Mental health impacts of lockdown juxtaposed with lockdown effectiveness during the COVID-19 pandemic: A perspective piece

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Lockdowns have been a common measure used worldwide to help mitigate the spread of COVID-19. Studies have shown that the effects of lockdowns during this pandemic, such as the lack of agency and social isolation, have negatively impacted people’s mental health worldwide. Cognitions, as well as the prevalence of mental illnesses, are being affected. However, it is also important to mention that there is some evidence that people have experienced positive mental health effects during lockdowns, such as increases in empathy and altruism and acquiring coping strategies that can help relieve stressors even after lockdowns pandemic are over. Studies have also shown that lockdowns themselves may not have been as effective in mitigating the spread of COVID-19 and, thus, have not significantly limited cases and deaths related to the disease. Consequently, the costs of lockdowns may outweigh potential benefits, especially as they may not have succeeded in thoroughly achieving their original purpose.

Keywords: cognition; COVID-19; lockdown; mental health; mental illness
It has been more than a year since COVID-19 began spreading globally, causing the current pandemic. As of 12th May 2021, around 580,073 COVID-19 deaths in the United States and 3,311,780 COVID-19 deaths worldwide (Centers for Disease Control and Prevention [CDC], 2021; World Health Organization [WHO], 2021). In response to this unprecedented situation, nations worldwide began employing lockdowns with varying levels of strictness to prevent the spread of the SARS-CoV-2 virus that causes the COVID-19 disease. In general, lockdowns involve measures that restrict the movement of people and can also be referred to with terms such as shelter-in-place orders and stay-at-home orders (Jacobsen & Jacobsen, 2020). The nature of these measures also results in business closures and delaying hospital procedures and appointments (Bendavid et al., 2021; Saba et al., 2021; Sud et al., 2020).

By design, lockdowns involve isolation from other people; this includes separation from family and friends who do not live in a person’s household. Besides isolation, lockdowns could have caused people to experience decreases in freedom of movement and agency and increases in loneliness and feelings of lack of control. Previous research has delved into the fact that these types of feelings and experiences can potentially lead to poor mental health outcomes such as increased likelihoods of depression, anxiety, and stress (Cote & Levine, 2014; Dalgard et al., 2006; Perlman & Peplau, 1981; Taylor et al., 2018). It is important to look at how lockdowns affect mental and cognitive health with this information in mind.

The present perspective piece will review five aspects regarding the COVID-19 lockdowns. These aspects will be the effects of lockdowns on cognition, the impact of lockdowns on mental illnesses, the effect of lockdowns on psychological health by way of effects on physiological health, and the generally positive effect on mental health effects of lockdowns. With a review of this information, the main goal will be to begin delving into whether the benefits of lockdowns over the course of the pandemic have outweighed the costs.

**General effects on cognition**

Cognitions cover a broad array of areas that involve how people think about, interpret, and understand the world around them. Types of cognitions may include memory, language, decision-making, and attention, among others. Some studies have already started to research how COVID-19 lockdowns have impacted people’s cognitions. One study, in particular, looked at adults in Scotland who experienced social isolation with a focus on how lockdowns affected cognitions such as decision making, selective attention, learning ability, working memory, and time estimation (Ingram et al., 2021). A negative mood was also considered here. Results showed that participants improved on tasks related to decision-making, selective attention, working memory, and negative mood as lockdowns were eased (Ingram et al., 2021). This study shows that easing restrictions and increased access to social activities, social contact, and general mobility helped increase scores on cognitive function tasks.

Other studies have also shown the detrimental effects of lockdowns on cognitions in people with and without previously diagnosed mental illnesses (Bland et al., 2021; Tondo et al., 2021). In particular, the Bland et al. (2021) study found that those with less social contact during lockdowns performed more negatively on cognition tasks. However, it is important to mention a major limitation. The Ingram et al. (2021) and the Bland et al. (2021) studies could not collect baseline scores from before the lockdowns, so it cannot necessarily be assumed that lockdowns decreased cognitive functioning. The better conclusion would be that the isolation and limitations on social interactions from lockdowns are correlated with deleterious effects on cognition, which dissipate as lockdowns are lifted.

**Mental illnesses**

Lockdowns have led to changes in the prevalence of various mental illnesses for children, adolescents, and adults. These groups have been through isolation and limits on social interactions. Children and adolescents in some parts of the world have experienced decreases in social school activities (recreational and academic). On the other hand, adults have experienced transitions from in-person work to working at home and closures of businesses that they own or work at. It is important to understand changes in prevalence rates as it speaks to the impacts of lockdowns and the potential need to focus on the future treatment of mental illnesses.

A white paper looking at paediatric mental health insurance claims in the US helps to show that children and adolescents were significantly affected during the pandemic. Throughout 2020, mental health claim lines increased for those aged 6–12 and 13–18 compared to 2019 for particular diagnoses (FAIR Health, 2021). For the 13–18 age group, an increase in claim lines was seen for generalised anxiety disorder, major depressive disorder, substance use disorders, and intentional self-harm (including suicide attempts) (FAIR Health, 2021). Even with this information, it was not stated what caused these increases in mental health claim lines. Lockdowns could be at play here, but one must also consider that these increases could have been affected by
anxiety/fear of COVID-19 (both in terms of catching it and being inundated with information about the disease) or by fear of being in an unprecedented situation that is a global threat (Lee, 2020; Nikšević et al., 2021; Nikšević & Spada, 2020).

Studies have done some work to parse through what may be causing these increases. For example, a separate study found that Australia’s children’s hospital saw a 104% increase in anorexia nervosa hospital admissions from January 2020 to May 2020 compared to that time frame in 2017, 2018, and 2019 (Haripersad et al., 2021). It was proposed that this was caused by the fact that lockdowns decreased protective factors for eating disorders seen from socialisation and schools (Haripersad et al., 2021). This possibility was raised using both recent and older studies in the literature that have shown how eating disorders that include anorexia nervosa, emotional eating, bingeing and purging, orthorexia Nervosa, and others may be exacerbated by consequences of lockdowns, including increased social media use, lack of normal routines, increased stress, and limits on areas for physical activity outside of the home (Haripersad et al., 2021; Heriseanu et al., 2017; Klatzkin et al., 2018; Levine & Murnen, 2009; Lombardo et al., 2020).

Similar studies have also been done for adults regarding the prevalence of mental illness or mental illness related symptoms during the lockdown. Many have been linked to incidences of anxiety disorders and depression. One study took a look at participants older than 18 in Nepal and the prevalence of depression and anxiety during the complete lockdown that occurred early on in the pandemic (Sigdel et al., 2020). It was found that 34.1% of the participants had depression, 31.2% of participants had anxiety, and 23.2% of participants were co-morbid for these two illnesses; further, participants were more likely to be in these three groups if they lived alone compared to if they lived with family (Sigdel et al., 2020). Related to the Bland et al. (2021) study, it seems that the isolation that can result from lockdowns have adverse effects on well-being.

The previous study’s findings can be combined with the results of a study that looked at mental illness prevalence rates of those older than 18 in Australia during part of their lockdown. Clinically significant depression symptoms were seen in 27.6% of participants, while mild symptoms were seen in 26.5% of participants (Fisher et al., 2020). Clinically significant generalised anxiety symptoms were seen in 21% of participants, while mild symptoms were seen in 24.5% of participants (Fisher et al., 2020). Also, 8.9% of participants had thoughts of self-harm or the idea that they would be better off dead on several days, while 5.7% of participants had these types of reviews more frequently (Fisher et al., 2020). A final important point from this study is that it was found that experiencing a negative impact from restrictions was related to living alone, just like in the Sigdel et al. (2020) study and Bland et al. (2021) study.

Other studies have also shown the impact of lockdowns on mental illnesses (Fancourt et al., 2021; Groarke et al., 2020). Limitations with a lot of these studies include the fact that many are correlational. Thus, cause and effect relationships cannot be determined. Further, due to the unexpected nature of the pandemic, some researchers were not able to gather baseline data before the pandemic or before lockdowns began. Altogether, this means that it is difficult to ascribe causality to mental illnesses from lockdowns. However, the studies have shown that symptoms related to mental illnesses decrease as lockdowns are lifted or that protective factors such as having more socialisation during the lockdown helped prevent symptoms of mental illness.

**Implications of changes to physiological health care on mental health**

Lockdowns have affected how hospitals and medical facilities are run through changes such as delays in general appointments, testing, and elective surgeries. Long-term impacts could potentially be seen regarding not only physical health but psychological health as well. It is important to delve into how restrictions have affected psychological health through effects on physiological health.

Cancer is one of the ways that physiological health has been affected by lockdowns and restrictions. There have been decreases in cancer diagnoses during the pandemic, as well as changes in treatment regimens and surgeries (Del Vecchio Blanco et al., 2020; Kaufman et al., 2020; Sharpless, 2020). From 1st March 2020 to 18th April 2020, there has been an estimated total 46.4% decrease in mean weekly diagnoses for breast cancer, colorectal cancer, lung cancer, pancreatic cancer, gastric cancer, and oesophageal cancer compared to 1st January 2019 to 29th February 2020 in the US (Kaufman et al., 2020). Looking towards effects on the future, one model estimates around 10,000 excess colorectal cancer and breast cancer deaths from 2020 to 2030 (Sharpless, 2020). Another model predicts that this effect on cancer can lead to a significant increase in life-years lost in the coming years (Sud et al., 2020).

In the past, there have been many studies on the relationship between cancer and mental health that can inform predictions about how patients may be affected by the COVID-19 lockdowns. In general, cancer can impact both patients and their families (Costa et al., 2016; Kotkamp-Mothes et al., 2005; Mitchell et al., 2013;
Papanastasiou et al., 2019). Factors such as low social support and adverse life events have been shown to correlate with psychological distress in cancer patients (Kornblith et al., 2001). Low social support is an important factor to consider as lockdowns lead to lower social interactions with peers and family members. Further, a cancer diagnosis can affect patients’ and families’ psychological health (Costa et al., 2016; Gibbins et al., 2012; Mcbride et al., 2000). This psychological impact may potentially be exacerbated by the mental distress caused by lockdowns and the general fact of being diagnosed during the COVID-19 pandemic. Late diagnosis due to lockdowns’ effects on hospitals and medical facilities may also play a role if the patient and family later find out that cancer could have been spotted earlier if not for the delays; this may especially be true if the late diagnosis potentially led to a worse prognosis. Studies have also found correlations between loneliness and cancer. Not only may loneliness lead to higher likely mortality among cancer patients, but it may also lead to higher rates of anxiety and depression (DTppolito et al., 2017; Hill & Hamm, 2019). The loneliness from lockdowns, thus, could lead to worsening mental health among cancer patients and could even be tied to the excess deaths and loss of life years among cancer patients that has been predicted.

There are already some papers that have delved into the psychological effects that measures such as lockdowns can have on cancer patients during the COVID-19 pandemic. Not only are the loneliness and social isolation important effects that can impact one psychologically, but one may also need to consider patients potentially considering themselves to be burdens on others. Some patients may need others to buy essential items for them or need others to assist them with their everyday activities, so they could feel guilty for having others help with tasks (Tsamakis et al., 2020). Guilt can potentially lead to poor psychological outcomes (Kubany et al., 1995; Pinede et al., 2006; Tangney et al., 1992). Further, it has been found that parents of paediatric cancer patients have experienced high amounts of stress and anxiety concerning lockdowns and other pandemic factors (Guido et al., 2020; Relojo-Howell, 2020).

There are also issues related to the heart that has been affected by lockdowns. Studies have considered an acute coronary syndrome (ACS) to look at the impact of lockdowns on heart issues. One study investigated ACS admissions from 20th February 2020 to 31st March 2020 in Italy; lockdowns began around 8th March 2020 (Filippo et al., 2020). It was found that admissions during this period were lower than the period of 20th February 2019 to 31st March 2020 and 1st January 2020 to 19th February 2020 (Filippo et al., 2020). Similar findings of a decrease in ACS related hospital admissions were seen from 2nd March 2020 to 29th March 2020 in Austria; it was proposed that restrictions to self-isolate and to stay home helped to cause this reduction (Metzler et al., 2020).

Previous studies from before the pandemic can potentially give insightful information on any relations between lockdowns, the documented decreases in ACS admissions, and psychological effects. Generally, it has been found that patients with cardiovascular diseases, which includes ACS, experience psychological health issues, including depression (Steca et al., 2013). Further, depression has been shown to predict increased mortality rates among these cardiovascular disease patients (Barth et al., 2004; Frasure-Smith & Lespérance, 2005; Nicholson et al., 2006; Penninx et al., 2001). Not only is it possible that depression may be exacerbated or increased by lockdowns among ACS patients, considering the increased prevalence of depression seen in the general population, but this could also potentially lead to increased mortality among ACS patients down the line. Thereby, lockdowns could be a factor in poorer ACS outcomes. It has been shown that having a Type D personality is correlated with delayed seeking medical attention for ACS (Arrebola-Moreno et al., 2020). A Type D personality is characterised by negative affectivity, neuroticism, and distress (De Fruyt & Denollet, 2002; Denollet, 2000; Sher et al., 2000). It will not be surprising if this type of personality is exacerbated by the loneliness and isolation of lockdowns, resulting in taking more time to seek medical attention, affecting disease outcomes.

Some COVID-19 specific studies have been published already in relation to ACS. Interviews have shown that higher stress from lockdowns and other pandemic related factors makes it more likely for a patient to seek ACS care later, leading to potentially delayed diagnosis and treatment (Greco et al., 2020). The Type D personality may be playing a role in these findings as well. With this in mind, it is important to remember that not only are lockdowns potentially independently leading to mental health changes, but lockdowns are also playing upon pre-existing characteristics or attributes of people when impacting mental health.

**Positive effects on mental health**

Some of the current literature on people’s experiences during lockdowns have shown that there have been some positive outcomes in conjunction with mental health. Some examples include a decrease in burnout syndrome among medical students, potentially due to the transition to online learning, and some self-reports of increased happiness among students (Bolativ et al., 2021; Mansfield et al., 2020). A study examining adolescents’ prosocial behaviours in the Netherlands saw several positive outcomes of lockdowns. Data from
particular time points before the lockdowns (T1 from May 2018 to October 2018, T2 from August 2019 to January 2020, and T1.5 between these two time points) and during the lockdowns (from 30th March 2020 to 17th April 2020) were compared (van de Groep, Zanolie, Green, et al., 2020). Important results were that the adolescents showed a higher level of perspective-taking during the lockdowns compared to T1 and T2 as well as that they showed higher levels of vigour (representative of positive emotions) and lower levels of tension (representative of negative emotions) at all surveyed weeks during the lockdowns compared to T1.5 (van de Groep, Zanolie, Green, et al., 2020). The authors believed that the changes seen in perspective taking, vigour, and tension might have been due to decreases in stressors and pressures before lockdowns (van de Groep, Zanolie, Green, et al., 2020).

Going more in-depth, the perspective-taking results may show that living through rough times, particularly the general state of the world during the pandemic and the strict lockdowns, related to the participants being better able to understand the views of others. This may indicate greater empathy among these adolescents. Further, the adolescents in the study also played the dictator game during the lockdown period. Here, the participants gave the most coins to doctors working in hospitals, followed by an individual with COVID-19 and a poor immune system (van de Groep, Zanolie, Green, et al., 2020). Altruism may be shown here as the participants determined the need and deservedness for specific groups of people contingent upon the current pandemic’s circumstances. These findings may connect to the empathy-altruism hypothesis that empathy motivates one to perform altruistic behaviours (Batson et al., 1981). The increased empathy and altruism could potentially lead to beneficial mental health effects through positive social interactions in the future.

Other positive outcomes that resulted from lockdowns involve the usage of coping strategies. These strategies reduce stress from certain situations (Folkman & Lazarus, 1980; Lazarus & Folkman, 1984). Over the course of the pandemic, people have been using a multitude of coping strategies to deal with stressors, such as the ones caused by feelings of loneliness and lack of agency that have arisen due to lockdowns: physical activity (Carriedo et al., 2020); spending time around nature (green and blue spaces) as well as doing activities in these spaces such as gardening (Corley et al., 2021; Pouso et al., 2021; Ribeiro et al., 2021); and various other strategies such as humour, reframing of the situation, planning, praying, and social media (Cauberghe et al., 2021; Jarego et al., 2021; Ramos-Lira et al., 2020). As some of the participants in these studies began to use these strategies during lockdowns, the strategy may become a part of the participants’ repertoire of ways to deal with other stressors in the future.

As lockdowns largely involve restriction of movement or confinement to a household, it would not be surprising if the coping strategy of social support through familial bonding would also have an important role in getting people through the adverse stressors of lockdowns. So far, research on familial bonding during the COVID-19 lockdowns has been positive. A qualitative study on families under lockdown in Finland found that relationship-level coping strategies were important ways to get through the stressors of lockdowns; this includes agreeing on familial routines or responsibilities, having flexibility in these routines or responsibilities, doing activities together, and having conversations (Salin et al., 2020). Beyond stress, the social support that arose from familial bonding has been related to positive outcomes regarding mental illnesses. Perceived familial support was a predictor of depressive symptomology (Mariani et al., 2020). Relatedly, the research found that greater familial bonding, represented by questions regarding an increase in cooking healthy meals together, spending more time together, and exercising together, was related to lower anxiety and depression symptoms in university students in Saudi Arabia (Alfawaz et al., 2021). Another study evaluated relationship quality assessed through The Quality of Marriage Index (QMI). It was found that those with good relationship quality had lower depression, anxiety, and stress scores and higher well-being, sleep quality, and quality of life scores than those with poor relationship quality (Pieh et al., 2020). A limitation with many of these studies is that they could not capture much information about familial support and bonding before lockdowns began. This means that it is difficult to understand if the support was maintained from pre-lockdown into the lockdown period or if there was an increase directly due to being in close proximity for an extended period.

**Evaluation of lockdown effectiveness**

Lockdowns have been used as a common spread reduction measure taken by many nations around the world. This has occurred even as WHO doctors have stated that the WHO does not advocate lockdowns as the main way to approach the pandemic, citing economic and social costs (Boseley, 2020; The Spectator, 2020). Especially in the face of the adverse effects of lockdowns seen in the previously mentioned research, it is important to determine whether these measures effectively accomplished the goals for which they were enacted.

Even as we are still amid the COVID-19 pandemic, studies are steadily being published that attempt to determine lockdown effectiveness. One, in particular, sets the stage as it notes that the effectiveness of
lockdowns appears to be highly influenced by the model one uses. Essentially, the researchers compared how three particular models estimated the change in COVID-19 transmission over time (Chin et al., 2020; Costic et al., 2020). The first model considered general non-pharmaceutical interventions (NPIs), the second model considered changes in mobility, and the third model considered both NPIs and mobility (Chin et al., 2020; Flaxman et al., 2020; Unwin et al., 2020). The models were used to look at intervention effectiveness from 4th March 2020 to 5th May 2020 and from 4th March 2020 to 12th July 2020 in 14 countries. For both the investigations up to 5th May and 12th July, the first model showed a high reduction in COVID-19 transmission due to lockdowns (Chin et al., 2020). For both the investigations up to 5th May and 12th July, the second model showed that COVID-19 transmission was already decreasing before imposed lockdowns (Chin et al., 2020). The third model showed that up to 5th May, COVID-19 transmission was not significantly impacted by lockdowns, but that transmission was impacted considerably by lockdowns when considered up to 12th July (Chin et al., 2020). Essentially, researchers’ results on whether lockdowns should have been implemented in the first place may have been biased by model usage. Certain prediction models may have biased lockdown effectiveness as the operative approach to the pandemic and that is why nations continue to readily implement them.

Beyond models, studies have delved into using correlational data to determine lockdown effectiveness. One study decided to delve into potential factors that had relations to COVID-19 mortality rates. The research looked at countries worldwide (and states and regions when considering parts of the United States and China) with at least 10 COVID-19 deaths (De La Rochelambert et al., 2020). One of the factors considered was a government response to COVID-19, which was determined by the containment and health index, the stringency index, and the economic support index. Particularly, the containment and health index looks at lockdown measures and other measures such as testing and contact tracing; also, the stringency index looks at the strictness of the lockdown and mobility limiting measures (De La Rochelambert et al., 2020). It was found that there were no significant correlations between the containment and health index or the stringency index in regards to COVID-19’s death rate (De La Rochelambert et al., 2020). Even though this is an example of the ineffectiveness of lockdown measures, one can argue that the goal of lockdowns was to control spread and not necessarily to prevent deaths directly. From this lens, the study is relatively limiting as it only looks at effects on mortality rates.

To control virus spread in mind, studies have delved into how lockdowns have affected COVID-19 cases. In one study, countries that imposed more restrictive non-pharmaceutical interventions (mrNPIs), which included mandatory stay-at-home orders and mandatory business closures, were compared to countries that imposed less restrictive non-pharmaceutical interventions (lnNPIs) (Bendavid et al., 2021). The countries studied that imposed mrNPIs were England, France, Germany, Iran, Italy, the Netherlands, Spain, and the United States; those that did not impose mrNPIs were Sweden and South Korea. When compared individually to Sweden and South Korea, none of the countries that implemented mrNPIs showed a significantly lower daily growth in case rates (Bendavid et al., 2021). Interestingly, it was found that when comparing Sweden to both Spain and England, the countries that imposed mrNPIs had a significantly more significant daily growth in case rates (Bendavid et al., 2021). Lockdown ineffectiveness is seen as there appeared to be non-significant differences in daily case rate growth between the countries that used mrNPIs and countries that used lnNPIs. Thus, lockdowns did not achieve the goal of preventing spread more so than the usage of other intervention methods.

Another study narrowed the research by specifically looking at shelter-in-place orders in the United States and how the orders tied to both COVID-19 cases and deaths. It was found that these orders did not lead to significant decreases in COVID-19 cases or deaths both immediately and several days after order implementation (Berry et al., 2021). Further, shelter-in-place orders continued to have no significant effect on COVID-19 cases when the researchers accounted for policy spillovers from other states and testing changes seen in different forms (Berry et al., 2021). Here, the lack of correlation between the shelter-in-place orders to COVID-19 cases and deaths may prove that the charges did nothing to change the pandemic trajectory substantially.

There are crucial limitations in these studies. Many of them look at the effects of lockdowns early in the pandemic. It is possible that lockdowns were ineffective at this initial stage in various countries but increased effectiveness over time. This could potentially have resulted from changes in testing and the potential greater severity of successive COVID waves. Another limitation is brought up in Berry et al. (2021) as there was not much consideration for how well enforced the restrictions were. Less enforcement of restrictions could potentially lead to perceived lesser effectiveness. The stringency index used in De La Rochelambert et al. (2020) helps alleviate this issue, and it would be useful if more studies applied it. Finally, it is challenging to disentangle effectiveness when many nations employed multiple measures at once. Bendavid et al. (2021) were effective in this regard as they looked at countries that used mrNPIs and lnNPIs to separate the
effectiveness of lockdowns from other measures such as testing, social distancing, and contact tracing. More studies should aim to do something similar to ensure that the effectiveness of measures is analysed as separately as possible.

Other studies show the opposite results compared to the studies mentioned above as they conclude that lockdowns were effective. Studies such as these cite avoidance of possible consequences of unimpeded COVID-19 spread, such as decreased medical resources and reduction of deaths not related to COVID-19, as proof of effectiveness (Gros, 2020; Qi et al., 2020). These considerations are one reason why all information regarding lockdown effectiveness must be taken in tandem. Different studies have different ways of assessing lockdown effectiveness. Further, lockdown effectiveness may differ between countries due to pre-existing demographic, health, and economic factors. Also, studies may look at the costs and benefits of lockdowns and differentially conclude the severity of the costs or the intensity of the benefits. The most impartial assessment method may be seen in Bendavid et al. (2021), where significant differences between nations that employed lockdowns versus ones that did not were investigated.

**DISCUSSION**

This perspective presented information about the mental health impacts of COVID-19 lockdowns and the effectiveness of these lockdowns. There is evidence that the lockdowns relate to adverse effects on decision-making, selective attention, and working memory. In addition, lockdowns have been correlated with increased prevalence rates of mental illnesses, including anxiety, depression, and anorexia nervosa. These mental health issues are exacerbated in those who already have physiological health problems such as cancer or ACS; thus, greater mortality rates may be seen among these populations. These negative impacts are all associated with isolation, lack of agency, and various other consequences of having restrictions on movement or contact with others. However, there are positive impacts of lockdowns that have been noted as well. Increased empathy and altruism among adolescents have been documented and can potentially lead to productive social interactions in the future or better relations with others. The literature supports the use of coping strategies such as social support stemming from familial bonding, and people may continue to use these strategies to help manage stressors after lockdowns and the pandemic are over.

Several studies delved into the impacts of lockdowns on mental health that could not be discussed previously. Positive impacts include decreased anxiety and depression scores during lockdowns for those classified as at risk for the respective disorders before lockdowns began (Widnall et al., 2020). There are also several other negative impacts of lockdowns to consider, each of which can take a psychological toll on a person: increased use and buying of tobacco in the US due to factors such as boredom or irregular routines (Giovenco et al., 2021); an estimate of 30,231 excess deaths in the US due to unemployment between April 2020 and March 2021 (which was in part caused by lockdown policies) (Matthay et al., 2021); increased violence against women (Roesch et al., 2020); and delayed elective surgeries (Fu et al., 2020; Sharpless, 2020).

It is important to consider these impacts on mental health in tandem with the findings mentioned above on lockdown effectiveness. It appears as though the COVID-19 lockdowns have had non-significant effects on COVID-19 cases and deaths in nations all over the world. Even though the positive impact of lockdowns is important to consider, the negative effects could potentially have lasting impacts. The increase in prevalence rates of mental illnesses is incredibly worrying and can lead to poor outcomes if people do not seek treatment. This is compounded by the fact that those with physiological health issues may face increased mortality due to the mental health issues that may have arisen or worsened during the lockdowns.

Further, some of the positive effects must be investigated to a greater extent before drawing concrete conclusions. For example, even though the Mansfield et al. (2020) report found increases in happiness during lockdowns for some students, large percentages of students also experienced worse or equal feelings of happiness during lockdowns in comparison to before; plus, the van de Groep, Zanolje, Green, et al. (2020) study, which found increased empathy through increased perspective-taking among adolescents during lockdowns, also found that adolescents experienced a decrease in empathic concern. Considering all of this, lockdowns may not have been the best strategy to deal with COVID-19 when evaluating the mental health costs accrued among the world population. To verify this, meta-analyses will have to be done to understand better the strength of the positive and negative impacts and lockdown effectiveness.

**General future research**

There are many potential directions for future research. First, there may need to be more qualitative studies on the impacts of lockdowns on mental health. There were several qualitative studies mentioned here that gave crucial insights into how people believed lockdowns affected them. New qualitative studies would
benefit from exploring generalised anxiety disorder and suicidal ideation, and mental health changes due to the stoppage of general medical care for children and adults. Connected to this, the Fancourt et al. (2021) study found that depression and anxiety scores eased as time passed.

Interestingly, some of this decrease was seen as lockdown measures persisted. This led the authors to consider the potentiality that people became acclimated to their new circumstances over time. A qualitative study would be helpful to see whether normalisation and acclimation were really at play during lockdown periods.

Second, it would be important for lockdown effectiveness to be assessed for times other than the early parts of the COVID-19 pandemic. Data to help with this assessment should be available, especially as time passes, and can help understand how lockdown effectiveness changed as the pandemic went along and if mental health was affected as a correlate of lockdown effectiveness over time. Third, more studies should investigate how likely it is for these effects on mental health to persist. Research shown here has already supplied information to show that at least the negative cognitive effects appear to decrease as lockdown measures are eased, but it will be important to find out if these decreases will return to pre-pandemic or pre-lockdown levels. Further, it will be interesting to see if the positive mental health effects such as social support from the family will be maintained as the lockdowns ease and members of households are not forced to remain in close proximity.

Lastly, more investigations into Bendavid et al. (2021) should be done to find out specific reasons to explain the few cases in which a country that employed mRNPis saw larger daily growth rates than countries that employed IrNPis. For each of these future research areas, researchers should do their due diligence to separate the effects of different COVID-19 mitigation measures since multiple measures were employed at once in many nations. Also, researchers should consider pre-existing demographic, health, and economic information regarding how COVID-19 affected different areas in particular ways (De Larochelambert et al., 2020).

The population of focus for future research on lockdown’s effects on mental health

A population of focus for researchers to explore regarding the effects of lockdowns on mental health may be adolescents. In general, adolescence involves social and neurocognitive changes relating to general cognitive abilities and general interactions with others (such as prosocial behaviours) (Blakemore, 2008; Crone & Dahl, 2012; van de Groep, Zanolie, & Crone, 2020; van de Groep, Zanolie, Green, et al., 2020). These changes can set the stage for how one experiences adulthood. Thus, adolescence is a very formative period in life. As lockdowns have kept adolescents away from peers, it would not be surprising to see potential effects on social behaviours and the neurophysiology of the brain that can have long term effects. WHO views adolescents as 10–19 (WHO, 2020). Some studies have already started to delve into how this age group has been affected by lockdowns.

Some positive findings include the results from the previously mentioned van de Groep, Zanolie, Green, et al. (2020) study that saw increases in perspective-taking and noticed evidence of an understanding of situational needs and deservedness among adolescents during lockdowns. Also, it has been seen that adolescents from 11–16 years old experienced a reduction of emotional symptoms such as fear, worry, and sadness during lockdown (Waire et al., 2021). Comparing March and April of 2020 to the same months in 2019, England saw decreases in adolescent psychiatric inpatient admissions and psychiatric-related accident and emergency presentations (Ougrin, 2020). Another study found decreased referrals to child and adolescent mental health services in the UK than before the lockdown (Tromans et al., 2020). It would be important further to understand the reasoning behind these decreases in psychiatric issues as various factors could explain them: decreased academic and social pressures (Waite et al., 2021); increased social support from family members who were in the household (Mathias et al., 2020); feelings of needing to follow implemented lockdown measures leading to the decreased search for support (Tromans et al., 2020); and decreased available support from peers and teachers leading to decreased identification of issues (Patra & Patro, 2020).

Adolescents’ negative findings were prominently seen in the previously mentioned FAIR Health (2021) white paper that saw increased mental health insurance claims in the US. Further, a significant number of adolescents may have experienced mental health issues related to depression, anxiety, ADHD, ODD, and problematic internet use during the period of lockdowns (Giannopoulou et al., 2021; Mallik & Radwan, 2021; Mohler-Kuo et al., 2021; O’Sullivan et al., 2021). Interestingly, lockdowns may have significantly impacted adolescents with previous psychological issues such as ADHD, ASD, and eating disorders, potentially creating comorbidities (Guessoum et al., 2020; O’Sullivan et al., 2021). For adolescents with these disorders, the disruption of relationships and routines due to lockdowns was significant in worsening symptoms and experiencing additional mental health issues. However, it is too early to determine if these effects are overwhelmingly positive or negative. Most importantly, it would be beneficial for researchers to do
longitudinal studies in the future to see if these effects lead to particular behaviours in adulthood. Imaging studies would also help assess neurophysiological changes that may be unexpected for adolescents.

CONCLUSION

Even with the positive effects that some people have experienced, the costs of lockdowns on mental health seem to outweigh any of the initially intended benefits. Instead of blanket lockdowns, it may have been better to use normal risk than COVID-19 risks to allow people to make their own decisions regarding how to approach the pandemic (Spiegelhalter, 2020). Further, implementation of only less restrictive measures such as testing, social distancing, and contact tracing may have potentially resulted in similar COVID-19 case and death numbers without the negative consequences on mental health from more restrictive lockdown measures (Bendavid et al., 2021; Habib, 2020; Normile, 2020). Hopefully, the negative mental health consequences of the lockdown measures can be mitigated in the future or are not long-lasting; hopefully, the people who did experience positive mental health effects can carry them long after the lockdowns and pandemics are over.

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