were not directly involved with this cohort[6]. The SARS outbreak was found to be a distressing long-term event for healthcare workers across the literature[7]. Particular attention must be given to protecting the mental health of our healthcare workers both during and after the Covid-19 pandemic.

SARS/MERS and long-term physical sequelae

Pulmonary

Initial commentary suggests key pathological similarities between SARS and Covid-19[8]. Acute respiratory distress syndrome (ARDS) is the most severe pulmonary complication that causes high mortality rates in both SARS and

Covid-19[8]. Short-term follow up studies of SARS survivors indicate that pulmonary fibrosis may develop in survivors[9]. Pulmonary fibrotic changes were also described in patients after recovery from MERS with patterns suggesting an association with; significantly greater number of ICU admission days, older age, higher chest radiographic scores, chest radiographic deterioration patterns and peak lactate dehydrogenase levels[10]. In addition, persistent pulmonary function impairment in about one third of patients one year after recovery from SARS has been described, with changes in FVC, FEV1 and FEV1/FVC seen[11].

However, studies have also highlighted a reduction in pulmonary lesions over time, with one study finding that pulmonary lesions on CT scans of SARS patients both 6 months and 84 months after rehabilitation clearly diminished compared with those seen at 3 months[12]. In addition, in a study which examined pulmonary function in hospital workers recovered from SARS most values of spirometry performed were within normal range[13]. These results are reason for optimism when considering the long-term consequences of Covid-19 on pulmonary function.

Fatigue and generalised weakness

The concept of post viral fatigue as an entity is well presented in the literature[14]. Chronic fatigue symptoms have been described at multiple time points in SARS survivors. Chronic fatigue symptoms were seen in SARS survivors in studies with 1-year, and 3-year follow up respectively[15,16]. In addition, a reciprocal association was seen between fatigue and psychiatric problems in the long-term follow up (3-year) of SARS survivors[16]. A further study showed chronic fatigue 12 months after MERS had indirect effects on prolonged post-traumatic stress symptoms 18 months after MERS via persisting depression in MERS survivors[17].

The data available to us on SARS and MERS survivors supports our belief in the planning of widespread community interventional and public health programmes addressing strategies for prevention and treatment of post viral fatigue during and after this pandemic.

Data on SARS survivors 2 weeks post hospitalisation showed deficits in muscular endurance and cardiopulmonary performance (6-minute walk test)[18]. Hui et al have postulated that numerous factors are likely contributors to post-SARS generalised muscle weakness[19]. These include, critical illness-associated polyneuromyopathy, corticosteroid-induced myopathy, prolonged confinement and/or immobilisation and SARS-induced myositis

Strategies to mitigate the mental health consequences of the pandemic

In efforts to mitigate the mental health consequences arising from the pandemic, we must consider the myriad of reasons for the development of psychological distress related to illness, bereavement, quarantine, social isolation and economic burdens.

During the period of quarantine, we must consider the need for effective measures to mitigate the negative psychological consequences associated with social disconnectedness. Since the outbreak of Covid-19 in China, numerous psychological supports have been introduced for members of the general public, including online counselling and cognitive behavioural therapy[20]. In addition, several free electronic copies of books mental health education have been published, including “Guidelines for public psychological self-help and counselling of 2019-nCoV pneumonia”, published by the Chinese Association for Mental Health. Government strategies which promote a sense of social connection will require the provision of good internet and phone services. Also, it is imperative that the public are provided with up-to-date, factual information delivered through a variety of media platforms.

We highlight particularly vulnerable groups to include the elderly, those with active or past psychiatric histories, the homeless and healthcare workers. Ensuring vulnerable groups have adequate provisions will need co-ordinated efforts within communities. Additionally, providing robust specialist care to patients with psychiatric conditions is imperative both during and after the pandemic. One model would be designating mental health professionals as case workers to individual patients, with the possibility of using phone and video call support as a means of supporting and triaging patients. On a fundamental level, systems need to exist in order to provide adequate and timely access to mental health services, making it essential for governments to prioritise mental health services in dealing with the potential ‘tsunami’ of psychological distress. Increased funding for community and hospital based

mental health services, in addition to providing online psychological support, will be of utmost importance. Consideration should be given to enhancing social support networks at community level.

It is imperative to ensure adequate occupational health, psychological support and intervention is available to all healthcare workers. Regular debriefing and indeed, resilience training can be of benefit in this cohort[21].

Physical Rehabilitation post Covid-19

The rehabilitation of Covid-19 survivors is key to ensure a return to physical fitness and psychological well-being. The role of physical activity in the reduction of all-cause mortality has been established in the literature[22]. We believe a key component in the rehabilitation of Covid-19 patients' physical fitness will be a structured, tailored exercise programme. Lau et al showed aerobic and strength improvements after 6 weeks of 4-5 weekly sessions of aerobic exercise and resistance training on SARS survivors at least 2 weeks after discharge from hospital[23]. Similarly, in a review of treatments of chronic fatigue syndrome, exercise therapy was found to have a positive effect on fatigue in adults[24].

Exercise protocols for Covid-19 survivors cannot be a 'catch-all' approach as severity of Covid-19 illness will vary from mild to severe forms, with a variety of potential physical sequalae encountered post infection. A clinician led exercise programme (General Practitioner or Sports and Exercise Medicine Physician), tailored to an individual's needs and co-morbidities, with regular follow-up will be the optimal model. However, we propose some over-arching principles which can be included in each exercise programme. We advocate the use of the American College of Sports Medicine 'Frequency, Intensity, Time, Type, Volume, Progression (FITT-VP)' when prescribing exercise protocols[25]. This allows a physical activity programme be designed in a systematic and individualised manner for each patient. In broad terms, adults aged 18–64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity and perform muscle-strengthening activities involving major muscle groups on 2 or more days a week, with additional focus on balance work recommended in adults 65 years and above[26].

Take Home Messages

- The long-term impacts of the Covid-19 pandemic are unknown.
- SARS and MERS survivors developed long-term psychological distress, with PTSD a common diagnosis.
- Healthcare workers involved in the care of SARS patients reported high levels of psychological distress.
- Pulmonary fibrosis has been shown in SARS/MERS survivors, but long-term pulmonary consequences seem favourable.
- Chronic fatigue is a commonly encountered problem amongst SARS/MERS survivors across the literature.
- Concentrated government strategies will be required to ensure social connection is maintained during the Covid-19 pandemic.
- Timely and adequate access to mental health services will need to be a priority for healthcare systems both during and after the pandemic.
- Robust community and hospital based mental health services, in addition to online psychological supports will be required.
- We propose healthcare workers, the elderly, patients with active or past psychiatric histories and the homeless sector to be at particular risk of psychological distress and targeted interventions in these groups will be needed.
- We believe exercise therapies will play a key role in the rehabilitation of Covid-19 survivors.
- We propose that tailored and clinician led exercise protocols will confer cardiopulmonary, muscular and psychological benefits to Covid-19 survivors.

Corresponding Author:
Dr Joe Jordan
Faculty of Sports and Exercise Medicine (RCPI & RCSI),
Royal College of Surgeons in Ireland, RCSI House, 121 St Stephen's Green, Dublin 2, Ireland.
E-mail: joejordan@rcsi.com

References:

1. Lam MH, Wing YK, Yu MW, Leung CM, Ma RC, Kong AP. Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up. Arch Intern Med. 2009 Dec 14;169(22):2142-7. doi: 10.1001/archinternmed.2009.384. PMID: 20008700.
2. Hong X, Currier GW, Zhao X, Jiang Y, Zhou W, Wei J. Posttraumatic stress disorder in convalescent severe acute respiratory syndrome patients: a 4-year follow-up study. Gen Hosp Psychiatry. 2009 Nov-Dec;31(6):546-54. doi:10.1016/j.genhosppsych.2009.06.008. Epub 2009 Aug 27. PMID: 19892213
3. Lau AL, Chi I, Cummins RA, Lee TM, Chou KL, Chung LW. The SARS (Severe Acute Respiratory Syndrome) pandemic in Hong Kong: effects on the subjective wellbeing of elderly and younger people. Aging Ment Health. 2008 Nov;12(6):746-60. doi: 10.1080/13607860802380607. PMID: 19023726.
4. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N**.** The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020 Mar 14;395(10227):912-920. doi: 10.1016/S0140-6736(20)30460-8. Epub 2020 Feb 26. PMID: 32112714
5. Jeong H, Yim HW, Song YJ, et al. Mental health status of people isolated due to Middle East Respiratory Syndrome. Epidemiol Health. 2016;38:e2016048. Published 2016 Nov 5. doi:10.4178/epih.e2016048
6. Maunder RG, Lancee WJ, Balderson KE, Bennett JP, Borgundvaag B, Evans S, Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. Emerg Infect Dis. 2006 Dec;12(12):1924-32. doi: 10.3201/eid1212.060584. PMID: 17326946; PMCID: PMC3291360.
7. Lin CY, Peng YC, Wu YH, Chang J, Chan CH, Yang DY. The psychological effect of severe acute respiratory syndrome on emergency department staff. Emerg Med J. 2007 Jan;24(1):12-7. doi: 10.1136/emj.2006.035089. PMID: 17183035; PMCID:PMC2658141.
8. Zhang T, Sun LX, Feng RE. [Comparison of clinical and pathological features between severe acute respiratory syndrome and coronavirus disease 2019].Zhonghua Jie He He Hu Xi Za Zhi. 2020 Apr 3;43(0):E040. Chinese. doi:10.3760/cma.j.cn112147-20200311-00312. Epub ahead of print. PMID: 32241072.
9. Antonio GE, Wong KT, Hui DS et al. Thin-section CT in patients with severe acute respiratory syndrome following hospital discharge: preliminary experience. Radiology 2003; 228: 810– 5.
10. Das KM, Lee EY, Singh R, et al. Follow-up chest radiographic findings in patients with MERS-CoV after recovery. Indian J Radiol Imaging. 2017;27(3):342–349. doi:10.4103/ijri.IJRI_469_16
11. Ong KC, et al. 1-year pulmonary function and health status in survivors of severe acute respiratory syndrome. Chest. 2005;128:1393–1400. doi: 10.1378/chest.128.3.1393.
12. Wu X, Dong D, Ma D. Thin-section computed tomography manifestations during convalescence and long-term follow-up of patients with severe acute respiratory syndrome (SARS) Med Sci. Monit. 2016;22:2793–2799. doi: 10.12659/MSM.896985
13. Su MC, Hsieh YT, Wang YH, Lin AS, Chung YH, Lin MC. Exercise capacity and pulmonary function in hospital workers recovered from severe acute respiratory syndrome. Respiration. 2007;74(5):511–516. doi:10.1159/000095673
14. Bruun Wyller V, Bjørneklett A, Brubakk O, et al. Diagnosis and Treatment of Chronic Fatigue Syndrome/Myalgic Encephalopathy (CFS/ME). Oslo, Norway: Knowledge Centre for the Health Services at The Norwegian Institute of Public Health (NIPH); 2006
15. Moldofsky H, Patcal J. Chronic widespread musculoskeletal pain, fatigue, depression and disordered sleep in chronic post-SARS syndrome; a case-controlled study. BMC Neurol 2011;11:37.
16. Wing YK[1], Leung CM. Mental health impact of severe acute respiratory syndrome: a prospective study. Hong Kong Med J. 2012 Aug;18 Suppl 3:24-7.
17. Lee SH, Shin HS, Park HY, et al. Depression as a Mediator of Chronic Fatigue and Post-Traumatic Stress Symptoms in Middle East Respiratory Syndrome Survivors. Psychiatry Investig. 2019;16(1):59–64. doi:10.30773/pi.2018.10.22.3
18. Lau HM, Lee EW, Wong CN, Ng GY, Jones AY, Hui DS. The impact of severe acute respiratory syndrome on the physical profile and quality of life. Arch Phys Med Rehabil. 2005;86(6):1134–1140. doi:10.1016/j.apmr.2004.09.025
19. Hui DS, Joynt GM, Wong KT, et al. Impact of severe acute respiratory syndrome (SARS) on pulmonary function, functional capacity and quality of life in a cohort of survivors. Thorax 2005;60:401–9.
20. Liu S, Yang L, Zhang C, et al. Online mental health services in China during the COVID-19 outbreak. Lancet Psychiatry. 2020;7(4):e17–e18. doi:10.1016/S2215-0366(20)30077-8
21. Aiello A, Khayeri MY, Raja S, et al. Resilience training for hospital workers in anticipation of an influenza pandemic. J Contin Educ Health Prof. 2011;31(1):15–20. doi:10.1002/chp.20096

22. World Health Organization. Global; Strategy on Diet, Physical Activity and Health. https://www.who.int/dietphysicalactivity/factsheet_adults/en/
23. Lau HM, Ng GY, Jones AY, Lee EW, Siu EH, Hui DS. A randomised controlled trial of the effectiveness of an exercise training program in patients recovering from severe acute respiratory syndrome. Aust J Physiother. 2005;51(4):213–219. doi:10.1016/s0004-9514(05)70002-7
24. Larun L, Brurberg KG, Odgaard-Jensen J, Price JR. Exercise therapy for chronic fatigue syndrome [published online ahead of print, 2019 Oct 2]. Cochrane Database Syst Rev. 2019;10(10):CD003200. doi:10.1002/14651858.CD003200.pub8
25. The American College of Sports Medicine. https://www.acsm.org/docs/default-source/publications-files/acsms-exercise-testing-prescription.pdf?sfvrsn=111e9306_4
26. World Health Organization. Global Strategy on Diet, Physical Activity and Health. https://www.who.int/dietphysicalactivity/factsheet_adults/en/