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RESEARCH ARTICLE

COVID-19 lockdown and lifestyles: A narrative review [version 1; peer review: 1 approved with reservations]

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Abstract

Background: The primary objective worldwide during the coronavirus disease 2019 (COVID-19) pandemic has been controlling disease transmission. However, lockdown measures used to mitigate transmission have affected human behavior and altered lifestyles, with a likely impact on chronic non-communicable diseases. More than a year into the pandemic, substantial peer-reviewed literature has emerged on altered lifestyles following the varying lockdown measures imposed globally to control the virus spread. We explored the impact of lockdown measures on six lifestyle factors, namely diet, physical activity, sleep, stress, social connectedness, and the use of tobacco, alcohol, or other harmful substances.

Methods: We comprehensively searched PubMed and the World Health Organization's global literature database on COVID-19 and retrieved 649 relevant articles for the narrative review. A critical interpretative synthesis of the articles was performed.

Results: Most of the articles included in the review identified the negative effect of lockdown measures on each of the lifestyle factors in many parts of the world. Encouraging lifestyle trends were also highlighted in a few articles. Such trends can positively influence the outcome of lifestyle-related chronic diseases, such as obesity and diabetes.

Conclusions: The COVID-19 pandemic provides an opportunity to better understand the negative impact of strict lockdown measures on lifestyles. At the same time, it helps us identify and initiate positive behavioral changes, which, if consolidated, could improve chronic disease outcomes. It is up to governments, communities, and healthcare/academic entities to derive benefit from lessons learned from the pandemic, with the ultimate objective of better educating and promoting healthy lifestyles among communities.

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Any reports and responses or comments on the article can be found at the end of the article.

Keywords

COVID-19, Lifestyle, Diet, Physical activity, Stress, Smoking, Substance, Alcohol, Emotional well-being, Social connectedness

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Introduction

The ongoing coronavirus disease 2019 (COVID-19) pandemic has caused thousands of deaths, overloaded health systems, and disrupted social and economic infrastructure worldwide. While the world remains focused on controlling the pandemic, we cannot ignore its impact on lifestyles and, in turn, on chronic non-communicable diseases (NCDs), which account for over 70% of global mortality. COVID-19 transmission-mitigating measures—requiring people to stay at home and practice physical distancing—afford us the opportunity to examine lifestyle factors and understand their effect on NCDs.

Various degrees of COVID-19 lockdown measures, including travel and movement restrictions, have helped reduce the spread of the virus. However, these measures also diminish access to healthy food; widen inequities between communities; result in suboptimal physical activity levels; exacerbate anxiety and stress; impair the quality of optimum sleep; and encourage substance abuse to allay anxiety and fear of the disease¹. Substantial published literature has emerged on altered lifestyles during the pandemic; however, to our knowledge, there has not been any synthesis of this literature.

We conducted an extensive narrative review to help understand lifestyle factors, particularly those related to NCDs, in the COVID-19 context. The review aims to synthesize alterations (positive or negative) in lifestyle factors among individuals and communities, that arose because of varying countries' lockdown measures. The review can be an instructive and valuable source for healthcare institutions and stakeholders interested in improving healthy lifestyles and healthcare during future lockdown measures. Additionally, it can inspire further research in the emerging field of lifestyle medicine and its role before, during, and after crisis situations, such as pandemics. For the review, we recognize the American College of Lifestyle Medicine (ACLM) definition of a healthy lifestyle as one that includes eating a predominantly plant-based diet, being physically active, sleeping well, managing stress, remaining socially connected, and refraining from the use of tobacco, alcohol, and other harmful substances. With optimum practice, these six healthy lifestyle factors can prevent, treat, and, in some cases, even reverse NCDs. This narrative review will focus on these lifestyle factors and how they may have been altered during the COVID-19 pandemic.

Methods

The narrative review was conducted using a *best-evidence synthesis* approach put forth by Green *et al.*² Following this approach, the expectation from a successful narrative review is to: “present information that is written using the required elements for a narrative review, be well structured, synthesize the available evidence about the topic, and convey a clear message.”² Following the Scale for the Assessment of Narrative Review Articles (SANRA)³, the methodology with the checklist is reported as Supplementary Material 1 in the Extended Data⁴.

Search strategy

The search strategy included a combination of keywords and controlled vocabulary (such as MeSH terms). The keywords

included the following: COVID-19 AND (lifestyle OR dietary habits OR physical activity OR sleep OR tobacco OR alcohol OR substance OR stress OR relationships) AND (lockdown OR quarantine OR isolation). We searched using these terms in PubMed and the World Health Organization (WHO) global literature database on coronavirus disease initially in September 2020 and updated the search in PubMed on 31 January 2021. We placed no restrictions on language, geography, or publication date. The reference lists of the retrieved articles were also scanned for additional articles with relevance to our review. The number of retrieved items from each database is provided in the Extended data, in Supplementary Material 2⁴.

Inclusion and exclusion criteria

We included all articles that discussed lifestyle factors in the general population within the COVID-19 pandemic context. The review focused on the six lifestyle factors included in the definition of a healthy lifestyle by the American College of Lifestyle Medicine.

Articles were excluded if they did not focus specifically on the six lifestyle factors (dietary habits, physical activity, sleep, tobacco or other substance use, stress, and emotional well-being and social connectedness) or did not discuss lifestyle within the COVID-19 context. We excluded articles that discussed lifestyle change in healthcare workers as they are a specialized group and subject to additional stressors beyond the effects of the lockdown measures. Additionally, we excluded published literature reporting modeled effects of lockdown during COVID-19.

Information extraction

Identified articles meeting the inclusion criteria were imported into Endnote X9⁵. Thereafter, the authors screened the title and abstract of the identified articles. Full texts of all relevant articles were further screened for useful data to be eventually included in the critical interpretive synthesis⁶. From each article, qualitative and quantitative information on the COVID-19-related lockdown and its effects on any of the six lifestyle factors (diet, physical activity, stress, connectedness, sleep, and tobacco or other substance use) on healthy individuals and those with pre-existing NCDs were extracted. In articles that were primary studies with quantitative data, we specifically scrutinized the study design, results, and the conclusion. In articles other than primary studies, we focused on the discussion and conclusion sections. For qualitative studies, opinions/perspectives, and viewpoints, we took a meta ethnographic approach⁷ as part of our interpretative synthesis. Though the ACLM definition combines smoking, alcohol, and substance use as one lifestyle factor, we reviewed these separately to explore them in greater depth. The information extracted from the articles was classified according to the six lifestyle factors and is summarized in the Results.

Results

Our search yielded a total of 2620 articles. Following the title, abstract, and full-text screening, 649 articles relevant to the narrative review scope were qualitatively synthesized

according to the six lifestyle factors – dietary habits, physical activity, sleep, tobacco or other substance use, stress, and emotional well-being and social connectedness. Though all included articles are reported in the Extended data, in Supplementary Material 3⁴, the manuscript bibliography was restricted to an optimal number applying the principle of ‘concept saturation’⁸ for several analytical findings.

Dietary habits

Most of the literature included in the narrative review referring to dietary habits indicate an alteration in the eating behavior of people in many parts of the world during the COVID-19 pandemic^{9–11}. Most survey-based studies report an increase in the intake of unhealthy foods by the majority of respondents, a small number highlight a higher intake of healthy foods, and some studies, such as one from Spain with 1036 participants, report a wide variation in the type of food (healthy vs unhealthy) consumed by the participants¹². One Polish study with 2381 participants reported that 34% of respondents ate more during the lockdown¹³, while another study from the same country with 1097 participants reported that 30% of the participants gained weight during the lockdown¹⁴. Whereas, among 3533 respondents from Italy, 46.1% reported consuming more food and 19.5% had gained weight¹⁵. A similar proportion (46%) of the Galician population from Spain also reported eating more than before the lockdown and 44% of the 1350 adults in the study reported weight gain¹⁶. A qualitative study from Ghana found similar eating behavior leading to weight gain during the lockdown¹⁷. This weight gain was more pronounced in people with pre-existing overweight/obesity¹⁸. In richer households, staying home encouraged excessive use of unhealthy foods, such as processed and fast foods in many parts of the world^{15,19–21}. An Italian study reported an increased uptake of ‘comfort foods’ including chocolates and ice-creams used by participants to allay lockdown anxiety¹⁵. In a study of 938 French adults during the lockdown, an individual’s mood was a significant factor for food choice²¹. Similarly, a high prevalence of ‘emotional eating’ was reported in Saudi Arabian women²² and among a cohort of 675 Spanish individuals²³. Additionally, some people including children inclined towards snacking to overcome boredom²⁴, and that led to relatively quick excessive weight gain^{15,16,25–28}. A Chinese retrospective study of 10,000 students found an increase in body mass index in most of the participants²⁹.

Staying home has also limited access to fresh vegetables and fruits, particularly in the most vulnerable and poorest sections of the society due to limited availability, accessibility, and affordability^{14,30}. Poorer households have been overwhelmed by food insecurity, as demonstrated by a study from Iran reporting 61% of 392 families facing some level of food insecurity³¹.

In some situations staying at home encouraged many individuals to eat a fresh, home-made, balanced diet³², as evidenced by a reduction in the consumption of fast food³³, fewer purchases of ready-made meals, and by the dominance of online/in-person grocery shopping as the major source of

food and food purchases in some countries^{16,34}. A study from China showed that families that did online shopping included a greater variety of foods in their diet than in normal circumstances³⁵. A large study of 7514 participants from Spain—predominantly young, university-educated females—reported a higher intake of fruits, vegetables, or legumes than during the pre-pandemic times³⁶. Gender (females faring better), family members staying at home, (less) TV watching while eating, and (higher) maternal education were determined to be factors influencing healthy food intake³⁷.

In the review, we find that individuals who were overweight/obese pre-pandemic gained weight during the pandemic, while the undernourished lost more weight^{14,15}. A study in Italy of 88 families found that children with obesity found it difficult to practice a healthy lifestyle during the pandemic, despite participating in a food education program in a hospital. Their unhealthy food consumption and sedentary lifestyle were attributed to a great deal of stress experienced by the children due to interruption of school and sports activities among other factors³⁸. Studies also reported that individuals with eating disorders and other psychiatric disorders diagnosed prior to the lockdown fared worse during the lockdown period due to low self-directedness and less adaptive coping^{20,39–44}.

Physical activity

The lockdown period saw a general reduction in physical activity levels as evidenced from the studies included in the review. A study from China of 339 participants revealed a significant reduction in the average exercise intensity for both males and females during the lockdown period (average steps per day, before vs during: 7038±1923 vs 3741±1042 steps, $p < 0.001$ for females and 8321±3000 vs 3728±1726 step, $p < 0.001$ for males)⁴⁵. A similar observation was made in Italy where 68% of participants in a study with a sample size of 490 adults reported a decrease in exercise levels⁴⁶. In a Polish study sample of 238, 43% of participants also reported a reduction in their physical activity during the lockdown period¹⁴. An international, multi-country online survey of 1047 participants found that the number of days per week of all physical activity declined by 24% during the lockdown period. The number of minutes per day spent on physical activity decreased by 33.5% while sitting time increased by 5–8 hours among the respondents⁴⁷. Diminished physical activity levels were also reported in other countries, such as Australia⁴⁸, United Kingdom (UK)⁴⁹, and the United States (US)^{50,51}. Longitudinal tracking of steps among participants in a physical activity program in Australia saw a decrease in the number of steps during lockdown, which returned to normal with the lifting of restrictions⁵². A similar improvement in physical activity levels was observed after the end of lockdown in Greece⁵³.

The working-from-home environment has predisposed individuals to spend more time sitting, leaning, reclining, or lying down on the bed²⁰. There is no predictable pattern as to who was less active during the lockdown period. While some studies found that previously physically active individuals became less active during the lockdown period^{51,54}, other studies

found no change⁵⁰ or reported a further reduction in physical activity among previously inactive individuals⁵⁴. A cross-sectional study in 64 cities in China, with 369 participants, concluded that previously physically active individuals were in greater distress as a consequence of the lockdown⁵⁵. Studies among preschoolers⁵⁶, children and adolescents in Spain⁵⁷ and Brazil found a downward trend in physical activity levels and an increase in screen time/sedentary behavior among children during the lockdown period⁵⁸. A similar reduction in physical activity levels among children and adolescents was also reported in studies from Canada, Germany, UK, Italy, and Spain^{59–64}. A study in India found a reduction in physical activity and increased screen time among men and those belonging to the upper socio-economic strata⁶⁵. Ironically, a study from Germany found that participants who regularly consumed alcohol and expressed greater satisfaction with their life were more physically active⁶⁶. It was also observed that older people who were single/alone⁶⁷, affected by frailty⁶⁸, used to exercising in groups, or who were not accustomed to online apps (which support exercise routines) experienced a reduction in physical activity and/or increased levels of sedentary behavior^{69–71}.

Lockdown provided an opportunity to be creative in finding ways to stay physically active. In South Korea, for example, it was observed that the public bicycle-sharing system recorded an increase in commuter and weekend users⁷². It is, however, to be noted that such initiatives required commitment from citizens and authorities to ensure adherence to physical distancing, hand hygiene, facemask use, and cleaning of public facility/site surfaces. Staying physically active in home environments is possible, and its feasibility was shown during COVID-19 lockdown periods in countries like Japan⁷³, Scotland⁷⁴, and Switzerland⁷⁵, particularly among children with good parental support and encouragement. A study of 213 university students in Spain found an increase in the mean number of days they were engaged in moderate and vigorous physical activity⁷⁶. The use of physical activity apps was useful in improving physical activity in the US⁵¹. A recent study of 1521 adults from the UK reported that, although most adults claimed to have maintained or increased their engagement in physical activity during the pandemic, the majority did not meet the recommended physical activity guidelines⁷⁷. Studies performed in several countries, including a large study of 43,995 individuals from Brazil⁷⁸, reconfirm that individuals who were physically active during the lockdown period were more resilient and had lower odds of suffering from stress, anxiety, and depression^{79–88}.

Sleep

Stay-at-home restrictions affected the sleep of people in many parts of the world^{89,90}. A global study involving 6882 participants from 59 countries found a large proportion (66.2%) reported changes in their sleep patterns during the pandemic⁹¹. In a large cross-sectional study across France, two weeks after the lockdown, 74% of the 1005 nationally representative participants reported problems trying to sleep as compared to 49% in a previous survey pre-lockdown⁹². An Italian study including 400 university students and administrative staff

reported that 40% of the respondents suffered from insomnia, while 15% specifically had issues in sleep initiation⁹³. A similar proportion (40.7%) among a sample of 1491 adults in Australia reported a negative change in sleep levels⁴⁸. Factors found to be associated with disturbed sleep were increased blue light exposure from extended screen time, browsing the internet to keep busy, and working remotely from home^{93,94}. Older age, living with a partner, and living in a higher income country were associated with better sleep health, while loss of job, challenges experienced in transitioning to working from home, being unable to pay important bills, and an increase in arguments and conflicts at home were associated with poorer sleep health⁹⁵. Poor sleep and anxiety/depression were found to be closely associated in a few studies^{96–98}.

Respondents in some studies reported sleeping more during the lockdown period. This was particularly true for preschoolers, children, and adolescents, as observed in studies from Brazil, Spain, Canada, and China^{20,58–60,76}. Among adults who slept more, the reported sleep quality was poor^{91,99}. Those who slept more also experienced sleepiness during the day and increased daytime sleep duration, as reported in a study of 203 corporate professionals and 325 university students in India¹⁰⁰. In the same study, it was also observed that females, younger people, and those experiencing loneliness and COVID-19-related worries had greater difficulty with sleep¹⁰⁰.

Frequent awakening and increased sleeping difficulty were noted in 69.6% of 365 patients in Portugal who had pre-existing sleep-disordered breathing¹⁰¹. One study reported an increased frequency in the uptake of sleeping pills among study participants⁹². Increased stress due to COVID-19, information overload, inconsistent bedtime, and low mood are all contributors to insomnia and its harmful effects on overall health¹⁰².

A few studies reported that individuals with previously erratic sleep patterns and social jetlag, were provided with an opportunity to normalize their sleep patterns and improve sleep hygiene for optimum functioning^{99,103–106}. One study from the US found that reduced rigid workload and school schedules led to an improvement in the overall sleep quality for some individuals¹⁰⁷, and a study in Canada found students were better able to sleep and reported reduced daytime sleepiness during the lockdown¹⁰⁸. A beneficial impact of quarantine on sleep was documented by a large global study of 14,000 individuals from 11 countries. A very small proportion of people were found to suffer from anxiety-induced insomnia in this study¹⁰⁹. At least one study showed that sleep problems encountered post-lockdown declined over time⁹⁵.

Substance use

Tobacco. Few studies are available on smoking behavior during COVID-19 lockdowns. Among those available, we found variations (increases, decreases, and remaining at pre-lockdown levels) in the smoking patterns among the respondents¹¹⁰. A cross-sectional study involving 345 participants in the US found that half of respondents retained their pre-lockdown level of smoking, one quarter of them reduced smoking, and the

remainder increased smoking¹¹¹. The same study also found that while 20% of respondents showed an increased motivation to quit, 15% showed a reduction in motivation¹¹¹. In a study of 957 participants from the Netherlands, 14.1% reported smoking less during the pandemic, while 18.9% reported smoking more¹¹². In Australia, 6.9% of 1491 adults reported a negative change in their smoking habits after the introduction of lockdown measures⁴⁸. In a multi-country study involving 6800 combustible and e-cigarette users from Italy, India, South Africa, UK, and the US, indoor smoking had increased in India and Italy, thus increasing the risk of secondhand smoke exposure among family members¹¹³. Anxiety, boredom, and stress experienced by many people during COVID-19 contributed to increased smoking in some individuals^{16,110,114,115}. Stress and inactivity were cited as the main reasons for increased smoking during lockdown by a cohort of patients with cardiovascular disease in France¹¹⁶.

Despite many deterrents, motivated individuals saw the lockdown period as an opportunity to become healthy and quit smoking¹¹¹. The motivation to quit was more discernible among those who smoked tobacco cigarettes than electronic cigarettes¹¹¹. Smokers who had a family member or someone close to them suffer from COVID-19 displayed a greater motivation to quit¹¹¹. One study reported that many parents wanted to appear on their best behavior in front of their children during lockdown and postulated that this was one of the reasons for them cutting down on their cigarette intake when spending more time at home¹¹⁷. In a qualitative study in the US, several participants mentioned that their cessation efforts improved due to a decrease in opportunities for social smoking and because they were spending more time at home. However, other individuals in the same study claimed an increase in smoking due to lack of the same restrictions at home compared to those imposed at their workplaces¹¹⁰.

Other harmful substances. Among other substances that cause dependence, alcohol stands out as one of the most commonly used psychoactive substances during the lockdown period^{114,118–120}, despite alcohol supply not being assured in many countries. A study from India documented that alcohol shop closures led to alcohol-dependent individuals experiencing withdrawal symptoms and suicides¹²¹. Where alcohol was available, some people resorted to increased alcohol intake to overcome adverse psychological outcomes of the lockdown, including stress and insomnia^{122,123}. Data from the Office for National Statistics in the UK demonstrates that alcohol sales rose by over 30% in month-on-month volume when compared to the previous year. In a survey of 6416 people from China, 32% of regular alcohol drinkers reported increased consumption during the lockdown period¹²⁴. In Australia, 26.6% of 1491 participants reported an increase in alcohol consumption during the lockdown⁴⁸. A higher frequency of drinking was selectively observed in men, young adults aged 18–24 years, and those living in big cities¹²⁵. A study in Italy observed that emergency admission of adolescents and young people in one hospital due to alcohol-related emergencies increased manifold during the lockdown⁶¹. In a survey of 1555 people in the UK, one

third reported that they had stopped or reduced drinking during the lockdown, while one fifth drank more frequently during the same period¹²⁶. A survey of 4072 participants in Poland found a reduced frequency of drinking in most participants¹²⁵.

It was identified that those who consume alcohol found it more difficult to cope with the mental health impact of the pandemic and associated lockdowns¹¹⁸. A large study from Australia found that people who were heavy drinkers, middle-aged, and had higher incomes before the pandemic, increased drinking during the pandemic¹²⁷. This study also found that individuals who had experienced recent job loss, were stressed/depressed, or had altered eating and sleep habits consumed larger amounts of alcohol than those who weren't¹²⁸. A study from the US found an increase in harmful alcohol use and related behaviors over the six months of lockdown-related measures¹²⁹.

A survey of 1555 patients with pre-existing alcoholic disorders in the UK concluded that 'lockdown represents a risk factor for increased alcohol consumption in people with alcohol use disorders and relapse for those who were previously abstinent'¹³⁰. Those who do relapse are at a high risk of harmful drinking and require a custom-tailored approach for follow-up and intervention.

A study of university students before and after university closures in the US revealed that those students who moved from on campus accommodation with peers to their homes with parents demonstrated a significant reduction in their drinking than those who remained in their pre-pandemic locations¹³¹. A study of 1951 students from Belgium found that pre-lockdown drinking motives reliably predicted alcohol consumption during the lockdown¹³².

With regard to addictive drugs, the European Monitoring Centre for Drugs and Drug Addiction determined that **people using addictive drugs may be at higher risk during the crisis**, particularly because of the aging cohort of opioid users and any associated comorbidities. Though the data is sparse at the present time, experts agree that movement restrictions reduced the availability of illicit drugs¹³³, thereby increasing the demand for addiction treatment. The limited availability of these services added to the suffering of this population. There was one study from France, however, which found an increase in cannabis use among 31.2% (195 of 620) of regular cannabis users making up 5.44% (620 of 11,391) of total participants¹³⁴. Another study from the Netherlands found increased use of cannabis among daily cannabis users¹³⁵. In addition, studies have demonstrated high anxiety levels among pre-COVID-19 substance users and COVID-19 substance initiators¹³⁶.

Stress

Watching, reading, or listening to the constant stream of COVID-19-related news, perceived health risks¹³⁷, and a perceived lack of autonomy¹³⁸ led to increased anxiety among individuals and families in many countries^{139–144}. The 2020 National Health Interview survey found that US adults were eight times more likely to fit the criteria for serious mental

distress during the lockdown as compared to before¹⁴⁵. A study from China reported the psychological impacts of COVID-19, expressed as mild-to-severe anxiety, among 25% of 7143 college students¹⁴⁶. In total, 65% of 432 respondents in another study from Hong Kong reported clinical levels of depression, anxiety, and/or stress. Older adults, especially those in isolation and with cognitive decline^{147,148}, and their caregivers¹⁴⁹ were identified to be more prone to anxiety, stress, and depression^{9,139}. A high prevalence of stress and post-traumatic stress disorders was documented among Nepalese¹⁵⁰, Lebanese¹⁵¹, Saudi Arabian¹⁵², Vietnamese¹⁵³, and Philippine nationals¹⁵⁴ at the height of lockdown. High levels of anxiety and depression were also documented in studies from India^{155–157}, Ecuador¹⁵⁸, Albania¹⁵⁹, Ireland¹⁶⁰, Hungary^{88,161}, Spain¹⁶², Palestine¹⁶³, the UK¹⁶⁴, Kuwait¹⁶⁵, Brazil, and Portugal¹⁶⁶. The prevalence of people reporting clinical depression and anxiety in a sample of 1215 respondents in Italy was recorded to be 32.3% and 35.7%, respectively (compared to 15.39% and 21.40%, respectively, during pre-COVID-19 times)¹⁴². A similar finding was made by another study from the country¹⁶⁷. One study from Jordan of 5274 participants found that four out of every ten participants in home quarantine suffered from some degree of anxiety¹⁶⁸.

Articles also suggest that quarantined children¹⁶⁹, adolescents¹⁷⁰, university students^{171–174} and adults¹⁷⁵, mothers of young children¹⁷⁶, and other healthy adults suffered from symptoms of poor mental health, such as post-traumatic stress, anger, and confusion^{177,178}. One study in Turkey found a difference in the self-reported quality of life (better) of children as opposed to the perception of their parents¹⁷⁹. Only a few studies made a clear distinction between the stress levels experienced by the general population as part of the community quarantine versus those who were quarantined as part of contact tracing or after testing COVID-19 positive. A few studies seem to suggest greater stress experienced by both those under isolation^{180,181} and others under home quarantine as part of contact tracing¹⁸². One study from China, however, found that home self-quarantine was associated with increased happiness as compared to those who were in community quarantine¹⁸³. A study from the UK found that a majority of the older people interviewed identified positive aspects of lockdown and felt better prepared to deal with the lockdown¹⁸⁴.

Higher stress levels associated with lockdown measures were observed in some groups, such as women^{185–187} (particularly pregnant women^{188,189}), single/divorced adults⁸¹, older people (particularly with pre-existing mental health conditions^{175,190}), parents with young children¹⁹¹, university students and young adults^{192–194}, workers¹⁹⁵, those self-medicating¹⁹⁶, the economically deprived¹⁴³, those with pre-existing depression¹⁹⁷, bipolar disorders¹⁹⁸, and other chronic medical conditions^{139,189,199–201}. A large study of 56,679 participants in China found that quarantine had a profound effect on the mental health of specific vulnerable groups, including those with pre-existing mental disorders, chronic physical diseases, frontline workers, and those living in the most affected areas²⁰². A similar large study of 53,524 participants from 26 countries during the pandemic found higher levels of stress associated with being young,

female gender, lower level of education, being single, number of children in the family, and living in a country experiencing severe community spread²⁰³.

Extreme stress driven by fear of COVID-19 infection, financial crisis, loneliness, the pressure to quarantine and isolate when tested positive, stigma, and the unavailability of alcohol have been identified as drivers of suicidal ideation and suicide during the pandemic and the associated lockdowns^{181,204–206}. A healthy diet and refraining from reading updates about COVID-19 were very often shown to be the best predictors of lower levels of anxiety and depressive symptoms²⁰⁷. A longitudinal study reported that fear of COVID-19 decreased over time since the introduction of lockdown, but depression levels increased in a cohort of Chinese individuals²⁰⁸. There were mixed results from New Zealand, one of the countries known to have best managed the pandemic, where 62% of those surveyed in a study reported ‘silver linings’ during the lockdown, such as enjoying working from home and a less polluted environment, while the same study found 16% of participants suffering from anxiety and 39% reporting low well-being²⁰⁹. A qualitative study from Italy found that, beyond the difficulties associated with lockdown, parents of children with neurodevelopmental disorders appreciated spending more quality time with their children, thus contributing to enhanced parent-child relationships²¹⁰. Some longitudinal studies have found the mental health of individuals to improve over time as extreme fear and the sense of emergency has subsided²¹¹.

Emotional wellbeing and social connectedness

The restriction of movement during the pandemic has led to a significant reduction in social activity among family, friends/neighbors, and for entertainment^{212,213}. This contributed to diminished life satisfaction in >30% of participants in a large, multi-continent study involving 1047 participants²¹³. A study of 571 healthy adults in Israel found greater psychological distress, poor connectedness, and lowered resilience among women, young adults, and the unemployed²¹⁴. An online survey of 309 residents in Europe and the US revealed that 100% of participants faced some degree of social isolation during the lockdown period. This study found that younger adults (aged 18–29 years) reported higher self-isolation than older groups. Those feeling socially isolated were also less satisfied with their food habits, work, and housing²¹⁵. Prolonged social media use has had a deleterious effect on the overall social well-being of individuals as reported by studies in Saudi Arabia²¹² and Italy²¹⁶.

Studies have found that a lack of social interaction has a more profound effect on people with higher income and education²¹⁴. Lack of social interaction also has a negative impact as more time passes for older people, as evidenced by large cross-sectional studies in the UK^{217,218} and Switzerland²¹⁹. Children and adolescents have reported being more restless, irritable, and inattentive during the lockdown²²⁰ with increased screen time being the likely contributor^{221,222} along with worsening of relationships²²³ and dysfunctional parenting²²⁴. Girls and women

confined to homes and quarantine facilities faced increased family tensions, an overload of domestic work, and remain vulnerable to physical and emotional abuse²²⁵. Intimate partner violence—characterized by physical, sexual, or emotional violence between partners—is also of concern during challenging times of staying home and physical distancing²²⁶. A study in Switzerland found that older adults who managed to maintain social communication at a satisfactory level were able to manage their stress level, thus underscoring the importance of social connectedness²¹⁹.

Lifestyle factors in patients with pre-existing NCDs

Studies show that patients with pre-existing NCDs have found it difficult to maintain a healthy lifestyle during the COVID-19 pandemic and associated lockdown measures introduced by countries²²⁷. Patients with coronary heart disease^{228–232}, neurological disorders^{233,234}, diabetes^{235,236} and cancer^{237,238} have had to compromise on their physical activity routine, dietary patterns, and social connectedness in particular^{227,236,239,240} as did families with children who had chronic respiratory diseases^{193,241}. Poor glycemic control in diabetics due to altered lifestyle was reported in many studies^{242–248}, while one study in India reported an improvement in the glycemic status of patients with type II diabetes mellitus²⁴⁹. In a study from France, 45% of 195 patients with chronic heart disease had a >25% reduction in physical activity and 24% of patients had gained >2kg weight²²⁹. A study of parents of 125 children with disabilities in the UK found that 61% of them reporting a reduction in physical activity levels and over 90% reported a negative impact on their children's mental health²⁵⁰. A qualitative study in Ireland came to a similar conclusion regarding increased mental health difficulties among children with Autistic Spectrum Disorder^{251,252}. Patients fearful of acquiring COVID-19 infection have also been found to postpone medical care for their chronic problems²⁵³, leading to greater physical and psychological distress, while adding to the suffering of chronically ill patients^{227,254,255}. Some studies found an improvement in patients with conditions such as migraine^{256,257}, whereas other studies found limited or no change in the lifestyle of those with other chronic diseases²⁵⁸.

Discussion

Our narrative review highlights the altered lifestyles of people worldwide during the lockdown period of the pandemic. Both positive and negative changes in the six lifestyle factors have occurred and their impact has varied in different instances. These findings could be instructive to health practitioners and health departments in their strategies to manage chronic disease.

With regard to dietary habits, at the start of the pandemic the United Nations Systems Standing Committee on Nutrition warned that the COVID-19 pandemic would disrupt food systems globally. The committee predicted a deterioration in the nutritional status of individuals due to altered dietary practices²⁵⁹. Particular concern was expressed over 'food environments', with regard to both external (availability and quality) and internal (accessibility, affordability, acceptability, and desirability) dimensions of the food systems²⁵⁹. Observations, more than

a year after the onset of the pandemic, now appear to confirm earlier fears of malnutrition and disrupted food environments, particularly in disadvantaged communities²⁶⁰. In general, the availability of healthy, plant-based food is ample in well-to-do communities. However, access to such food during the pandemic could be limited, at least in some settings and for specific populations. This lack of access may present health risks, such as lower immunity and adverse chronic disease outcomes, to individuals in those settings. Alternatively, staying at home has encouraged individuals in some populations to eat fresh, home-made food²⁶¹, likely due to additional time available to cook. **Home-cooking** not only helps cut down the intake of unhealthy processed and fast foods but also has proven emotional and health benefits. Further research is needed to understand the motivational factors behind healthy dietary practices during the pandemic and whether pre-pandemic awareness and practices likely had a positive influence.

It is well known that any amount of physical activity, no matter how little, is beneficial. Sedentary behavior associated with excessive television watching, increased internet browsing, playing screen games, and using mobile devices are shown to negatively impact chronic disease outcomes²⁶². With parks and gymnasiums closed and public movement in the open discouraged, people's ability to remain physically active has been challenged during the lockdown period. Though the majority of studies have shown a reduction in physical activity levels and increased sedentariness during the lockdown, it is heartening to note that some individuals in select settings have seen an opportunity to be creative in finding ways of staying even minimally active (e.g., gardening, exploring online free exercise routines, and walking up and down the stairs/steps) in a home environment^{69,263}.

Adequate sleep improves concentration and diligent decision-making. Disrupted and suboptimal sleep on the other hand has been correlated with an elevated body mass index, obesity, metabolic syndrome, and type 2 diabetes²⁶⁴. Exposure to blue light also increases night-time heart rate, blood pressure, and core body temperature, and suppresses melatonin and sleepiness. The high prevalence of insomnia and an increase in screen time during the lockdown periods are concerning and a reversal of some of these newfound habits will be important in order to promote sleep hygiene in communities and reap the benefits of sleep in improving mood, immunity, and overall health and well-being of individuals and communities.

Reports of people hoarding cigarettes and alcohol along with food and toilet paper during the early phases of the pandemic are suggestive of the fact that smoking cessation and quitting alcohol may not have been a priority during the lockdown period; our review confirms this. Some smokers wanting to quit may have found accessing smoking cessation clinics a challenge due to the suspension of non-essential health services, and this lack of access to addiction clinicals will have also affected those dependent on alcohol and other psychoactive substances. Getting substance cessation and control programs back on track at local, national, and international levels will require

a redoubling of efforts as countries start relaxing lockdown measures.

Most of the studies in our review have unequivocally pointed towards high stress levels among populations worldwide during COVID-19 lockdowns. Stress is causally associated with risky behaviors, such as smoking, physical inactivity, and heavy alcohol use, lending to additional concern since these are independent risk factors for chronic diseases. However, on the positive side, staying at home provides an opportunity for families to bond and engage in activities at their convenience, which can elicit relaxation and calming responses. Examples of such activities include prayers, meditation, and breathing exercises, all having positive health benefits²⁶⁵. Nevertheless, we did not find any studies where communities claimed to be using such positive coping measures to alleviate stress. This may indicate a lack of awareness in communities regarding the importance of healthy lifestyle measures for stress management, as well as public health professionals/healthcare practitioners not emphasizing the importance of addressing lifestyle-related factors adequately.

More importantly, one cannot deny that of all the lifestyle factors altered during COVID-19 lockdowns, the crucial one has been the loss of connectedness and social networking. This is unfortunate since positive resonance and micro-moments of connectivity encountered in situations of togetherness are associated with health and longevity. Virtual connectivity, though inadequately studied, and small acts of kindness where possible during this period, remain the best measures of improving relationships and connectedness. The lockdown has no doubt led to an increase in family time, at least for nuclear families in most instances. This may have been an opportune time for families to bond and strengthen relationships. One concern of staying home, however, has been reports of increased domestic violence²⁶⁶. Future research is likely to provide more answers to the questions surrounding the nature of relationships and domestic activities, and their overall impact—positive or negative—on mental and physical health.

During this period, patients with pre-existing NCDs have suffered both from their inability to maintain a healthy lifestyle and neglect from national health authorities and hospitals with guidance issued to delay routine care and non-urgent procedures. Since the advisory by the US Medicare and Medicaid Centers in mid-March 2020 to delay non-urgent procedures,

adult patient visits for primary care and gastroenterology services declined by 49% and 61%, respectively²⁶⁷. This could, inevitably, compromise patients receiving timely care. Tapper and Asrani²⁶⁸ discuss care in the context of managing patients with liver cirrhosis (a common complication of obesity and diabetes) during COVID-19 and suggest three challenging phases in treating patients with chronic disease: 1) the current 'intense period' with a delay in routine care, 2) a 'return to the norm' when physical distancing ends and health systems respond to a backlog of cases, and 3) a 'protracted period' of poor outcomes due to unabated disease progression. The world is headed towards a catch-up period concerning NCDs due to altered lifestyles and concomitant treatment backlog.

The American College of Lifestyle Medicine proposes healthy lifestyle measures to reduce chronic disease risk and improve immunity during this period¹ (Table 1). Though the measures may appear relatively easy and simple enough to implement, many people may not adhere to these recommendations for a variety of reasons, including poverty, lack of education, unaffordability of technological resources, cramped living spaces, and poor city planning. Governments, health care practitioners, and communities should do everything possible to break those barriers and ensure access to healthy lifestyle measures for all.

Strengths and Limitations

This narrative review is a comprehensive analysis of the existing literature on the impact of COVID-19-related lockdown on the lifestyles of people globally. As the review is narrative, we included all the relevant and available published literature on the subject to ensure comprehensiveness. We have not done a quality assessment of each of the publications and instead used data as reported in the articles. Most of the studies included in our review are observational, which is an inherent limitation of the review study design. Despite this general limitation—as is the case with all narrative reviews—we do not consider this a major impediment to our research pursuit, as our analysis relies largely on trends and qualitative aspects of data. We only searched two databases for the study and with the huge volume of studies in this broad subject, it is possible we might have inadvertently missed a very small number of studies in our synthesis. The point of concept saturation was based on judgement of the authors though acceptable in an interpretivist paradigm, this can be seen as a limitation in a positivist paradigm. We also acknowledge that home quarantine, institutional quarantine, community quarantine, and isolation can

Table 1. Healthy lifestyle measures to reduce chronic disease risk and improve immunity¹.

- Stress management by practicing techniques like meditation and yoga.
- Healthy eating focused on a plant-based diet and whole grains.
- Remaining physically active.
- Quitting smoking and harmful substances.
- Optimizing good sleep hygiene.
- Maintaining social connections virtually, like video or phone calls with friends and families.

each have different levels of impact on lifestyles, but did not find an adequate number of studies in each category to analyze them separately.

Conclusions

COVID-19 has disrupted our lifestyle balance. Based on its rapid assessment of service delivery for NCDs in 163 countries, the World Health Organization has identified that the COVID-19 pandemic could throw the global health progress on NCDs off track²⁶⁹. This requires that we act as one world and make every effort to promote healthy lifestyles in communities worldwide. COVID-19 will likely redefine conventional public health by placing additional emphasis on healthy lifestyles, disease prevention, and self-care. Given the strong evidence in favor of lifestyle medicine, the incorporation of lifestyle medicine in day-to-day medical practice and public health approaches is likely to receive worldwide attention. Serious consideration should be given to augmenting professional health curricula by including topics such as evidence-based public health practices, lifestyle medicine, and building health systems that can address the holistic needs of local populations before, during, and after crises. Also, integrating basic health, infectious disease, and lifestyle education in school and undergraduate college education would be a step in the right direction. It would be up to the governments, communities, and healthcare delivery systems to learn and benefit from the lifestyle medicine lessons learnt—during and consequent to the COVID-19 pandemic—with the ultimate objective of promoting healthy lifestyles in communities.

Data availability

Underlying data

All data underlying the results are available as part of the article and no additional source data are required.

Extended data

Harvard Dataverse: COVID-19 and lifestyle - a narrative review - supplementary material. <https://doi.org/10.7910/DVN/ZIA8LI>⁴

This project contains the following extended data:

- Supplementary Materials.docx (Supplementary material 1: SANRA—a scale for the quality assessment of narrative review articles; Supplementary material 2: Search results and Supplementary Material 3: Included Studies (2021-04-24))

Data are available under the terms of the [Creative Commons Zero “No rights reserved” data waiver](#) (CC0 1.0 Public domain dedication).

Author contributions

Sathyanarayanan Doraiswamy (SD), Sohaila Cheema (SC), Ahmad Al Mulla (AM), and Ravinder Mamtani (RM) collectively contributed to the conception of the study. SD carried out the literature search, screening, and data extraction. Analysis and manuscript drafting were carried out by SD with support from SC, AM and RM. All authors read, edited, and approved the final manuscript.

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References

1. Leanne M: **Lifestyle Medicine: More Relevant Than Ever in the Face of COVID-19**. 2020. [Reference Source](#)
2. Green BN, Johnson CD, Adams A: **Writing narrative literature reviews for peer-reviewed journals: secrets of the trade**. *J Chiropr Med*. 2006; 5(3): 101–117. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
3. Baethge C, Goldbeck-Wood S, Mertens S: **SANRA-a scale for the quality assessment of narrative review articles**. *Res Integr Peer Rev*. 2019; 4: 5. [PubMed Abstract](#) | [Publisher Full Text](#)
4. Doraiswamy S: **COVID-19 and lifestyle - a narrative review - supplementary material**. Harvard Dataverse, V1. 2021. <http://www.doi.org/10.7910/DVN/ZIA8LI>
5. Hupe M: **EndNote X9**. *Journal of Electronic Resources in Medical Libraries*. 2019; 16(3-4): 117–119. [Publisher Full Text](#)
6. Dixon-Woods M: **Critical interpretive synthesis: what it is and why it is needed**. In: *14th Cochrane Colloquium*. Dublin, UK Cochrane.org. 2006. [Reference Source](#)
7. Atkins S, Lewin S, Smith H, et al.: **Conducting a meta-ethnography of qualitative literature: Lessons learnt**. *BMC Med Res Methodol*. 2008; 8: 21. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
8. Pacheco-Vega R: **How to do a literature review: Citation tracing, concept saturation and results mind-mapping**. 2016. [Reference Source](#)
9. Di Santo SG, Franchini F, Filippini B, et al.: **The Effects of COVID-19 and Quarantine Measures on the Lifestyles and Mental Health of People Over 60 at Increased Risk of Dementia**. *Front Psychiatry*. 2020; 11: 578628. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
10. Cheikh Ismail L, Osaili TM, Mohamad MN, et al.: **Assessment of eating habits and lifestyle during the coronavirus 2019 pandemic in the Middle East and North Africa region: a cross-sectional study**. *Br J Nutr*. 2020: 1–10. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
11. Huber BC, Steffen J, Schlichtiger J, et al.: **Alteration of physical activity during COVID-19 pandemic lockdown in young adults**. *J Transl Med*. 2020; 18(1): 410. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
12. Perez-Rodrigo C, Gianzo Citores M, Hervas Barbara G, et al.: **Patterns of Change in Dietary Habits and Physical Activity during Lockdown in Spain Due to the COVID-19 Pandemic**. *Nutrients*. 2021; 13(2): 300. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
13. Górnicka M, Drywień ME, Zielinska MA, et al.: **Dietary and Lifestyle Changes During COVID-19 and the Subsequent Lockdowns among Polish Adults: A Cross-Sectional Online Survey PLifeCOVID-19 Study**. *Nutrients*. 2020; 12(8): 2324. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
14. Sidor A, Rzymyski P: **Dietary Choices and Habits during COVID-19 Lockdown**.

- Experience from Poland.** *Nutrients.* 2020; **12**(6): 1657.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
15. Scarmozzino F, Visioli F: **Covid-19 and the Subsequent Lockdown Modified Dietary Habits of Almost Half the Population in an Italian Sample.** *Foods.* 2020; **9**(5): 675.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 16. Sinisterra Loaiza LI, Vázquez Belda B, Miranda López JM, *et al.*: **[Food habits in the Galician population during confinement by COVID-19].** *Nutr Hosp.* 2020; **37**(6): 1190–1196.
[PubMed Abstract](#) | [Publisher Full Text](#)
 17. Ansah EW, Sarfo JO, Apaak D: **Physical activity and dietary behaviors: a phenomenological analysis of experiences of Ghanaians during the COVID-19 lockdown.** *Pan Afr Med J.* 2020; **37**(2): 199.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 18. Robinson E, Boyland E, Chisholm A, *et al.*: **Obesity, eating behavior and physical activity during COVID-19 lockdown: A study of UK adults.** *Appetite.* 2021; **156**: 104853.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 19. Cicero AFG, Fogacci F, Giovannini M, *et al.*: **COVID-19-Related Quarantine Effect on Dietary Habits in a Northern Italian Rural Population: Data from the Brisighella Heart Study.** *Nutrients.* 2021; **13**(2): 309.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 20. Pietrobello A, Pecoraro L, Ferruzzi A, *et al.*: **Effects of COVID-19 Lockdown on Lifestyle Behaviors in Children with Obesity Living in Verona, Italy: A Longitudinal Study.** *Obesity (Silver Spring).* 2020; **28**(8): 1382–1385.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 21. Marty L, de Lauzon-Guillain B, Labesse M, *et al.*: **Food choice motives and the nutritional quality of diet during the COVID-19 lockdown in France.** *Appetite.* 2021; **157**: 105005.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 22. Al-Musharaf S: **Prevalence and Predictors of Emotional Eating among Healthy Young Saudi Women during the COVID-19 Pandemic.** *Nutrients.* 2020; **12**(10): 2923.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 23. López-Moreno M, López MTI, Miguel M, *et al.*: **Physical and Psychological Effects Related to Food Habits and Lifestyle Changes Derived from Covid-19 Home Confinement in the Spanish Population.** *Nutrients.* 2020; **12**(11): 3445.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 24. Bin Zarah A, Enriquez-Marulanda J, Andrade JM: **Relationship between Dietary Habits, Food Attitudes and Food Security Status among Adults Living within the United States Three Months Post-Mandated Quarantine: A Cross-Sectional Study.** *Nutrients.* 2020; **12**(11): 3468.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 25. Pellegrini M, Ponzio V, Rosato R, *et al.*: **Changes in Weight and Nutritional Habits in Adults with Obesity during the “Lockdown” Period Caused by the COVID-19 Virus Emergency.** *Nutrients.* 2020; **12**(7): 2016.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 26. Philippe K, Chabanet C, Issanchou S, *et al.*: **Child eating behaviors, parental feeding practices and food shopping motivations during the COVID-19 lockdown in France: (How) did they change?** *Appetite.* 2021; **161**: 105132.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 27. Kriaucionienė V, Bagdonavičienė L, Rodríguez-Pérez C, *et al.*: **Associations between Changes in Health Behaviours and Body Weight during the COVID-19 Quarantine in Lithuania: The Lithuanian COVIDiet Study.** *Nutrients.* 2020; **12**(10): 3119.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 28. Giacalone D, Frøst MB, Rodríguez-Pérez C: **Reported Changes in Dietary Habits During the COVID-19 Lockdown in the Danish Population: The Danish COVIDiet Study.** *Front Nutr.* 2020; **7**: 592112.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 29. Yang S, Guo B, Ao L, *et al.*: **Obesity and activity patterns before and during COVID-19 lockdown among youths in China.** *Clin Obes.* 2020; **10**(6): e12416.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 30. Shammi M, Bodrud-Doza M, Towfiqul Islam ARM, *et al.*: **COVID-19 pandemic, socioeconomic crisis and human stress in resource-limited settings: A case from Bangladesh.** *Heliyon.* 2020; **6**(5): e04063.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 31. Pakravan-Charvadeh MR, Savari M, Khan HA, *et al.*: **Determinants of household vulnerability to food insecurity during COVID-19 lockdown in a mid-term period in Iran.** *Public Health Nutr.* 2021; **1**–10.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 32. Rossinot H, Fantin R, Venne J: **Behavioral Changes During COVID-19 Confinement in France: A Web-Based Study.** *Int J Environ Res Public Health.* 2020; **17**(22): 8444.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 33. Husain W, Ashkanani F: **Does COVID-19 change dietary habits and lifestyle behaviours in Kuwait: a community-based cross-sectional study.** *Environ Health Prev Med.* 2020; **25**(1): 61.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 34. Zhao A, Li Z, Ke Y, *et al.*: **Dietary Diversity among Chinese Residents during the COVID-19 Outbreak and Its Associated Factors.** *Nutrients.* 2020; **12**(6): 1699.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 35. Zhang J, Zhao A, Ke Y, *et al.*: **Dietary Behaviors in the Post-Lockdown Period and Its Effects on Dietary Diversity: The Second Stage of a Nutrition Survey in a Longitudinal Chinese Study in the COVID-19 Era.** *Nutrients.* 2020; **12**(11): 3269.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 36. Rodríguez-Pérez C, Molina-Montes E, Verardo V, *et al.*: **Changes in Dietary Behaviours during the COVID-19 Outbreak Confinement in the Spanish COVIDiet Study.** *Nutrients.* 2020; **12**(6): 1730.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 37. Ruiz-Roso MB, de Carvalho Padilha P, Mantilla-Escalante DC, *et al.*: **Covid-19 Confinement and Changes of Adolescent's Dietary Trends in Italy, Spain, Chile, Colombia and Brazil.** *Nutrients.* 2020; **12**(6): 1807.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 38. Nicodemo M, Spreghini MR, Manco M, *et al.*: **Childhood Obesity and COVID-19 Lockdown: Remarks on Eating Habits of Patients Enrolled in a Food-Education Program.** *Nutrients.* 2021; **13**(2): 383.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 39. Cooper M, Reilly EE, Siegel JA, *et al.*: **Eating disorders during the COVID-19 pandemic and quarantine: an overview of risks and recommendations for treatment and early intervention.** *Eat Disord.* 2020; **1**–23.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 40. Marchitelli S, Mazza C, Lenzi A, *et al.*: **Weight Gain in a Sample of Patients Affected by Overweight/Obesity with and without a Psychiatric Diagnosis during the Covid-19 Lockdown.** *Nutrients.* 2020; **12**(11): 3525.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 41. Robertson M, Duffy F, Newman E, *et al.*: **Exploring changes in body image, eating and exercise during the COVID-19 lockdown: A UK survey.** *Appetite.* 2021; **159**: 105062.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 42. Castellini G, Cassioli E, Rossi E, *et al.*: **The impact of COVID-19 epidemic on eating disorders: A longitudinal observation of pre versus post psychopathological features in a sample of patients with eating disorders and a group of healthy controls.** *Int J Eat Disord.* 2020; **53**(11): 1855–1862.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 43. Baenas I, Caravaca-Sanz E, Granero R, *et al.*: **COVID-19 and eating disorders during confinement: Analysis of factors associated with resilience and aggravation of symptoms.** *Eur Eat Disord Rev.* 2020; **28**(6): 855–863.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 44. Machado PPP, Pinto-Bastos A, Ramos R, *et al.*: **Impact of COVID-19 lockdown measures on a cohort of eating disorders patients.** *J Eat Disord.* 2020; **8**(1): 57.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 45. He M, Xian Y, Lv X, *et al.*: **Changes in Body Weight, Physical Activity, and Lifestyle During the Semi-lockdown Period After the Outbreak of COVID-19 in China: An Online Survey.** *Disaster Med Public Health Prep.* 2020; **1**–6.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 46. Canello R, Soranna D, Zambra G, *et al.*: **Determinants of the Lifestyle Changes during COVID-19 Pandemic in the Residents of Northern Italy.** *Int J Environ Res Public Health.* 2020; **17**(17): 6287.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 47. Ammar A, Brach M, Trabelsi K, *et al.*: **Effects of COVID-19 Home Confinement on Eating Behaviour and Physical Activity: Results of the ECLB-COVID19 International Online Survey.** *Nutrients.* 2020; **12**(6): 1583.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 48. Stanton R, To QG, Khalesi S, *et al.*: **Depression, Anxiety and Stress during COVID-19: Associations with Changes in Physical Activity, Sleep, Tobacco and Alcohol Use in Australian Adults.** *Int J Environ Res Public Health.* 2020; **17**(11): 4065.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 49. McCarthy H, Potts HWW, Fisher A: **Physical Activity Behavior Before, During, and After COVID-19 Restrictions: Longitudinal Smartphone-Tracking Study of Adults in the United Kingdom.** *J Med Internet Res.* 2021; **23**(2): e23701.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 50. Meyer J, McDowell C, Lansing J, *et al.*: **Changes in Physical Activity and Sedentary Behavior in Response to COVID-19 and Their Associations with Mental Health in 3052 US Adults.** *Int J Environ Res Public Health.* 2020; **17**(18): 6469.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 51. Yang Y, Koenigstorfer J: **Determinants of physical activity maintenance during the Covid-19 pandemic: a focus on fitness apps.** *Transl Behav Med.* 2020; **10**(4): 835–842.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 52. To QG, Duncan MJ, Van Itallie A, *et al.*: **Impact of COVID-19 on Physical Activity Among 10,000 Steps Members and Engagement With the Program in Australia: Prospective Study.** *J Med Internet Res.* 2021; **23**(1): e23946.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 53. Bourdas DI, Zacharakis ED: **Evolution of changes in physical activity over lockdown time: Physical activity datasets of four independent adult**

- sample groups corresponding to each of the last four of the six COVID-19 lockdown weeks in Greece. *Data Brief*. 2020; **32**: 106301. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
54. Ong JL, Lau T, Massar SAA, et al.: COVID-19-related mobility reduction: heterogenous effects on sleep and physical activity rhythms. *Sleep*. 2021; **44**(2): zsa1179. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 55. Zhang SX, Wang Y, Rauch A, et al.: Unprecedented disruption of lives and work: Health, distress and life satisfaction of working adults in China one month into the COVID-19 outbreak. *Psychiatry Res*. 2020; **288**: 112958. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 56. Alonso-Martínez AM, Ramírez-Vélez R, García-Alonso Y, et al.: Physical Activity, Sedentary Behavior, Sleep and Self-Regulation in Spanish Preschoolers during the COVID-19 Lockdown. *Int J Environ Res Public Health*. 2021; **18**(2): 693. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 57. Mon-López D, Bernardez-Vilaboa R, Fernandez-Balbuena AA, et al.: The Influence of COVID-19 Isolation on Physical Activity Habits and Its Relationship with Convergence Insufficiency. *Int J Environ Res Public Health*. 2020; **17**(20): 7406. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 58. Lopez-Gil JF, Tremblay MS, Brazo-Sayavera J: Changes in Healthy Behaviors and Meeting 24-h Movement Guidelines in Spanish and Brazilian Preschoolers, Children and Adolescents during the COVID-19 Lockdown. *Children (Basel)*. 2021; **8**(2): 83. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 59. López-Bueno R, López-Sánchez GF, Casajús JA, et al.: Health-Related Behaviors Among School-Aged Children and Adolescents During the Spanish Covid-19 Confinement. *Front Pediatr*. 2020; **8**: 573. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 60. Moore SA, Faulkner G, Rhodes RE, et al.: Impact of the COVID-19 virus outbreak on movement and play behaviours of Canadian children and youth: a national survey. *Int J Behav Nutr Phys Act*. 2020; **17**(1): 85. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 61. Guerrero MD, Vanderloo LM, Rhodes RE, et al.: Canadian children's and youth's adherence to the 24-h movement guidelines during the COVID-19 pandemic: A decision tree analysis. *J Sport Health Sci*. 2020; **9**(4): 313–321. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 62. Schmidt SCE, Anedda B, Burchartz A, et al.: Physical activity and screen time of children and adolescents before and during the COVID-19 lockdown in Germany: a natural experiment. *Sci Rep*. 2020; **10**(1): 21780. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 63. Rogers NT, Waterlow NR, Brindle H, et al.: Behavioral Change Towards Reduced Intensity Physical Activity Is Disproportionately Prevalent Among Adults With Serious Health Issues or Self-Perception of High Risk During the UK COVID-19 Lockdown. *Front Public Health*. 2020; **8**: 575091. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 64. Tornaghi M, Lovecchio N, Vandoni M, et al.: Physical activity levels across COVID-19 outbreak in youngsters of Northwestern Lombardy. *J Sports Med Phys Fitness*. 2020. [PubMed Abstract](#) | [Publisher Full Text](#)
 65. Chopra S, Ranjan P, Singh V, et al.: Impact of COVID-19 on lifestyle-related behaviours - a cross-sectional audit of responses from nine hundred and ninety-five participants from India. *Diabetes Metab Syndr*. 2020; **14**(6): 2021–2030. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 66. Maertl T, De Bock F, Huebl L, et al.: Physical Activity during COVID-19 in German Adults: Analyses in the COVID-19 Snapshot Monitoring Study (COSMO). *Int J Environ Res Public Health*. 2021; **18**(2): 507. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 67. Salman D, Beaney T, Robb CE, et al.: Impact of social restrictions during the COVID-19 pandemic on the physical activity levels of older adults: an analysis of the CHARIOT COVID-19 Rapid Response Study. *medRxiv*. 2021; 2021.2001.2026.21250520. [Publisher Full Text](#)
 68. Shinohara T, Saida K, Tanaka S, et al.: Association between frailty and changes in lifestyle and physical or psychological conditions among older adults affected by the coronavirus disease 2019 countermeasures in Japan. *Geriatr Gerontol Int*. 2021; **21**(1): 39–42. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 69. Constandt B, Thibaut E, De Bosscher V, et al.: Exercising in Times of Lockdown: An Analysis of the Impact of COVID-19 on Levels and Patterns of Exercise among Adults in Belgium. *Int J Environ Res Public Health*. 2020; **17**(11): 4144. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 70. Martinez-de-Quel O, Suarez-Iglesias D, Lopez-Flores M, et al.: Physical activity, dietary habits and sleep quality before and during COVID-19 lockdown: A longitudinal study. *Appetite*. 2021; **158**: 105019. [PubMed Abstract](#) | [Publisher Full Text](#)
 71. Richardson DL, Duncan MJ, Clarke ND, et al.: The influence of COVID-19 measures in the United Kingdom on physical activity levels, perceived physical function and mood in older adults: A survey-based observational study. *J Sports Sci*. 2021; **39**(8): 887–899. [PubMed Abstract](#) | [Publisher Full Text](#)
 72. Park S, Kim B, Lee J: Social Distancing and Outdoor Physical Activity During the COVID-19 Outbreak in South Korea: Implications for Physical Distancing Strategies. *Asia Pac J Public Health*. 2020; **32**(6–7): 360–362. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 73. Aung MN, Yuasa M, Koyanagi Y, et al.: Sustainable health promotion for the seniors during COVID-19 outbreak: a lesson from Tokyo. *J Infect Dev Ctries*. 2020; **14**(4): 328–331. [PubMed Abstract](#) | [Publisher Full Text](#)
 74. Janssen X, Fleming L, Kirk A, et al.: Changes in Physical Activity, Sitting and Sleep across the COVID-19 National Lockdown Period in Scotland. *Int J Environ Res Public Health*. 2020; **17**(24): 9362. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 75. Gilic B, Ostojic L, Corluca M, et al.: Contextualizing Parental/Familial Influence on Physical Activity in Adolescents before and during COVID-19 Pandemic: A Prospective Analysis. *Children (Basel)*. 2020; **7**(9): 125. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 76. Romero-Blanco C, Rodríguez-Almagro J, Onieva-Zafra MD, et al.: Physical Activity and Sedentary Lifestyle in University Students: Changes during Confinement Due to the COVID-19 Pandemic. *Int J Environ Res Public Health*. 2020; **17**(18): 6567. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 77. Spence JC, Rhodes RE, McCurdy A, et al.: Determinants of physical activity among adults in the United Kingdom during the COVID-19 pandemic: The DUK-COVID study. *Br J Health Psychol*. 2020; **26**(2): 588–605. [PubMed Abstract](#) | [Publisher Full Text](#)
 78. Werneck AO, Silva DR, Malta DC, et al.: Physical inactivity and elevated TV-viewing reported changes during the COVID-19 pandemic are associated with mental health: A survey with 43,995 Brazilian adults. *J Psychosom Res*. 2021; **140**: 110292. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 79. Schuch FB, Bulzing RA, Meyer J, et al.: Associations of moderate to vigorous physical activity and sedentary behavior with depressive and anxiety symptoms in self-isolating people during the COVID-19 pandemic: A cross-sectional survey in Brazil. *Psychiatry Res*. 2020; **292**: 113339. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 80. Amatori S, Donati Zeppa S, Preti A, et al.: Dietary Habits and Psychological States during COVID-19 Home Isolation in Italian College Students: The Role of Physical Exercise. *Nutrients*. 2020; **12**: 3660. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 81. Shah SMA, Mohammad D, Qureshi MFH, et al.: Prevalence, Psychological Responses and Associated Correlates of Depression, Anxiety and Stress in a Global Population, During the Coronavirus Disease (COVID-19) Pandemic. *Community Ment Health J*. 2021; **57**(1): 101–110. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 82. Sfendla A, Hadrya F: Factors Associated with Psychological Distress and Physical Activity During the COVID-19 Pandemic. *Health Secur*. 2020; **18**(6): 444–453. [PubMed Abstract](#) | [Publisher Full Text](#)
 83. Dobler CL, Krüger B, Strahler J, et al.: Physical Activity and Mental Health of Patients with Pulmonary Hypertension during the COVID-19 Pandemic. *J Clin Med*. 2020; **9**(12): 4023. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 84. Ernsten L, Havnen A: Mental health and sleep disturbances in physically active adults during the COVID-19 lockdown in Norway: does change in physical activity level matter? *Sleep Med*. 2021; **77**: 309–312. [PubMed Abstract](#) | [Publisher Full Text](#)
 85. Carriedo A, Cecchini JA, Fernández-Río J, et al.: Resilience and physical activity in people under home isolation due to COVID-19: A preliminary evaluation. *Ment Health Phys Act*. 2020; **19**: 100361. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 86. Costabile T, Carotenuto A, Lavorgna L, et al.: COVID-19 pandemic and mental distress in multiple sclerosis: implications for clinical management. *Eur J Neurol*. 2020; **10.1111/ene.14580**. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 87. Vancini RL, Camargo-Neto L, de Lira CAB, et al.: Physical Activity and Sociodemographic Profile of Brazilian People during COVID-19 Outbreak: An Online and Cross-Sectional Survey. *Int J Environ Res Public Health*. 2020; **17**(21): 7964. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 88. Szabó C, Pukánszky J, Kemény L: Psychological Effects of the COVID-19 Pandemic on Hungarian Adults. *Int J Environ Res Public Health*. 2020; **17**(24): 9565. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 89. Lee PH, Marek J, Nálevka P: Sleep pattern in the US and 16 European countries during the COVID-19 outbreak using crowdsourced smartphone data. *Eur J Public Health*. 2021; **31**(1): 23–30. [PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 90. Cellini N, Canale N, Mioni G, et al.: Changes in sleep pattern, sense of time

- and digital media use during COVID-19 lockdown in Italy. *J Sleep Res.* 2020; 29(4): e13074.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
91. Yüksel D, McKee GB, Perrin PB, *et al.*: **Sleeping when the world locks down: Correlates of sleep health during the COVID-19 pandemic across 59 countries.** *Sleep Health.* 2021; 7(2): 134–142.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 92. Beck F, Léger D, Fressard L, *et al.*: **Covid-19 health crisis and lockdown associated with high level of sleep complaints and hypnotic uptake at the population level.** *J Sleep Res.* 2021; 30(1): e13119.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 93. Marelli S, Castelnuovo A, Somma A, *et al.*: **Impact of COVID-19 lockdown on sleep quality in university students and administration staff.** *J Neurol.* 2021; 268(1): 8–15.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 94. Lahiri A, Jha SS, Acharya R, *et al.*: **Correlates of insomnia among the adults during COVID19 pandemic: evidence from an online survey in India.** *Sleep Med.* 2021; 77: 66–73.
[PubMed Abstract](#) | [Publisher Full Text](#)
 95. Beck F, Leger D, Cortaredona S, *et al.*: **Would we recover better sleep at the end of Covid-19? A relative improvement observed at the population level with the end of the lockdown in France.** *Sleep Med.* 2021; 78: 115–119.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 96. Al-Ajlouni YA, Park SH, Alawa J, *et al.*: **Anxiety and depressive symptoms are associated with poor sleep health during a period of COVID-19-induced nationwide lockdown: a cross-sectional analysis of adults in Jordan.** *BMJ Open.* 2020; 10(12): e041995.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 97. Bartoszek A, Walkowiak D, Bartoszek A, *et al.*: **Mental Well-Being (Depression, Loneliness, Insomnia, Daily Life Fatigue) during COVID-19 Related Home-Confinement-A Study from Poland.** *Int J Environ Res Public Health.* 2020; 17(20): 7417.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 98. Pérez-Carbonell L, Meurling JJ, Wassermann D, *et al.*: **Impact of the novel coronavirus (COVID-19) pandemic on sleep.** *J Thorac Dis.* 2020; 12(Suppl 2): S163–S175.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 99. Sinha M, Pande B, Sinha R: **Impact of COVID-19 lockdown on sleep-wake schedule and associated lifestyle related behavior: A national survey.** *J Public Health Res.* 2020; 9(3): 1826.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 100. Majumdar P, Biswas A, Sahu S: **COVID-19 pandemic and lockdown: cause of sleep disruption, depression, somatic pain, and increased screen exposure of office workers and students of India.** *Chronobiol Int.* 2020; 37(8): 1191–1200.
[PubMed Abstract](#) | [Publisher Full Text](#)
 101. Pinto J, van Zeller M, Amorim P, *et al.*: **Sleep quality in times of Covid-19 pandemic.** *Sleep Med.* 2020; 74: 81–85.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 102. Cajochen C, Münch M, Kobiakka S, *et al.*: **High sensitivity of human melatonin, alertness, thermoregulation, and heart rate to short wavelength light.** *J Clin Endocrinol Metab.* 2005; 90(3): 1311–1316.
[PubMed Abstract](#) | [Publisher Full Text](#)
 103. Altena E, Baglioni C, Espie CA, *et al.*: **Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy.** *J Sleep Res.* 2020; 29(4): e13052.
[PubMed Abstract](#) | [Publisher Full Text](#)
 104. Blume C, Schmidt MH, Cajochen C: **Effects of the COVID-19 lockdown on human sleep and rest-activity rhythms.** *Curr Biol.* 2020; 30(14): R795–R797.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 105. Wright KP Jr, Linton SK, Withrow D, *et al.*: **Sleep in university students prior to and during COVID-19 Stay-at-Home orders.** *Curr Biol.* 2020; 30(14): R797–R798.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 106. Kocavska D, Blanken TF, Van Someren EJW, *et al.*: **Sleep quality during the COVID-19 pandemic: not one size fits all.** *Sleep Med.* 2020; 76: 86–88.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 107. Gao C, Scullin MK: **Sleep health early in the coronavirus disease 2019 (COVID-19) outbreak in the United States: integrating longitudinal, cross-sectional, and retrospective recall data.** *Sleep Med.* 2020; 73: 1–10.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 108. Gruber R, Saha S, Somerville G, *et al.*: **The impact of COVID-19 related school shutdown on sleep in adolescents: a natural experiment.** *Sleep Med.* 2020; 76: 33–35.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 109. Roitblat Y, Burger J, Leit A, *et al.*: **Stay-at-home circumstances do not produce sleep disorders: An international survey during the COVID-19 pandemic.** *J Psychosom Res.* 2020; 139: 110282.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 110. Joyce AA, Styklunas GM, Rigotti NA, *et al.*: **Quit Experiences among Primary Care Patients Enrolled in a Smoking Cessation Pilot RCT Early in the COVID-19 Pandemic.** *Int J Environ Res Public Health.* 2021; 18(3): 1011.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 111. Klemperer EM, West JC, Peasley-Miklus C, *et al.*: **Change in Tobacco and Electronic Cigarette Use and Motivation to Quit in Response to COVID-19.** *Nicotine Tob Res.* 2020; 22(9): 1662–1663.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 112. Bommele J, Hopman P, Walters BH, *et al.*: **The double-edged relationship between COVID-19 stress and smoking: Implications for smoking cessation.** *Tob Induc Dis.* 2020; 18: 63.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 113. Yach D: **Tobacco Use Patterns in Five Countries During the COVID-19 Lockdown.** *Nicotine Tob Res.* 2020; 22(9): 1671–1672.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 114. Ferrante G, Camussi E, Piccinelli C, *et al.*: **Did social isolation during the SARS-CoV-2 epidemic have an impact on the lifestyles of citizens? Epidemiol Prev. 2020; 44(5–6 Suppl 2): 353–362.
[PubMed Abstract](#) | [Publisher Full Text](#)**
 115. Martínez-Lezaun I, Santamaría-Vázquez M, Del Líbano M: **Influence of Confinement by COVID-19 on the Quality of Sleep and the Interests of University Students.** *Nat Sci Sleep.* 2020; 12: 1075–1081.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 116. Chagué F, Boulin M, Eicher J, *et al.*: **Alarming increased rate of smoking and associated lifestyle behaviours in patients with chronic cardiac diseases during COVID-19 pandemic related lockdown.** *Archives of Cardiovascular Diseases Supplements.* 2021; 13(1): 127.
[Publisher Full Text](#)
 117. Caponnetto P, Inguscio L, Saitta C, *et al.*: **Smoking behavior and psychological dynamics during COVID-19 social distancing and stay-at-home policies: A survey.** *Health Psychol Res.* 2020; 8(1): 9124.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 118. Chodkiewicz J, Talarowska M, Miniszewska J, *et al.*: **Alcohol Consumption Reported during the COVID-19 Pandemic: The Initial Stage.** *Int J Environ Res Public Health.* 2020; 17(13): 4677.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 119. Boschuetz N, Cheng S, Mei L, *et al.*: **Changes in Alcohol Use Patterns in the United States During COVID-19 Pandemic.** *WMJ.* 2020; 119(3): 171–176.
[PubMed Abstract](#)
 120. Garnett C, Jackson S, Oldham M, *et al.*: **Factors associated with drinking behaviour during COVID-19 social distancing and lockdown among adults in the UK.** *Drug Alcohol Depend.* 2021; 219: 108461.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 121. Balhara YPS, Singh S, Narang P: **Effect of lockdown following COVID-19 pandemic on alcohol use and help-seeking behavior: Observations and insights from a sample of alcohol use disorder patients under treatment from a tertiary care center.** *Psychiatry Clin Neurosci.* 2020; 74(8): 440–441.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 122. Hobin E, Smith B: **Is another public health crisis brewing beneath the COVID-19 pandemic? Can J Public Health. 2020; 111(3): 392–396.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)**
 123. Jacob L, Smith L, Armstrong NC, *et al.*: **Alcohol use and mental health during COVID-19 lockdown: A cross-sectional study in a sample of UK adults.** *Drug Alcohol Depend.* 2020; 219: 108488.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 124. Sun Y, Li Y, Bao Y, *et al.*: **Brief Report: Increased Addictive Internet and Substance Use Behavior During the COVID-19 Pandemic in China.** *Am J Addict.* 2020; 29(4): 268–270.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 125. Szajnoga D, Klimek-Tulwin M, Piekut A: **COVID-19 lockdown leads to changes in alcohol consumption patterns. Results from the Polish national survey.** *J Addict Dis.* 2020; 39(2): 215–225.
[PubMed Abstract](#) | [Publisher Full Text](#)
 126. The Lancet Gastroenterology H: **Drinking alone: COVID-19, lockdown, and alcohol-related harm.** *Lancet Gastroenterol Hepatol.* 2020; 5(7): 625.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 127. Neill E, Meyer D, Toh WL, *et al.*: **Alcohol use in Australia during the early days of the COVID-19 pandemic: Initial results from the COLLATE project.** *Psychiatry Clin Neurosci.* 2020; 74(10): 542–549.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 128. Schmits E, Glowacz F: **Changes in Alcohol Use During the COVID-19 Pandemic: Impact of the Lockdown Conditions and Mental Health Factors.** *Int J Ment Health Addict.* 2021; 1–12.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 129. Killgore WDS, Cloonan SA, Taylor EC, *et al.*: **Alcohol dependence during COVID-19 lockdowns.** *Psychiatry Res.* 2020; 296: 113676.
[PubMed Abstract](#) | [Publisher Full Text](#)
 130. Kim JU, Majid A, Judge R, *et al.*: **Effect of COVID-19 lockdown on alcohol consumption in patients with pre-existing alcohol use disorder.** *Lancet Gastroenterol Hepatol.* 2020; 5(10): 886–887.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 131. White HR, Stevens AK, Hayes K, *et al.*: **Changes in Alcohol Consumption**

- Among College Students Due to COVID-19: Effects of Campus Closure and Residential Change.** *J Stud Alcohol Drugs.* 2020; **81**(6): 725–730.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
132. Bollen Z, Pabst A, Creupelandt C, et al.: **Prior drinking motives predict alcohol consumption during the COVID-19 lockdown: A cross-sectional online survey among Belgian college students.** *Addict Behav.* 2021; **115**: 106772.
[PubMed Abstract](#) | [Publisher Full Text](#)
133. Dietze PM, Peacock A: **Illicit drug use and harms in Australia in the context of COVID-19 and associated restrictions: Anticipated consequences and initial responses.** *Drug Alcohol Rev.* 2020; **39**(4): 297–300.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
134. Rolland B, Haesebaert F, Zante E, et al.: **Global changes and factors of increase in caloric/salty food, screen, and substance use during the early COVID-19 containment phase in France: a general population online survey.** *JMIR Public Health Surveill.* 2020; **6**(3): e19630.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
135. Cousijn J, Kuhns L, Larsen H, et al.: **For better or for worse? A pre-post exploration of the impact of the COVID-19 lockdown on cannabis users.** *Addiction.* 2021.
[PubMed Abstract](#) | [Publisher Full Text](#)
136. Rogers AH, Shepherd JM, Garey L, et al.: **Psychological factors associated with substance use initiation during the COVID-19 pandemic.** *Psychiatry Res.* 2020; **293**: 113407.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
137. Robinson E, Daly M: **Explaining the rise and fall of psychological distress during the COVID-19 crisis in the United States: Longitudinal evidence from the Understanding America Study.** *Br J Health Psychol.* 2020; **26**(2): 570–587.
[PubMed Abstract](#) | [Publisher Full Text](#)
138. Schwinger M, Trautner M, Kärchner H, et al.: **Psychological Impact of Corona Lockdown in Germany: Changes in Need Satisfaction, Well-Being, Anxiety, and Depression.** *Int J Environ Res Public Health.* 2020; **17**(23): 9083.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
139. Lima CKT, Carvalho PMM, Lima I, et al.: **The emotional impact of Coronavirus 2019-nCoV (new Coronavirus disease).** *Psychiatry Res.* 2020; **287**: 112915.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
140. Benke C, Autenrieth LK, Asselmann E, et al.: **Lockdown, quarantine measures, and social distancing: Associations with depression, anxiety and distress at the beginning of the COVID-19 pandemic among adults from Germany.** *Psychiatry Res.* 2020; **293**: 113462.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
141. Planchuelo-Gómez A, Odriozola-González P, Irujo MJ, et al.: **Longitudinal evaluation of the psychological impact of the COVID-19 crisis in Spain.** *J Affect Disord.* 2020; **277**: 842–849.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
142. Fiorenzato E, Zabberoni S, Costa A, et al.: **Cognitive and mental health changes and their vulnerability factors related to COVID-19 lockdown in Italy.** *PLoS One.* 2021; **16**(1): e0246204.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
143. Gloster AT, Lamnisos D, Lubenko J, et al.: **Impact of COVID-19 pandemic on mental health: An international study.** *PLoS One.* 2020; **15**(12): e0244809.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
144. Garre-Olmo J, Turró-Garriga O, Martí-Lluch R, et al.: **Changes in lifestyle resulting from confinement due to COVID-19 and depressive symptomatology: A cross-sectional a population-based study.** *Compr Psychiatry.* 2021; **104**: 152214.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
145. Twenge JM, Joiner TE: **Mental distress among U.S. adults during the COVID-19 pandemic.** *J Clin Psychol.* 2020; **76**(12): 2170–2182.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
146. Cao W, Fang Z, Hou G, et al.: **The psychological impact of the COVID-19 epidemic on college students in China.** *Psychiatry Res.* 2020; **287**: 112934.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
147. Borquilla A, Fernández-Lebrero A, Estragués-Gázquez I, et al.: **Effects of COVID-19 Pandemic Confinement in Patients With Cognitive Impairment.** *Front Neurol.* 2020; **11**: 589901.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
148. Cagnin A, Di Lorenzo R, Marra C, et al.: **Behavioral and Psychological Effects of Coronavirus Disease-19 Quarantine in Patients With Dementia.** *Front Psychiatry.* 2020; **11**: 578015.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
149. Gallagher S, Wetherell M: **Risk of depression in family caregivers: unintended consequence of COVID-19.** *BJPsych Open.* 2020; **6**(6): e119.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
150. Kandel S, Lamsal M, Yadav SA, et al.: **Lifestyle, behavior, perception and practices of Nepalese during lockdown due to COVID-19 pandemic.** *JNMA J Nepal Med Assoc.* 2020; **58**(229): 690–695.
[PubMed Abstract](#) | [Free Full Text](#)
151. Fawaz M, Samaha A: **COVID-19 quarantine: Post-traumatic stress symptomatology among Lebanese citizens.** *Int J Soc Psychiatry.* 2020; **66**(7): 666–674.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
152. Alshehri FS, Alatawi Y, Alghamdi BS, et al.: **Prevalence of post-traumatic stress disorder during the COVID-19 pandemic in Saudi Arabia.** *Saudi Pharm J.* 2020; **28**(12): 1666–1673.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
153. Duong KNC, Le Bao TN, Nguyen PTL, et al.: **Psychological Impacts of COVID-19 During the First Nationwide Lockdown in Vietnam: Web-Based, Cross-Sectional Survey Study.** *JMIR Form Res.* 2020; **4**(12): e24776.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
154. Tee ML, Tee CA, Anlacan JP, et al.: **Psychological impact of COVID-19 pandemic in the Philippines.** *J Affect Disord.* 2020; **277**: 379–391.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
155. Verma S, Mishra A: **Depression, anxiety, and stress and socio-demographic correlates among general Indian public during COVID-19.** *Int J Soc Psychiatry.* 2020; **66**(8): 756–762.
[PubMed Abstract](#) | [Publisher Full Text](#)
156. Pandey D, Bansal S, Goyal S, et al.: **Psychological impact of mass quarantine on population during pandemics-The COVID-19 Lock-Down (COLD) study.** *PLoS One.* 2020; **15**(10): e0240501.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
157. Hazarika M, Das S, Bhandari SS, et al.: **The psychological impact of the COVID-19 pandemic and associated risk factors during the initial stage among the general population in India.** *Open J Psychiatry Allied Sci.* 2021; **12**(1): 31–35.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
158. Paz C, Mascialino G, Adana-Díaz L, et al.: **Behavioral and sociodemographic predictors of anxiety and depression in patients under epidemiological surveillance for COVID-19 in Ecuador.** *PLoS One.* 2020; **15**(9): e0240008.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
159. Kamberi F, Jaho J, Mechili EA, et al.: **Effect of Covid-19 pandemic on mental health among Albanian people residing in the country and abroad - Implications for mental care.** *Arch Psychiatr Nurs.* 2020; **34**(6): 507–512.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
160. Hyland P, Shevlin M, McBride O, et al.: **Anxiety and depression in the Republic of Ireland during the COVID-19 pandemic.** *Acta Psychiatr Scand.* 2020; **142**(3): 249–256.
[PubMed Abstract](#) | [Publisher Full Text](#)
161. Szabó C, Pukánszky J, Kemény L: **Psychological Effects of the COVID-19 Pandemic on Hungarian Adults.** *Int J Environ Res Public Health.* 2020; **17**(24): 9565.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
162. Odriozola-González P, Planchuelo-Gómez Á, Irujo MJ, et al.: **Psychological symptoms of the outbreak of the COVID-19 confinement in Spain.** *J Health Psychol.* 2020; **135**: 105320967086.
[PubMed Abstract](#) | [Publisher Full Text](#)
163. Al Zabadi H, Alhroub T, Yaseen N, et al.: **Assessment of Depression Severity During Coronavirus Disease 2019 Pandemic Among the Palestinian Population: A Growing Concern and an Immediate Consideration.** *Front Psychiatry.* 2020; **11**: 570065.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
164. Pieh C, Budimir S, Delgadillo J, et al.: **Mental health during COVID-19 lockdown in the United Kingdom.** *Psychosom Med.* 2020.
[PubMed Abstract](#) | [Publisher Full Text](#)
165. Burhamah W, Alkhayyat A, Oroszlányová M, et al.: **The psychological burden of the COVID-19 pandemic and associated lockdown measures: Experience from 4000 participants.** *J Affect Disord.* 2020; **277**: 977–985.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
166. Passos L, Prazeres F, Teixeira A, et al.: **Impact on Mental Health Due to COVID-19 Pandemic: Cross-Sectional Study in Portugal and Brazil.** *Int J Environ Res Public Health.* 2020; **17**(18): 6794.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
167. Fiorillo A, Sampogna G, Giallonardo V, et al.: **Effects of the lockdown on the mental health of the general population during the COVID-19 pandemic in Italy: Results from the COMET collaborative network.** *Eur Psychiatry.* 2020; **63**(1): e87.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
168. Massad I, Al-Tajer R, Massad F, et al.: **The impact of the COVID-19 pandemic on mental health: early quarantine-related anxiety and its correlates among Jordanians.** *East Mediterr Health J.* 2020; **26**(10): 1165–1172.
[PubMed Abstract](#) | [Publisher Full Text](#)
169. Orgilés M, Morales A, Delvecchio E, et al.: **Immediate Psychological Effects of the COVID-19 Quarantine in Youth From Italy and Spain.** *Front Psychol.* 2020; **11**: 579038.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
170. Pigaiani Y, Zocante L, Zocca A, et al.: **Adolescent Lifestyle Behaviors, Coping Strategies and Subjective Wellbeing during the COVID-19 Pandemic: An Online Student Survey.** *Healthcare (Basel).* 2020; **8**(4): 472.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
171. Khan AH, Sultana MS, Hossain S, et al.: **The impact of COVID-19 pandemic on mental health & wellbeing among home-quarantined Bangladeshi students: A cross-sectional pilot study.** *J Affect Disord.* 2020; **277**: 121–128.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
172. Szczepańska A, Pietrzyka K: **The COVID-19 epidemic in Poland and its influence on the quality of life of university students (young adults) in the context of restricted access to public spaces.** *Z Gesundh Wiss.* 2021; 1–11.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)

173. Alfawaz HA, Wani K, Aljumah AA, *et al.*: **Psychological well-being during COVID-19 lockdown: Insights from a Saudi State University's Academic Community.** *J King Saud Univ Sci.* 2021; **33**(1): 101262.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
174. Szkody E, Stearns M, Stanhope L, *et al.*: **Stress-Buffering Role of Social Support during COVID-19.** *Fam Process.* 2020.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
175. Alkhamees AA, Aljohani MS, Alghesien MA, *et al.*: **Psychological Distress in Quarantine Designated Facility During COVID-19 Pandemic in Saudi Arabia.** *Risk Manag Healthc Policy.* 2020; **13**: 3103–3120.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
176. Malkawi SH, Almhdawi K, Jaber AF, *et al.*: **COVID-19 Quarantine-Related Mental Health Symptoms and their Correlates among Mothers: A Cross Sectional Study.** *Matern Child Health J.* 2020; **25**(5): 695–705.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
177. Holt-Lunstad J: **The Potential Public Health Relevance of Social Isolation and Loneliness: Prevalence, Epidemiology, and Risk Factors.** *Public Policy Aging Rep.* 2018; **27**(4): 127–130.
[Publisher Full Text](#)
178. Han TMW, Gong H: **Investigation and analysis of negative emotion among university students during home quarantine of COVID-19.** *Journal of Xi'an Jiaotong University (Medical Sciences).* 2021; **42**: 132–136.
[Reference Source](#)
179. Adibelli D, Sümen A: **The effect of the coronavirus (COVID-19) pandemic on health-related quality of life in children.** *Child Youth Serv Rev.* 2020; **119**: 105595.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
180. Herat M: **"I feel like death on legs": COVID-19 isolation and mental health.** *Soc Sci Humanit Open.* 2020; **2**: 100042.
[Publisher Full Text](#)
181. Kang E, Lee SY, Kim MS, *et al.*: **The Psychological Burden of COVID-19 Stigma: Evaluation of the Mental Health of Isolated Mild Condition COVID-19 Patients.** *J Korean Med Sci.* 2021; **36**(3): e33.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
182. Rossi R, Socci V, Talevi D, *et al.*: **COVID-19 Pandemic and Lockdown Measures Impact on Mental Health Among the General Population in Italy.** *Front Psychiatry.* 2020; **11**: 790.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
183. Lu H, Nie P, Qian L: **Do Quarantine Experiences and Attitudes Towards COVID-19 Affect the Distribution of Mental Health in China? A Quantile Regression Analysis.** *Appl Res Qual Life.* 2020; 1–18.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
184. Brown L, Mossabir R, Harrison N, *et al.*: **Life in lockdown: A telephone survey to investigate the impact of COVID-19 lockdown measures on the lives of older people (≥ 75 years).** *Age Ageing.* 2020; **50**(2): 341–346.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
185. Bigalke JA, Greenlund IM, Carter JR: **Sex differences in self-report anxiety and sleep quality during COVID-19 stay-at-home orders.** *Biol Sex Differ.* 2020; **11**(1): 56.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
186. Bonati M, Campi R, Zanetti M, *et al.*: **Psychological distress among Italians during the 2019 coronavirus disease (COVID-19) quarantine.** *BMC Psychiatry.* 2021; **21**(1): 20.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
187. Prati G: **Mental health and its psychosocial predictors during national quarantine in Italy against the coronavirus disease 2019 (COVID-19).** *Anxiety Stress Coping.* 2021; **34**(2): 1–12.
[PubMed Abstract](#) | [Publisher Full Text](#)
188. Atesyakar N, Ecevitoglu A, Duman EA: **Preliminary findings on the impact of COVID-19 pandemic on mood and daily routines of women from the BABIP birth cohort.** *Psychoneuroendocrinology.* 2020; **119**: 104965.
[Publisher Full Text](#)
189. Lebel C, MacKinnon A, Bagshawe M, *et al.*: **Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic.** *J Affect Disord.* 2020; **277**: 5–13.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
190. Hyland P, Shevlin M, McBride O, *et al.*: **Anxiety and depression in the Republic of Ireland during the COVID-19 pandemic.** *Acta Psychiatr Scand.* 2020; **142**(3): 249–256.
[PubMed Abstract](#) | [Publisher Full Text](#)
191. Gadermann AC, Thomson KC, Richardson CG, *et al.*: **Examining the impacts of the COVID-19 pandemic on family mental health in Canada: findings from a national cross-sectional study.** *BMJ Open.* 2021; **11**(1): e042871.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
192. Tang W, Hu T, Hu B, *et al.*: **Prevalence and correlates of PTSD and depressive symptoms one month after the outbreak of the COVID-19 epidemic in a sample of home-quarantined Chinese university students.** *J Affect Disord.* 2020; **274**: 1–7.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
193. Glowacz F, Schmits E: **Psychological distress during the COVID-19 lockdown: The young adults most at risk.** *Psychiatry Res.* 2020; **293**: 113486.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
194. Fu W, Yan S, Zong Q, *et al.*: **Mental health of college students during the COVID-19 epidemic in China.** *J Affect Disord.* 2021; **280**(Pt A): 7–10.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
195. Serralla FB, Zibetti MR, Evans C: **Psychological Distress of University Workers during COVID-19 Pandemic in Brazil.** *Int J Environ Res Public Health.* 2020; **17**(22): 8520.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
196. Goodwin R, Hou WK, Sun S, *et al.*: **Psychological and behavioural responses to COVID-19: a China-Britain comparison.** *J Epidemiol Community Health.* 2021; **75**(2): 189–192.
[PubMed Abstract](#)
197. Werneck AO, Silva DRD, Malta DC, *et al.*: **Lifestyle behaviors changes during the COVID-19 pandemic quarantine among 6,881 Brazilian adults with depression and 35,143 without depression.** *Cien Saude Colet.* 2020; **25**(suppl 2): 4151–4156.
[PubMed Abstract](#) | [Publisher Full Text](#)
198. Yocum AK, Zhai Y, McInnis MG, *et al.*: **Covid-19 pandemic and lockdown impacts: A description in a longitudinal study of bipolar disorder.** *J Affect Disord.* 2021; **282**: 1226–1233.
[PubMed Abstract](#) | [Publisher Full Text](#)
199. Ballivian J, Alcaide ML, Cecchini D, *et al.*: **Impact of COVID-19-Related Stress and Lockdown on Mental Health Among People Living With HIV in Argentina.** *J Acquir Immune Defic Syndr.* 2020; **85**(4): 475–482.
[PubMed Abstract](#) | [Publisher Full Text](#)
200. Havermans T, Houben J, Vermeulen F, *et al.*: **The impact of the COVID-19 pandemic on the emotional well-being and home treatment of Belgian patients with cystic fibrosis, including transplanted patients and paediatric patients.** *J Cyst Fibros.* 2020; **19**(6): 880–887.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
201. Harris RJ, Downey L, Smith TR, *et al.*: **Life in lockdown: experiences of patients with IBD during COVID-19.** *BMJ Open Gastroenterol.* 2020; **7**(1): e000541.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
202. Wang Y, Shi L, Que J, *et al.*: **The impact of quarantine on mental health status among general population in China during the COVID-19 pandemic.** *Mol Psychiatry.* 2021; 1–10.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
203. Kowal M, Coll-Martín T, Ikizer G, *et al.*: **Who is the Most Stressed During the COVID-19 Pandemic? Data From 26 Countries and Areas.** *Appl Psychol Health Well Being.* 2020; **12**(4): 946–966.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
204. Caballero-Domínguez CC, Jiménez-Villamizar MP, Campo-Arias A: **Suicide risk during the lockdown due to coronavirus disease (COVID-19) in Colombia.** *Death Stud.* 2020; 1–6.
[PubMed Abstract](#) | [Publisher Full Text](#)
205. Dsouza DD, Quadros S, Hyderabadwala ZJ, *et al.*: **Aggregated COVID-19 suicide incidences in India: Fear of COVID-19 infection is the prominent causative factor.** *Psychiatry Res.* 2020; **290**: 113145.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
206. Patsali ME, Mousa DV, Papadopoulou EVK, *et al.*: **University students' changes in mental health status and determinants of behavior during the COVID-19 lockdown in Greece.** *Psychiatry Res.* 2020; **292**: 113298.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
207. Fullana MA, Hidalgo-Mazzei D, Vieta E, *et al.*: **Coping behaviors associated with decreased anxiety and depressive symptoms during the COVID-19 pandemic and lockdown.** *J Affect Disord.* 2020; **275**: 80–81.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
208. Duan H, Yan L, Ding X, *et al.*: **Impact of the COVID-19 pandemic on mental health in the general Chinese population: Changes, predictors and psychosocial correlates.** *Psychiatry Res.* 2020; **293**: 113396.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
209. Every-Palmer S, Jenkins M, Gendall P, *et al.*: **Psychological distress, anxiety, family violence, suicidality, and wellbeing in New Zealand during the COVID-19 lockdown: A cross-sectional study.** *PLoS One.* 2020; **15**(11): e0241658.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
210. Bentenuto A, Mazzoni N, Giannotti M, *et al.*: **Psychological impact of Covid-19 pandemic in Italian families of children with neurodevelopmental disorders.** *Res Dev Disabil.* 2021; **109**: 103840.
[PubMed Abstract](#) | [Publisher Full Text](#)
211. González-Sanguino C, Ausín B, Castellanos MA, *et al.*: **Mental health consequences of the Covid-19 outbreak in Spain: A longitudinal study of the alarm situation and return to the new normality.** *Prog Neuropsychopharmacol Biol Psychiatry.* 2021; **107**: 110219.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
212. Al-Qahtani AM, Elgar WT, Ibrahim HA: **COVID-19 Pandemic: Psycho-social Consequences During the Social Distancing Period Among Najran City Population.** *Psychiatr Danub.* 2020; **32**(2): 280–286.
[PubMed Abstract](#) | [Publisher Full Text](#)
213. Ammar A, Chtourou H, Boukhris O, *et al.*: **COVID-19 Home Confinement Negatively Impacts Social Participation and Life Satisfaction: A Worldwide Multicenter Study.** *Int J Environ Res Public Health.* 2020; **17**(17): 6237.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
214. Lipskaya-Velikovsky L: **COVID-19 Isolation in Healthy Population in Israel:**

- Challenges in Daily Life, Mental Health, Resilience, and Quality of Life.** *Int J Environ Res Public Health.* 2021; **18**(3): 999.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
215. Clair R, Gordon M, Kroon M, *et al.*: **The effects of social isolation on well-being and life satisfaction during pandemic.** *Humanit Soc Sci Commun.* 2021; **8**: 28.
[Publisher Full Text](#)
 216. Boursier V, Gioia F, Musetti A, *et al.*: **Facing Loneliness and Anxiety During the COVID-19 Isolation: The Role of Excessive Social Media Use in a Sample of Italian Adults.** *Front Psychiatry.* 2020; **11**: 586222.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 217. Ogden RS: **The passage of time during the UK Covid-19 lockdown.** *PLoS One.* 2020; **15**(7): e0235871.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 218. Groarke JM, Berry E, Graham-Wisener L, *et al.*: **Loneliness in the UK during the COVID-19 pandemic: Cross-sectional results from the COVID-19 Psychological Wellbeing Study.** *PLoS One.* 2020; **15**(9): e0239698.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 219. Macdonald B, Hülür G: **Well-Being and Loneliness in Swiss Older Adults during the COVID-19 Pandemic: The Role of Social Relationships.** *Gerontologist.* 2020; **61**(2): 240–250.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 220. Sama BK, Kaur P, Thind PS, *et al.*: **Implications of COVID-19-induced nationwide lockdown on children's behaviour in Punjab, India.** *Child Care Health Dev.* 2021; **47**(1): 128–135.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 221. Imran N, Aamer I, Sharif MI, *et al.*: **Psychological burden of quarantine in children and adolescents: A rapid systematic review and proposed solutions.** *Pak J Med Sci.* 2020; **36**(5): 1106–1116.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 222. Xiao S, Yan Z, Zhao L: **Physical Activity, Screen Time, and Mood Disturbance Among Chinese Adolescents During COVID-19.** *J Psychosoc Nurs Ment Health Serv.* 2020; **1**–7.
[PubMed Abstract](#) | [Publisher Full Text](#)
 223. Gambin M, Sękowski M, Woźniak-Prus M, *et al.*: **Generalized anxiety and depressive symptoms in various age groups during the COVID-19 lockdown in Poland. Specific predictors and differences in symptoms severity.** *Compr Psychiatry.* 2021; **105**: 152222.
[PubMed Abstract](#) | [Publisher Full Text](#)
 224. Ezpeleta L, Navarro JB, de la Osa N, *et al.*: **Life Conditions during COVID-19 Lockdown and Mental Health in Spanish Adolescents.** *Int J Environ Res Public Health.* 2020; **17**(19): 7327.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 225. Kroshus E: **Gender, marital status, and commercially prepared food expenditure.** *J Nutr Educ Behav.* 2008; **40**(6): 355–360.
[PubMed Abstract](#) | [Publisher Full Text](#)
 226. Evans ML, Lindauer M, Farrell ME: **A Pandemic within a Pandemic - Intimate Partner Violence during Covid-19.** *N Engl J Med.* 2020; **383**(24): 2302–2304.
[PubMed Abstract](#) | [Publisher Full Text](#)
 227. Saqib MAN, Siddiqui S, Qasim M, *et al.*: **Effect of COVID-19 lockdown on patients with chronic diseases.** *Diabetes Metab Syndr.* 2020; **14**(6): 1621–1623.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 228. Sassone B, Mandini S, Grazzi G, *et al.*: **Impact of COVID-19 Pandemic on Physical Activity in Patients With Implantable Cardioverter-Defibrillators.** *J Cardiopulm Rehabil Prev.* 2020; **40**(5): 285–286.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 229. Cransac-Miet A, Zeller M, Chagué F, *et al.*: **Impact of COVID-19 lockdown on lifestyle adherence in stay-at-home patients with chronic coronary syndromes: Towards a time bomb.** *Int J Cardiol.* 2021; **323**: 285–287.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 230. Al Fagih A, Al Onazi M, Al Basiri S, *et al.*: **Remotely monitored inactivity due to COVID-19 lockdowns. Potential hazard for heart failure patients.** *Saudi Med J.* 2020; **41**(11): 1211–1216.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 231. Okely JA, Corley J, Welstead M, *et al.*: **Change in Physical Activity, Sleep Quality, and Psychosocial Variables during COVID-19 Lockdown: Evidence from the Lothian Birth Cohort 1936.** *Int J Environ Res Public Health.* 2020; **18**(1): 210.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 232. Chagué F, Boulain M, Eicher JC, *et al.*: **Impact of lockdown on patients with congestive heart failure during the coronavirus disease 2019 pandemic.** *ESC Heart Fail.* 2020; **7**(6): 4420–4423.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 233. Baschi R, Luca A, Nicoletti A, *et al.*: **Changes in Motor, Cognitive, and Behavioral Symptoms in Parkinson's Disease and Mild Cognitive Impairment During the COVID-19 Lockdown.** *Front Psychiatry.* 2020; **11**: 590134.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 234. Kalron A, Dolev M, Greenberg-Abrahami M, *et al.*: **Physical activity behavior in people with multiple sclerosis during the COVID-19 pandemic in Israel: Results of an online survey.** *Mult Scler Relat Disord.* 2021; **47**: 102603.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 235. Pal R, Yadav U, Verma A, *et al.*: **Awareness regarding COVID-19 and problems being faced by young adults with type 1 diabetes mellitus amid nationwide lockdown in India: A qualitative interview study.** *Prim Care Diabetes.* 2021; **15**(1): 10–15.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 236. Ghosh A, Arora B, Gupta R, *et al.*: **Effects of nationwide lockdown during COVID-19 epidemic on lifestyle and other medical issues of patients with type 2 diabetes in north India.** *Diabetes Metab Syndr.* 2020; **14**(5): 917–920.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 237. Biagioli V, Albanesi B, Belloni S, *et al.*: **Living with cancer in the COVID-19 pandemic: An Italian survey on self-isolation at home.** *Eur J Cancer Care (Engl).* 2021; **30**(2): e13385.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 238. Gallagher S, Bennett KM, Roper L: **Loneliness and depression in patients with cancer during COVID-19.** *J Psychosoc Oncol.* 2020; **1**–7.
[PubMed Abstract](#) | [Publisher Full Text](#)
 239. Ruiz-Roso MB, Knott-Torcal C, Matilla-Escalante DC, *et al.*: **COVID-19 Lockdown and Changes of the Dietary Pattern and Physical Activity Habits in a Cohort of Patients with Type 2 Diabetes Mellitus.** *Nutrients.* 2020; **12**(8): 2327.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 240. Marçal IR, Fernandes B, Viana AA, *et al.*: **The Urgent Need for Recommending Physical Activity for the Management of Diabetes During and Beyond COVID-19 Outbreak.** *Front Endocrinol (Lausanne).* 2020; **11**: 584642.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 241. Zorcec T, Jakovska T, Micevska V, *et al.*: **Pandemic with COVID-19 and Families with Children with Chronic Respiratory Diseases.** *Pril (Makedon Akad Nauk Umet Odd Med Nauki).* 2020; **41**(2): 95–101.
[PubMed Abstract](#) | [Publisher Full Text](#)
 242. Al Agha AE, Alharbi RS, Almohammadi OA, *et al.*: **Impact of COVID-19 lockdown on glycemic control in children and adolescents.** *Saudi Med J.* 2021; **42**(1): 44–48.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 243. Tao J, Gao L, Liu Q, *et al.*: **Factors contributing to glycemic control in diabetes mellitus patients complying with home quarantine during the coronavirus disease 2019 (COVID-19) epidemic.** *Diabetes Res Clin Pract.* 2020; **170**: 108514.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 244. Ollickal JJ, Chinnakali P, Suryanarayana BS, *et al.*: **Effect of COVID19 pandemic and national lockdown on persons with diabetes from rural areas availing care in a tertiary care center, southern India.** *Diabetes Metab Syndr.* 2020; **14**(6): 1967–1972.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 245. Khader MA, Jabeen T, Namoj R: **A cross sectional study reveals severe disruption in glycemic control in people with diabetes during and after lockdown in India.** *Diabetes Metab Syndr.* 2020; **14**(6): 1579–1584.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 246. Önmez A, Gamsızkan Z, Özdemir S, *et al.*: **The effect of COVID-19 lockdown on glycemic control in patients with type 2 diabetes mellitus in Turkey.** *Diabetes Metab Syndr.* 2020; **14**(6): 1963–1966.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 247. Fisher L, Polonsky W, Asuni A, *et al.*: **The early impact of the COVID-19 pandemic on adults with type 1 or type 2 diabetes: A national cohort study.** *J Diabetes Complications.* 2020; **34**(12): 107748.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 248. Ghesquière L, Garabedian C, Drumez E, *et al.*: **Effects of COVID-19 pandemic lockdown on gestational diabetes mellitus: A retrospective study.** *Diabetes Metab.* 2021; **47**(2): 101201.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 249. Rastogi A, Hiteshi P, Bhansali A: **Improved glycemic control amongst people with long-standing diabetes during COVID-19 lockdown: a prospective, observational, nested cohort study.** *Int J Diabetes Dev Ctries.* 2020; **1**–6.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 250. Theis N, Campbell N, De Leeuw J, *et al.*: **The effects of COVID-19 restrictions on physical activity and mental health of children and young adults with physical and/or intellectual disabilities.** *Disabil Health J.* 2021; **10**: 1064.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 251. O'Sullivan K, Clark S, McGrane A, *et al.*: **A Qualitative Study of Child and Adolescent Mental Health during the COVID-19 Pandemic in Ireland.** *Int J Environ Res Public Health.* 2021; **18**(3): 1062.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 252. Di Stefano V, Battaglia G, Giustino V, *et al.*: **Significant reduction of physical activity in patients with neuromuscular disease during COVID-19 pandemic: the long-term consequences of quarantine.** *J Neurol.* 2021; **268**(1): 20–26.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 253. Irmak AY, Çelikkalp U, Ekuklu G: **Evaluation of the chronic disease management and depression levels of people over 65 years of age during the COVID-19 pandemic period.** *Perspect Psychiatr Care.* 2020.
[PubMed Abstract](#) | [Publisher Full Text](#)
 254. Kang C, Yang S, Yuan J, *et al.*: **Patients with chronic illness urgently need integrated physical and psychological care during the COVID-19 outbreak.** *Asian J Psychiatr.* 2020; **51**: 102081.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 255. Croizier C, Bouillon-Minois JB, Bay JO, *et al.*: **COVID-19 lockdown and mental**

- health: why we must look into oncology units. *Psychol Med*. 2020; 1–2.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
256. Delussi M, Gentile E, Coppola G, *et al.*: **Investigating the Effects of COVID-19 Quarantine in Migraine: An Observational Cross-Sectional Study From the Italian National Headache Registry (RICE)**. *Front Neurol*. 2020; **11**: 597881.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 257. Verhagen IE, van Casteren DS, Lentsch SV, *et al.*: **Effect of lockdown during COVID-19 on migraine: A longitudinal cohort study**. *Cephalalgia*. 2021; 333102420981739.
[PubMed Abstract](#) | [Publisher Full Text](#)
 258. Sankar P, Ahmed WN, Mariam Koshy V, *et al.*: **Effects of COVID-19 lockdown on type 2 diabetes, lifestyle and psychosocial health: A hospital-based cross-sectional survey from South India**. *Diabetes Metab Syndr*. 2020; **14**(6): 1815–1819.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 259. UNSSCN: **The COVID-19 pandemic is disrupting people's food environments: a resource list on Food Systems and Nutrition responses**. 2020.
[Reference Source](#)
 260. Food and Agriculture Organization of the United Nations: **The State of Food Security and Nutrition in the World 2020**. Rome. 2020.
[Reference Source](#)
 261. Di Renzo L, Gualtieri P, Pivari F, *et al.*: **Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey**. *J Transl Med*. 2020; **18**(1): 229.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 262. Matthews CE, George SM, Moore SC, *et al.*: **Amount of time spent in sedentary behaviors and cause-specific mortality in US adults**. *Am J Clin Nutr*. 2012; **95**(2): 437–445.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 263. Ding D, Del Pozo Cruz B, Green MA, *et al.*: **Is the COVID-19 lockdown nudging people to be more active: a big data analysis**. *Br J Sports Med*. 2020; **54**(20): 1183–1184.
[PubMed Abstract](#) | [Publisher Full Text](#)
 264. Ferrie JE, Kivimäki M, Akbaraly TN, *et al.*: **Change in Sleep Duration and Type 2 Diabetes: The Whitehall II Study**. *Diabetes Care*. 2015; **38**(8): 1467–1472.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 265. Harmon RL, Myers MA: **Prayer and meditation as medical therapies**. *Phys Med Rehabil Clin N Am*. 1999; **10**(3): 651–662.
[PubMed Abstract](#) | [Publisher Full Text](#)
 266. Sediri S, Zgueb Y, Ouane S, *et al.*: **Women's mental health: acute impact of COVID-19 pandemic on domestic violence**. *Arch Womens Ment Health*. 2020; **23**(6): 749–756.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 267. Issaka RB, Somsouk M: **Colorectal Cancer Screening and Prevention in the COVID-19 Era**. *JAMA Health Forum*. 2020; **1**: e200588.
[Publisher Full Text](#)
 268. Tapper EB, Asrani SK: **The COVID-19 pandemic will have a long-lasting impact on the quality of cirrhosis care**. *J Hepatol*. 2020; **73**(2): 441–445.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
 269. World Health Organization: **Rapid assessment of service delivery for NCDs during the COVID-19 pandemic**. Geneva. 2020.
[Reference Source](#)

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Dear authors

My comments can be explained below:

1. Remove references from the conclusion section.
2. There is no clear conclusion that has been raised in this manuscript. Provide more criticism in the abstract, introduction, and conclusion.
3. Why do authors depend their search based on two databases only? What about other reliable databases such as Web of Science, Science Direct, and Scopus? I think there is no justification for this concern.
4. How can narrative review include a method like a systematic review? What is the difference? The authors should report that to the readers.
5. I can see the introduction is not suitable when it is presented. The introduction should clarify many subjects within. Thus, the introduction needs to clarify the motivation, challenges, contribution, objective, significance, and others. All the information should be presented in sequence idea.
6. Write the conclusion and consider the following comments: Highlight your analysis and reflect only the important points for the whole paper. Mention the benefits. Mention the implication in the last of this section.
7. The authors mentioned, "Articles were excluded if they did not focus specifically on the six lifestyle factors (dietary habits, physical activity, sleep, tobacco or other substance use, stress, and emotional well-being and social connectedness) or did not discuss lifestyle

within the COVID-19 context." Why? what about others factors. Normally, this type of review is a comprehensive, critical, and objective analysis of the current knowledge on a topic. While we see here, the authors specified these factors from the beginning. I need the authors to defend this comment in the revised manuscript within the "method" section.

8. I am surprised the introduction contains only one reference. Also, there is no comparison with any published review articles. Therefore, the authors should provide a clear comparison with academic literature based on specific points. At least four published articles should be included in the benchmark comparison. I added some citations that the authors could use in this comparison.

In conclusion, I see this manuscript is sound and a high-quality study.

Best Wishes

References

1. Odone A, Lugo A, Amerio A: COVID-19 lockdown impact on lifestyle habits of Italian adults. *Acta Biomed*. 2020. [Publisher Full Text](#)
2. Albahri AS, Hamid RA, Alwan JK, Al-Qays ZT, et al.: Role of biological Data Mining and Machine Learning Techniques in Detecting and Diagnosing the Novel Coronavirus (COVID-19): A Systematic Review. *J Med Syst*. 2020; **44** (7): 122 [PubMed Abstract](#) | [Publisher Full Text](#)
3. Di Santo SG, Franchini F, Filiputti B, Martone A, et al.: The Effects of COVID-19 and Quarantine Measures on the Lifestyles and Mental Health of People Over 60 at Increased Risk of Dementia. *Front Psychiatry*. 2020; **11**: 578628 [PubMed Abstract](#) | [Publisher Full Text](#)
4. Albahri OS, Zaidan AA, Albahri AS, Zaidan BB, et al.: Systematic review of artificial intelligence techniques in the detection and classification of COVID-19 medical images in terms of evaluation and benchmarking: Taxonomy analysis, challenges, future solutions and methodological aspects. *J Infect Public Health*. 2020; **13** (10): 1381-1396 [PubMed Abstract](#) | [Publisher Full Text](#)

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: medical informatics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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