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Factors related to compliance with the COVID-19 health regulations among young people

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Abstract

The coronavirus pandemic has affected all facets of our lives and all ages and social strata worldwide. Measures have been taken to protect against the spread of the virus, such as more rigorous hand hygiene, the use of face masks and social distancing. However, the focus has often been on young people, who have been seen as a group lacking sufficient respect for government-imposed measures. This review outlines the preventive measures that have been taken in different countries and discusses their specific impact on young people and adolescents, taking into account the developmental stage and concrete needs of this age group. It summarizes those studies that have provided information on compliance with preventive measures by young people and adolescents, concluding that although compliance levels among this age group are lower than among older adults, the general view of youths as non-compliant is not consistent with real, objective data. The review also summarizes different views regarding the possible reasons for this lower level of compliance, taking into account both social (gender and age) and personal factors (personality, empathy, prosociality, self-control, cognitive styles and motivations), and discusses the practical implications of these findings for the future.

Key Words: COVID-19; Health regulations; Compliance; Young people; Adolescents

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Core Tip: The effects of health regulations designed to prevent the spread of the coronavirus disease 2019 virus may be much more intense and pernicious among young people than adults. Social and personal factors, as well as the level of information to which one is exposed, peer influence and the number of elderly people one knows are factors that may help us understand why it is more challenging for

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young people to comply with the established measures. This greater insight may help us design more effective preventive strategies and awareness raising campaigns, so that we can be better prepared for future crises.

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INTRODUCTION

Coronavirus disease 2019 and health regulations

In December 2019, there was an outbreak of the coronavirus disease 2019 (COVID-19) in Wuhan (Hubei, China). At the beginning of 2020, the disease began to spread throughout China, with the rapid increase of confirmed cases and deaths soon starting to spread around the world. On January 31, 2020, the World Health Organization declared the COVID-19 outbreak a Public Health Emergency of International Concern [1].

Each country took its own measures to protect the health and safety of its citizens, contain the progression of the disease and strengthen the public health system. South Korea became the world leader in containing the virus, focusing strongly on mass testing, early contact tracking and quarantine [2]. In other parts of the world, such as China, Spain, Italy and the United States, the increase in the number of daily cases prompted governments to implement mitigation measures [3] such as stricter hand hygiene, travel restrictions, school closures and social distancing.

At the beginning of the pandemic, at least 186 countries instigated varying degrees of restrictions on population movements to curb the spread of COVID-19 and prevent health systems from being overwhelmed [4]. The first measure taken in many countries was a home lockdown and the establishment of restrictions such as allowing people to circulate on public roads only for essential tasks such as buying food, commuting to work or caring for dependents [4]. Moreover, in many countries, face-to-face educational activities were suspended in all schools and at all stages, cycles, grades, courses and levels of education, with this being one of the most widely-used measures to help maintain social distancing and decrease the contagion rate [5].

Following these restrictions, and after the incidence of the disease had started to abate, governments began to create exit strategies to unblock and re-establish "normality" in their respective countries, always in accordance with public health principles and population indicators [6]. The restrictive measures caused major economic and social disruption around the world, and governments were forced to try different exit strategies [7]. In the absence of a treatment or vaccine, some countries took measures to limit the density of gatherings. In addition to banning large concentrations of people, on a smaller scale, workplaces were obliged to establish schedules to limit crowding in offices, and healthcare facilities were forced to reduce opening hours, space out waiting rooms and offer weekend and evening appointments to accommodate and care for the most at-risk patients. Commercial establishments limited the number of people allowed in their store, and bars and restaurants reduced their capacity and even closed down during the most critical moments of the pandemic [3].

In terms of individual responsibility, behaviors in response to COVID-19 were similar to the health behaviors described by Bish and Michie [8] in relation to pandemics in general. These behaviors fall into one of three categories: preventive behaviors, which include hand washing, the use of face masks, coughing into one's sleeve and getting vaccinated; avoidance behaviors, which include social distancing; and quarantine and illness management behaviors, which refer to actions taken once a person believes they have been infected and in the case of COVID-19 includes self-quarantine [9].

In addition to being a simple and low-cost intervention, hand washing for the control of infectious diseases has the advantage of offering easy compliance as well as great health benefits. Indeed, several studies have shown that hand washing reduces

the risk of virus transmission by 55%[10].

As for the use of face masks, despite several debates about their effectiveness, in most parts of the world they have been declared mandatory in public places to prevent the spread of the virus. The use of face masks is one of the non-pharmaceutical intervention measures that can be implemented effectively without drastically altering social practices[11]. Their use in the community may also be beneficial for healthy individuals, as transmission may be presymptomatic.

Another of the measures implemented is social distancing, with scientific evidence confirming that a physical distance of at least 1 meter significantly reduces infection, and that distances of 2 meters may be even more effective. It has been demonstrated that social distancing measures prevent the transmission of the virus, thereby reducing the spread of the infection[12].

Another individual area of responsibility in the context of the current pandemic is self-quarantine. People who have been infected with the virus need to isolate themselves in order to prevent the spread of the disease. However, those who have been exposed to COVID-19 should also be isolated in order to monitor whether or not they develop the disease over time[13].

Many different health regulation measures have been implemented since the start of the pandemic. In most countries, the measures were more restrictive at the beginning and have since varied in accordance with incidence rates and hospital saturation. However, those that have remained clear and constant in many countries and have been maintained throughout the pandemic include the use of face masks, social distancing, self-quarantine and the avoidance of large gatherings of people.

The health regulation measures currently in place are therefore the main strategies used to prevent the transmission of the COVID-19 virus[14], and these measures have an important differential impact on people in accordance with variables such as age.

THE IMPACT OF HEALTH REGULATIONS ON YOUNG PEOPLE

Studies about the COVID-19 and previous pandemics have identified the fear of contamination and restricted social contact as the main risk factors for increased mental health problems[15,16]. Indeed, Orben *et al*[16] assert that “it is possible that the effects of such deprivation of social contact will extend beyond the period of physical distancing and might affect the population for years to come” (p. 634).

Social distancing may be especially challenging for adolescents and young people. Social contact is essential for developing cognition, emotions, attachment and relationships and contributes to the physiological regulation of the body’s responses to acute stressors[17,18]. It is well known that peer relationships are central across the different areas of psychosocial development during adolescence and youth. As children grow older, peers become the referents around which leisure time is structured and provide emotional support and guidance in the process of growing up [19]. However, adolescence is also an especially vulnerable stage of life and is associated with strong risks for the development of mental health problems, such as anxiety and depression[20]. Moreover, the multiple hormonal and neurobiological changes that take place during this period have been linked to heightened emotional reactivity, which in turn leads to a constant need to adjust coping and stress regulation strategies[21]. Conversely, high-quality peer relationships seem to protect against mental health problems and to strengthen adolescent resilience[22].

Therefore, if we accept that young people and adolescents are at greater risk of emotional problems and that their peers are an important source of social and emotional support, it is logical to assume that the situation engendered by the pandemic may be particularly critical for them. Alivernini *et al*[23] concluded that a pandemic is a stressful life event that can have a major impact on adolescent development, especially affecting their mental health and increasing their levels of anxiety and psychological distress. Moreover, emotion regulation skills may fail when exposed to a global, ongoing stressor such as the COVID-19 pandemic, or it may be impossible to implement such skills due to pandemic-related restrictions[24].

Research has found elevated mental health concerns during the COVID-19 pandemic in comparison with time points prior to its onset[25,26]. In the specific case of adolescents, Alivernini *et al*[23] explored the positive and negative emotions of a sample of Italian adolescents before and after the start of the COVID-19 pandemic, finding an increase in adolescents’ levels of negative affect following the national lockdown and a decrease in their levels of positive affect. These results are consistent with those found by Rogers *et al*[27] among United States adolescents, with the authors

arguing that the pandemic may have challenged the psychological and coping resources of adolescents and young people, leading to fluctuations in underlying mood states and rendering them more vulnerable to mental health problems.

A qualitative study carried out in the United Kingdom, which explored public perceptions and experiences of social distancing and social isolation related to the COVID-19 pandemic, found that frustration or anxiety over loss of social interaction and fears over the duration of social distancing and isolation measures were all major worries[28]. A similar study also identified participants' concerns about not being able to socialize face-to-face with their peers as well as their willingness to participate in the response and recovery process as a means to make their voices heard[29].

In response to this lack of face-to-face interactions with peers and the decrease in leisure time spent in large groups with friends, young people and adolescents have increased the time they spend on social media and the internet. The use of screens has increased considerably, not only because it is a way of interacting with peers but also because it has been the means of communication to which many schools and universities have had to resort. Some studies have asserted that adolescent use of digital technologies and social media might mitigate some of the negative effects of physical distancing[16]. In contrast, however, previous studies have identified certain risks linked to the excessive use of screens, such as poor sleep, higher accumulated time spent sedentarily and exacerbated risk for mental health problems[30]. Indeed, the study by Larcher *et al*[29] mentioned above identified some concerns among young people about the significant amount of screen time to which they are now exposed during the pandemic. In this respect, Orben *et al*[16] suggested that the types of technology used by young people should be taken into account since engaging in direct communication may increase wellbeing[31] and help maintain personal relationships[32], whereas passive use of social media has been related to negative effects (social comparison, envy, *etc.*)[33]. Moreover, the effect information and communication technology use at all levels of education has had on pupils' academic and holistic development remains to be seen.

On a more optimistic note, increased family time may be one of the positives that can be taken from the critical situation to which the pandemic has brought us. The fact that young people and adolescents have spent more time with their families may have mitigated the effects of the drop in social face-to-face interactions with peers. In particular, adolescents who have positive relationships with their parents or caregivers may be less affected by physical distancing than those who do not or who are living alone[16].

COMPLIANCE WITH HEALTH REGULATIONS AMONG YOUNG PEOPLE

Compliance rates

Adolescents and young adults are internationally considered to be the potentially least compliant age group in relation to the measures established by different governments, especially those involving social distancing[34].

This had already been found prior to the pandemic in relation to other health-related behaviors[35,36]. In contrast to the younger population, a study conducted in May 2020 found that the older population was the one that engaged most in protective health behaviors[9].

But let us examine the compliance rates reported to date. For example, in a study conducted with 683 adolescents (13-18 years) from the United States, Oosterhoff *et al* [37] found that most youths were engaging in social distancing a lot (26.9%) or a great deal (56.6%), with fewer engaging in social distancing somewhat (13.0%) or a little (3.5%).

Similarly, a longitudinal study that was already collecting data in Zurich prior to the pandemic (in this case with 737 young adults) found that non-compliance was somewhat higher for hygiene-related measures than for social distancing, but even so, non-compliance levels were low[34].

In another study, also carried out in Switzerland but in this case in another canton [38], the authors observed high self-reported adherence to rules (85%), which increased significantly with age and level of worry.

In Oslo (Norway), 12686 secondary school students were found to have high percentages of compliance with the regulations. Most of them exceeded 70% compliance, with hand washing (84%) being the rule most frequently complied with. However, the compliance rate for physical distance (50%) was considerably lower[39]. In other words, although it is true that most adolescents comply with the established

rules, the greatest difficulty seems to be in maintaining social distances, something which, as has already been pointed out in previous sections, is especially difficult during a developmental stage such as adolescence. Nevertheless, Rieger[40] found high levels of compliance with even social distancing among 250 university students in Germany.

In light of the findings outlined above, it seems that the prevalent pessimistic view of young people's compliance rates is inconsistent with real, objective data. This is similar to what Raude *et al*[41] observed about France. Underlying this may be the fact that everyone feels they are complying much more than everyone else with the established regulations. In this sense, it is worth noting the study by Shelby *et al*[38] which observed a discrepancy between respondents' perceptions of their own compliance (85%) and their perceptions of others' compliance (65%).

Nevertheless, even if non-compliance is not always as high as is often perceived, it may be interesting to determine the factors behind both compliance and non-compliance with the aforementioned measures.

Explanatory factors

At this point, it may be worth mentioning both more immediate factors that explain why people do not comply with the measures and not so immediate previous risk factors, which at both a personal and social level may be influencing this lack of compliance. Regarding the former, variables such as the perception of risk, the search for information, trust in the government and the perception of compliance with these measures as a moral obligation are related to a higher level of respect for them (see studies cited by Nivette *et al*[34]).

In their own study, Nivette *et al*[34] distinguished between internal (such as wanting to protect oneself and others) and external factors (such as having social events cancelled) for social distancing compliance. Likewise, they identify a series of barriers that can lead to non-compliance with this measure, including feelings of sadness derived from loneliness or the inability to work remotely. Fortunately, aspects such as misconceptions and/or conspiracy theories yielded practically residual data (1%-3%), suggesting that despite the attention these issues sometimes receive in the media, they do not really seem to be a major reason for failing to comply with the recommended health measures.

Among the variables mentioned above, the one that seems to stand out from the others is trust in the government, which largely determines the population's compliance with the different preventive measures in countries such as France[41] and Japan, to cite only two.

In relation to the not so immediate pre-existing aspects, which can be considered more long-term risk or protective factors, two types can be distinguished: social factors and personal factors.

The most widely studied social factors have been gender and age. For example, it has been found that women generally comply more than men with the established public health measures[34]. This was also found in Spain in a study carried out during the weeks of severe lockdown[42] as well as in France where it was found that men, as well as young adults, were less likely to follow the guidelines established to curb the spread of the virus[41]. This second finding is also linked to the other psychosocial variable mentioned above, namely age.

Numerous studies highlight age as a key variable for compliance with preventive measures; in some cases, even after controlling for the effect of other factors[43]. Nivette *et al*[34] found that people over 45 years of age were significantly more compliant with social distancing than those aged 18-24. These results are consistent with those reported in Spain during the severe lockdown by Gutiérrez *et al*[42]. These authors found that the age groups most likely to break the rules were those between 20-30-years-old and under 20-years-old, which had non-compliance percentages of 32.7% and 23.3%, respectively. Similarly, Margraf *et al*[44] point out that there are countries, including Spain, in which younger people show less adherence to norms than other age groups.

With respect to personal variables, one of the factors that has been studied regarding non-compliance with health measures among the adult population in general is personality, specifically aspects such as high levels of the so-called dark triad traits (machievellianism, narcissism and psychopathy) or low levels of agreeableness[45]. These are known as antisocial traits and have been studied by Miguel *et al*[46] in a large sample of Brazilian adults ($n = 1578$), with the results indicating (as expected) that people with an antisocial pattern profile found it more difficult to comply with the measures than those with an empathy pattern.

The same can be said for people who avoid risk and are more prone to health/safety behaviors. In times of the pandemic, these people tend to adopt measures such as social distancing and mask wearing[46,47] or tend to reduce their mobility[48,49] to a greater extent than those with a risk attitude.

Coroiu *et al*[14] discuss the role of empathy and prosocial behavior as well as the barriers and facilitators of compliance. Moreover, a series of studies conducted with 3718 people from Germany, the United States and the United Kingdom has found that fostering empathy for those most vulnerable to the virus encourages adherence to prevention measures[50].

Likewise, level of self-control also seems to have a significant influence on compliance with the established preventive measures. People with higher levels of self-control comply to a greater extent with rules such as social distancing or the use of face masks, and the weight of this factor remains significant even after controlling for other factors such as political ideology or demographic variables[47].

Xu and Cheng[47] also identify another personal variable, in this case of a cognitive type, which influences compliance with preventive measures: need for cognition, understood as a tendency to seek information and engage in systematic thinking that increases decision-making competence. This variable has previously been associated with other healthy behaviors, such as being informed about AIDS or adopting a positive attitude towards condom use[51]. In the context of the current pandemic, need for cognition is understood as a personal variable associated with a higher level of compliance with measures such as social distancing and face mask wearing.

Another psychological factor that may influence compliance is the time perspective [52], defined by Sobol *et al*[53] as “a cognitive style involving a tendency to focus on a particular segment of time: past, present or future” (p.2). The “carpe diem” perspective (focused on the here and now, in the sense of being aware that what one does at this moment has an influence on the future situation) has been found to be the best predictor of compliance.

All the factors described so far refer to the population in general, but what can be said about the younger generations in particular? Is there any factor that explains the level of compliance with preventive measures among this segment of the population?

One of the variables that has been studied in relation to both youths and the general population is gender, although the conclusions are as yet unclear. For example, in a study carried out with young adults in Switzerland, a higher level of non-compliance was found among men in terms of total scores on the hygiene, social distancing and general non-compliance measures. However, a more detailed examination of the results revealed no differences between men and women in many of the specific aspects of each measure[34].

Oosterhoff *et al*[37] analyzed motives for respecting social distancing norms in a sample of 683 American adolescents aged between 13 and 18 years from the perspective of Self-Determination Theory[54]. According to this theory, the motives that prompt a person to act in a certain way may be externally controlled (*e.g.*, obeying imposed rules) or autonomous (volition-based). A priori, autonomous motivations are more closely associated with prosocial behaviors than controlled motivations[55] as well as entailing greater benefits in terms of mental health for the person who puts them into practice[56]. These reasons were the ones most commonly reported by the participants in the study. Specifically, “youths most commonly referenced prosocial motivations, including social responsibility (78.1%) and not wanting others to get sick (77.9%), to engage in social distancing”[37], although controlled motivations were also common. Similar results were found by Alivernini *et al*[23] in a longitudinal study with Italian adolescents.

In relation to those rules with which we are often obliged to comply, prior to the pandemic it was found that young people with characteristics of the so-called antisocial potential[57] are more likely to break the rules, and the scientific evidence gathered in times of the pandemic also seems to be consistent with this. For example, impulsivity and certain personality traits such as amorality, egoism and psychopathy are associated with greater non-compliance with health measures[58]. For their part, Alivernini *et al*[23] report that of the personality-related aspects they analyzed, only one, openness to experiences, was found to have a statistically significant relationship with physical distancing behavior. Specifically, the results indicated that adolescents who were more non-compliant with the social distancing norm were those who were more attracted to risk, although this association was weak.

Another variable that has been identified is peer influence, which is particularly important (both negatively and positively) during this vital developmental stage[59] and may be an aspect to take into account in the future when attempting to design campaigns that really manage to convince this age group of the importance of

complying with health measures.

For their part, Sobkow *et al*[60] focused on risk perception and the cognitive and emotional factors that may influence it, studying the impact of variables such as affect, mental imagery, controllability, self-efficacy and numeracy.

In a study carried out with 2130 Chinese adults (university students), Guo *et al*[61] analyzed the individual and environmental factors that may be behind compliance with social distancing rules. The individual factors identified included variables such as gender, depressive symptoms and psychological distress, whereas the influence of social media was the principal environmental factor found, with people who spend less time informing themselves online being more vulnerable due to their limited knowledge of the measures required to stay safe.

Finally, another factor that seems to influence the younger population's compliance with health measures such as social distancing is the number of elderly people they know personally[40]. This may be relevant when designing and implementing prevention programs aimed at this segment of the population.

Table 1 summarizes the main findings on factors related to the level of compliance with COVID-19 prevention measures.

CONCLUSION

The emergence of the COVID-19 pandemic at the beginning of 2020 plunged the world into an unprecedented situation, with implications in all spheres of people's lives. In order to cope with this crisis and curb the spread of the virus, governments in different countries took measures, which were generally stricter at the beginning of the pandemic (*e.g.*, lockdown) and have since been relaxed as contagion and death rates and pressure on healthcare systems have decreased[6]. Nevertheless, some restrictions, such as the use of face masks, hand washing and social distancing remain in force in many countries, and until vaccines and treatments begin to have a clear impact, compliance with these rules will continue to be key elements in the struggle to keep the situation under control.

In this regard, it should be noted that adolescents and young people have been internationally identified as the age group least committed to compliance with these measures[34,42,44]. However, it is important to understand that given the characteristics of their developmental stage (*e.g.*, need for greater contact with peers for their cognitive, social and emotional development), compliance is particularly difficult for them. Moreover, it should not be forgotten that adolescents and young people are more vulnerable to mental health problems[20], and limitations on social contact put them at even higher risk[22]. One way or another, what is certain is that it is not yet possible to anticipate how long physical distancing measures will remain in place and how they will affect adolescents' and young people's development and mental health in the longer term. Although social distancing measures are temporary, several months of physical distancing represent a large proportion of a young person's life during a sensitive period of development, and in this sense, the effects may be much more intense and pernicious than among adults. Furthermore, we still do not know how other stressors stemming from this crisis will influence adolescents and young people in the future (economic pressure, uncertainty, cancellation of public events marking key life stages and rites of passage, *etc.*)[16]. Finally, although technological devices enable relationships to be maintained at a distance and bring people closer to their peers, their excessive use also has negative consequences[30], and they should not, therefore, be viewed as the only alternative.

As for the factors that influence compliance or non-compliance with established measures, the few studies that have been published to date point to a wide range of different elements that still require further research and in-depth study. For the moment though, it seems that lower compliance is associated with factors such as being male and being young as well as with having an antisocial personality pattern, a low level of empathy, a low level of self-control or a certain tendency to engage in risky behaviors. The level of information to which one is exposed, the influence of peers and the number of elderly people one knows also seem to play a role. Although explanations of the influence of these factors are still tentative, they point the way for further research. Moreover, it is interesting to consider these factors as possible foci for interventions in the long term. Indeed, many of the factors identified can be modified or improved: for example, self-control can be strengthened with practices such as delayed gratification[62,63]; news report and message framing may affect how people evaluate the risk of an incident or situation[64,65] and may therefore be useful for

Table 1 Explanatory factors for compliance/adherence to coronavirus disease 2019 measures

Factor types	Factor sub-types	Specific aspect	Adherence/compliance
Immediate factors		Trust in the government	Higher level of trust
		Perception of risk	Higher perception of risk
		Search for information	More search of information
		Perception of compliance with rules	Perceiving compliance as a moral obligation
Previous risk-factors	Social factors	Gender	Women
		Age	Older people
	Personal factors	Personality traits	Machiavellism
			Narcissism
			Psychopathy
			Antisocial traits
		Risk taking	More risk taking
		Empathy and prosocial behavior	Higher empathy and prosocial behavior: higher compliance
		Self-control	More self-control: Higher compliance
		Need for cognition	Tendency to seek information and to follow a systematic thinking
		Time-perspective	"Carpe diem" perspective
		Motivation	Autonomous motivation
		Influence of peers	Depending on peers' attitudes
		Number of elderly people one knows	Higher number
			Higher compliance

addressing risky attitudes[40]; and emphasizing relations with the elderly may help raise awareness and enhance empathy towards this population group.

However, although the contribution of these individual factors is of great interest, when thinking about preventive strategies or awareness raising campaigns, it is important to include interventions that will impact a large number of people since individual variables are usually difficult to modify, even more so in such a short period of time as that required to curb the spread of a virus. It is particularly important to continue with an exhaustive study of all the factors that facilitate or hinder compliance with social distancing measures ("stay-at-home" or "shelter-in-place" orders), given that these may potentially be required for months or even years[14] and involve significant lifestyle changes. One possible strategy for encouraging these behaviors would be to provide the population with real data on those who do not comply with the measures, of whom there are far fewer than generally believed[41]. This would perhaps encourage people to consider non-compliance behaviors as isolated and non-representative events, which would in turn decrease the general frustration felt by those who make the effort to comply as well as increasing social criticism of these attitudes.

In relation to the specific ways in which preventive or intervention campaigns can be implemented, some authors highlight the need to identify which groups are at greater risk of non-compliance with the rules in order to design social marketing strategies or policies that are customized and adapted to their specific characteristics [66]. The basic argument is that if we want standards to be effective, we cannot simply direct them at the entire population and expect everyone to comply. Rather, an effort should be made to adjust them to different social groups and their particularities.

To facilitate this last point, and given that adolescents and young people are one of those groups with a lower level of compliance, many authors and studies have already pointed out the importance of giving youths a voice and involving them in strategic plans for restructuring the policies, systems, workflows and communities affected by COVID-19. The idea is that they should not perceive the measures as something

imposed by adults or institutions, and therefore far removed from their own world, but rather as something worth getting involved in. It is therefore advisable to give adolescents and young people the autonomy to develop and deliver their own campaigns through social media, for example, supported by influencers and/or people who are relevant to them[60]. We should validate the passion felt by youths to regain normalcy while at the same time encouraging, empowering, and engaging them in forming creative solutions for a new normal.

Finally, it is important to note that although the future of the coronavirus crisis looks brighter every day, the reality is that we will continue to have to live with these measures for some time yet to come. It is therefore essential to apply the knowledge we are gaining to the way in which we deal with this pandemic, until it finally comes to an end, and to take advantage of all these ideas and resources to prepare for other social and health crises that may occur in the future.

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