

#StayHomeStayFit: UNIMI's approach to online healthy lifestyle promotion during the COVID-19 pandemic

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Summary. The COVID-19 lockdown imposed radical changes in the lifestyles of the population through isolation measures, with considerable health, social, psychological and economic consequences. Lockdown measures may have exacerbated negative population behaviors regarding exercise and nutrition, with risk of weight gain and obesity, collectively predisposing to increased cardiometabolic risk and mortality. At particular risk of deleterious consequences were patients such as those affected by chronic non communicable diseases (CNCD). The benefits of regular exercise are evident at several levels of CNCD prevention, however, from a public health standpoint, it is important to consider they are also related to improved stress management, work/academic performance, and reduced illegal behavior, isolation and depression. Therefore, during enforced isolation, a primary goal for all individuals is to maintain energy balance. During lockdown, several lifestyle interventions were posted online, with the internet playing a major role in exercise and fitness promotion. Among these one must recognize the ambitious “*#StayHomeStayFit*” project by the University of Milan, providing useful general information and trustworthy advice regarding nutrition, physical activity, and psychological support, for the general population in a time of need. Data showed a total of 21224 views on various social media and webpages during the reference period, with a mean time of 4' 17" spent per page/video. Given the health risks associated with population physical inactivity and unhealthy lifestyle, policymakers should evaluate the benefits of projects such as *#StayHomeStayFit* and consider how to maximize population perception and reach. After all, additional COVID-19 lockdowns might be implemented in the future. (www.actabiomedica.it)

Introduction

The coronavirus disease 2019 (COVID-19) possibly emerged by the end of 2019 in Wuhan, China, as a new zoonotic infection caused by a novel coronavirus known as severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2)¹. Following the increase in notification rates both in China and internationally,

the World Health Organisation (WHO) confirmed a public health emergency of intercontinental concern on January 30th 2020, and declared the rapidly spreading novel coronavirus outbreak a pandemic on March 11th 2020².

Since then, SARS-CoV-2 has infected more than 16 million people and caused more than 650,000 deaths worldwide³.

At the beginning of March 2020, the Italian Government, later followed by several others, announced a nationwide “lockdown” known as the “*io-resto-a-casa*” decree^{4,5} (that may be translated as the *stay-at-home* decree), in order to contrast and contain the spread of the novel SARS-CoV-2 infection. During this time period, travel was completely forbidden (even within the same city) except for work or emergency reasons, smart-working was strongly encouraged when possible, public events of any kind were suspended (including cultural, recreational, sports, and religious events), educational institutions of all types were shut down, and gyms, pools, bars, restaurants, retail stores and shopping malls were closed indefinitely^{6,7}. Supermarkets and pharmacies were the only services to remain active, with severe enforcement of social distancing measures. Therefore, it is easy to see how the “*io-resto-a-casa*” decree enforced a radical and sudden change in the habits and lifestyles of the entire Italian population through social distancing and isolation at home, with considerable predictable health, social, psychological and economic consequences.

The Impact of Lockdown and Social Distancing Measures on Health

It is frequently said that COVID-19 has changed everything, however, to fully appreciate its detrimental effects from a public health standpoint, one cannot only focus on the ways in which clinical services have been rapidly reorganized to shift the focus of care, both of public and private healthcare sectors, to cope with the flood of COVID-19 patients, or on the public health measures aimed at flattening the epidemic curve. In fact, it is of fundamental importance to note that globally significant health issues that existed before COVID-19, including chronic non communicable diseases (CNCD), have not disappeared but rather may have been exacerbated by the pandemic. Due to inpatient and outpatient medical and surgical treatment being restricted to urgent cases, and most hospital wards and operating rooms being transformed into triage and emergency departments or intensive care units for COVID-19 patients, several individuals affected by CNCDs may have modified their behavior, even

when symptomatic, to avoid hospitalization. Moreover, major focus was placed on preventing infection in high-risk individuals, including CNCD patients and the elderly, who were thus continuously advised to remain at home and communicate with their general practitioners exclusively by telephone, further increasing the possibility of medical care avoidance in these subjects. This concept is supported by data published in the literature describing a decline in the number of patients seeking medical care for non-COVID-19-related causes^{8,9} further raising concern for significant collateral damage in the future.

The health burden during the COVID-19 outbreak has also been evaluated by several studies which have shown increased rate of anxiety disorders, depressive symptoms, alcoholism, perceived stress, post-traumatic stress disorder, and poor sleep quality, among others¹⁰⁻¹⁸. Usual lifestyle habits have been heavily disrupted by this unprecedented emergency and by the enforced lockdown, and have resulted in important behavioral changes, particularly concerning dietary and exercise habits¹⁹⁻²¹. In fact, social isolation might have also exacerbated negative lifestyle behaviors with reduced exercise levels¹⁷, enhanced sedentarism, as well as decreased outdoor time and increased weight gain and obesity²²⁻²⁴.

Two major aspects must be considered crucial in the cascade of events leading to negative lifestyle behaviors: staying at home for most of the day (due to movement restrictions, digital-education, smart-working, limitations in both outdoor and gym physical activity) and stockpiling food because of restrictions in grocery shopping. A disrupted work routine, whether due to smart-working or job interruption, can result in unstructured schedules, leading to boredom or increased screen time, which in turn can induce overeating and consequent greater energy intake²⁵. Additionally, hearing or reading continuously about the COVID-19 epidemic from the media can increase stress, which also leads subjects to overeating or “emotional eating”, particularly manifesting food cravings for sugar-rich ‘comfort foods’^{26,27} as these counteract stress through the serotonergic pathway²⁸. Unfortunately, these food types are also characterized by a high glycemic index which is associated with increased risk of cardiovascular disease, obesity and inflammation, all

shown to increase the risk for the more severe complications of COVID-19^{28,29}.

Other than modifications in food intake, a fundamental concern relating to isolation during lockdown, is the disruption of daily living leading to a substantial reduction in energy expenditure. In fact, an inevitable consequence of all isolation strategies is that the majority of individuals will spend more time sitting and engaging in activities with low rates of energy expenditure e.g. desk-bound work, online social networking or gaming activities and television/screen viewing.

Although several Countries have lifted or have started to lift the more severe bans enforced during lockdown, others are starting to or are still confining citizens to home isolation, enforcing very strict measures in terms of physical movement outside the home, banning any “unnecessary” public outdoor activities, closing all fitness centers and sport clubs, and postponing or cancelling all sport competitions³⁰. These lockdowns thus heavily limit people’s exercise possibilities, leading to a more sedentary lifestyle that is likely to exacerbate the ongoing public health crisis, driven by the already low levels of voluntary physical activity pre-dating the COVID-19 epidemic, and the subsequent consequences for cardiometabolic health. In fact, data collected from over 30 million consumers worldwide during March 2020 by the wearable technology company Fitbit highlighted a substantial reduction in daily step counts (ranging from a 7% to 38% decline across different countries) compared to the corresponding period in 2019³¹. This is of concern as low levels of daily physical activity and increased sedentary behavior have been associated with several adverse health outcomes including dyslipidaemia³², peripheral insulin resistance and microvascular dysfunction³³. Collectively these can predispose to weight gain and a concomitant increase in cardiometabolic risk and, unfortunately, these unfavorable effects have been shown to occur rapidly³³. Indeed, physical inactivity is the fourth leading risk factor for global mortality, accounting for 6% of global deaths after hypertension, tobacco use and prolonged hyperglycaemia³⁴.

The Benefits of a Healthy Lifestyle

The mechanisms underlying the relationship between regular physical exercise and health are several and complex. Indeed, exercise may act on several regulatory pathways including hormonal release, immunological function, and the autonomic nervous system; and it may produce benefits similar to some drugs in the secondary prevention of coronary heart disease, rehabilitation after stroke, treatment of heart failure, and prevention of diabetes.

In fact, the prevention and treatment of chronic non communicable diseases (CNCD) including obesity, cardiovascular disease and diabetes, for decades have been among the principal objectives of Governments and Medical Institutions worldwide. Interventions aimed at improving the lifestyle of the population as a whole play a crucial role in this undertaking and have been the basis for public health promotion since antiquity. In fact, it was Hippocrates who first suggested that “*if we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health*”, not only stressing the fundamental significance of nutrition and exercise in this feat, but also the importance of titrating their occurrence.

The benefits of regular exercise are evident at several levels of prevention of many CNCD, including secondary, primary and primordial prevention³⁵. Furthermore, regular exercise is associated with longevity, happiness, reduced risk of physical disability and dependence as well as with general reduction in all-cause mortality. So much so that cardiorespiratory fitness may be considered the best quantitative predictor of all-cause mortality and may be a potentially stronger predictor of mortality than established risk factors.

From a public health standpoint, it is also important to consider that the benefits of a healthy lifestyle, and of exercise particularly, are not limited to the prevention and/or management of CNCD but are also related to the improvement of stress management, work and academic performance, as well as to a reduction in illegal behavior, isolation and depression³⁶. Furthermore, it is important to consider that exercise and physical activity are not merely the opposite

of sedentary behavior. In fact, although many studies have shown that the latter is an important cardiometabolic risk factor per se, sedentary behavior may actually reduce the beneficial effects of physical activity. Thus, from a behavioral standpoint, interventions need to be aimed not only towards increasing exercise time but also reducing time dedicated to sedentary activities. Moreover, the effects of exercise in the prevention and/or treatment of CNCD are increased when associated to other healthy lifestyle interventions, particularly healthy nutrition, smoking cessation, and stress management³⁷.

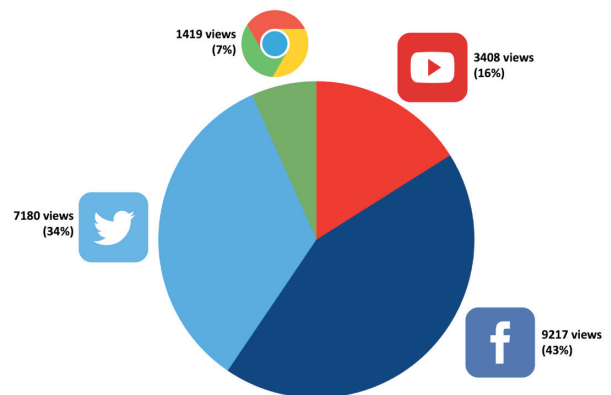
Thus, for optimal effects, any lifestyle intervention concerning physical activity, must involve two parallel pathways: one aimed at reducing sedentary behavior, taking advantage of daily opportunities to perform physical activity e.g. preferring stairs to elevators, walking or cycling instead of using personal or public transportation etc., the other aiming to introduce a structured exercise program into the daily routine^{38,39}

During isolation and enforced periods of reduced energy expenditure, a primary goal for all individuals is thus to achieve and maintain energy balance (matching energy intake to energy expenditure). Although this is challenging even under normal conditions, as evident by the high prevalence of overweight and obesity in both industrialised and developing Countries, public health stakeholders must clearly convey the health benefits of a healthy lifestyle, advocating for physical activity and nutritional advice to prevent future health issues⁴⁰.

An Approach to Online Health Promotion During the Covid-19 Pandemic

Throughout the lockdown period, several web-based and social media lifestyle interventions were posted by private citizens/personal trainers, gyms, sports federations and public health authorities^{41,42,43,44,45,46,47,48,49,50,51,52}. The internet therefore played a major role in promoting exercise and fitness activities during the coronavirus outbreak, increasingly serving as a simplified platform for the proposal of exercise and lifestyle activities and tips, which were meanwhile suggested by the medical community in the literature^{53,54,55,56}.

Interestingly, very few public institutions were involved in this health promotion activity among which one must recognize the ambitious project entitled “*#StayHomeStayFit i consigli degli esperti*” by the University of Milan^{57,58}. The latter was designed as a consequence of the concept that staying home to counter the COVID-19 pandemic could become an opportunity to improve population lifestyle and health. With this in mind, *#StayHomeStayFit* was ideated through a multidisciplinary collaboration between the Head and members of the residency program in Sports Medicine and physical exercise, several Professors and experts in the various areas of personal health and wellbeing



involved from the University of Milan, as well as support from Governance and University Administration. It is a platform that aimed to provide useful information and trustworthy advice targeting the general population in a time of need, during which communications between individuals or with clinical practitioners were difficult.

The platform is in fact divided into specific macro-areas: namely nutrition, physical activity and posture, psychological support and useful general information. Each area can be explored by downloading specific “cards” or video tutorials (available on the University’s YouTube channel). It is useful for all individuals who are desk-bound or induced into sedentary behavior by digital education or smart-working, or for all others who are subject to movement restrictions and isolation

measures. In fact the platform helps to better manage ones' time: from organizing the day, to choosing a healthy diet, to adopting a correct posture for PC use, to physical activity suggestions, to tips on how to manage stress or fears related to COVID-19, to useful general information on the use of gloves and mask types. Data from the #StayHomeStayFit platform showed a total of 21224 views on various social media and web-pages between the 10th and 30th of April (Fig. 1), with a mean time of 4 minutes 17 seconds spent per page/video, suggesting great interest for the topic.

Figure 1. Pie-chart illustrating total views per Application type.

In detail, the contact data related to the reference period, regarding social channels was the following: Youtube (www.youtube.com/user/UnimiVideo) total views for the total number of available videos reached 3408; Facebook (www.facebook.com/LaStatale) program contents reached 9217 people via the news-feed, resulting in 2836 interactions (i.e. the combined total clicks on the posts as well as links, comments, reactions and shares on personal accounts); Twitter (www.twitter.com/LaStatale) views of the program's Twitter feeds reached 7180 total views.

Concerning the Unimi.it website and portal (www.unimi.it/it/studiare/vivere-luniversita/stay-homestayfit-i-consigli-degli-esperti) the webpage was viewed by a total of 1419 users (including returning users), resulting in 889 unique pageviews.

Conclusions

The COVID-19 pandemic has greatly impacted human health, causing sudden lifestyle changes through social distancing and isolation at home, with devastating social and economic consequences. Although not much is yet known about the long-term physical and mental health effects of lockdown on the population as a whole, recent literature suggests part of the population could adopt or reinforce unhealthy behaviors. As explained, the lockdown context inevitably induces a sedentary lifestyle, limits regular physical activity, and promotes unhealthy eating habits. Therefore, optimizing public health interventions during the pandemic, not only requires knowledge from medical and biological sciences, but also from human sciences relating to dietary habits and lifestyle. All gathered

knowledge must then be conveyed to the population over digital platforms.

In the past decade, there has been increasing interest in the use of the Internet as a platform for the delivery of public health interventions, and the COVID-19 pandemic has forcibly pushed us to exploit these platforms on a global scale. In fact, with severely restricted access to public gyms, swimming pools and parks, home-based exercise and nutritional interventions were broadcast online and implemented with minimal equipment, supervision, expense, or time commitment. More platforms could be created, or the existing ones enriched in order to maximize health promotion and motivate individuals of all ages to follow a healthy lifestyle at home by increasing physical activity and pursuing a balanced diet. Ensuring adequate physical activity could help limit the consequences and offset the deleterious effects of physical inactivity and sedentary behavior. Furthermore, it could encourage the maintenance of positive habits and help with the resumption of usual activities or the acquisition of new ones, ensuring better resilience after the pandemic.

Given the health risks associated with physical inactivity and unhealthy lifestyle at general population level, policymakers and public health stakeholders should understand and evaluate the benefits of projects such as #StayHomeStayFit by the University of Milan and consider how to maximize population perception and reach. After all, additional COVID-19 lockdowns might be implemented in the future.

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