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Chapter

The Social Isolation Triggered by COVID-19: Effects on Mental Health and Education in Mexico

Ana Karen Limón-Vázquez, Gabriel Guillén-Ruiz and Emma Virginia Herrera-Huerta

Abstract

Public health in Mexico was on alert since the World Health Organization declared a pandemic of COVID-19. This disease represents a challenge not only for the health system but also for the education system, which implement emerging measures such as online education. In Mexico online education has several limitations associated with computer and internet access, which affect the academic achievement of the students. Additionally, the main measures against the pandemic are social isolation, but this measure can generate stress and affect the academic achievement and mental health of the population. The present review was based on Mexican scientific and journalistic sources, and a thesaurus system such as Medical Subject Headings (MeSH) terms to find original articles to social isolation, mental health, and academic achievement. The contribution of this chapter is to describe the effects that social isolation has caused on mental health and scholar challenges in the Mexican student population.

Keywords: social isolation, COVID-19, stress, online education, academic achievement

1. Introduction

Humanity has always coexisted with several microorganisms, groups of bacteria and viruses that surround us at all times, with some of these, mainly bacteria, even symbiotic relationships have been established, for example, the various bacterial species that make up the intestinal microbiota. On the other hand, the relationship with viruses has been more conflictive, from adenoviruses that cause respiratory infections, conjunctivitis and gastroenteritis, to the human immunodeficiency virus that causes acquired immunodeficiency syndrome, pathologies caused by viruses have always been present. In this sense, the occurrence of a new virus that affects humans causes uncertainty. Currently, the COVID-19 disease (coronavirus disease 2019) caused by SARS-CoV-2 or severe acute respiratory syndrome coronavirus 2, a virus of the coronavirus family, originated in Wuhan, China in late 2019 [1]. It is a disease of the respiratory tract that presents with symptoms such as fever, dry cough, shortness of breath, muscle pain, rhinorrhea, chest pain, and some patients may have diarrhea, nausea, and vomiting [2], it is transmitted from person to person through small particles of contaminated fluids [3] or by contact with contaminated surfaces [4].

On January 30, 2020, the World Health Organization declared a public health emergency of international concern due to COVID-19 [5] and on March 12, 2020, due to the speed of transmission of the disease was declared a pandemic, by this date, 125,000 cases had been reported from 118 countries and territories [6] including Mexico, which was in phase 1 (importation) and reported its first case on February 28, 2020. Due to the spread of the pandemic in Mexico, phase 2 (community dispersal) of the disease began on March 24, 2020, and on March 30, the government declared a national health emergency [7]. The national day of healthy distance was implemented, a national strategic program of actions to mitigate the spread and transmission of the virus that included the suspension of non-essential activities, cancelation of events or meetings of more than 50 people, hygiene measures such as the washing of hands frequently, sneezing or coughing applying the respiratory tag (using the fold of the arm at the elbow level), not shaking hands or kissing and home protection of the entire population [8], however, despite the actions implemented, April 21, 2020, was released phase 3 (epidemic) of the disease [9].

As part of the Mexican government's strategy to reduce the spread of the virus, since March 14, 2020, the Ministry of Public Education suspended face-to-face education in the classroom [10], and to continue with academic activities, they were implemented new teaching strategies through the use of virtual media and work from home, to conclude the school year, which at the time of suspension had an advance of 73% [11]. However, in Mexico online education has several limitations such as the absence of a computer or lack of access to the internet, which affects the academic achievement of the students. Additionally, the main measures against the pandemic is social distancing and isolation [12], but social isolation added to the uncertainty of progress, the lack of an effective treatment and vaccine, and the prolongation of quarantine have generated negative psychological manifestations such as anger, irritability, aggressiveness, excessive vigilance in the face of possible symptoms of the disease, predisposing the population to the development of anxiety disorders, depression, panic attacks and post-traumatic stress disorder [13–15]. Therefore, the objective of this chapter is to describe the effects that social isolation has caused mental health and scholar challenges in the Mexican student population.

2. Influence of COVID-19 on the mental health of Mexicans

Mass confinement at home, lack of social interaction, adaptation to new work and study routines at home and lack of physical activity are stressful changes that affect emotional regulation [16]. Social isolation generates maladaptive behaviors that affect work, family, social and educational relationships (**Table 1**).

In addition to the negative effects associated with social isolation, in people who have been in contact with COVID-19 positive patients, there is an increase in negative feelings such as fear, nervousness, guilt, and sadness compared to people who have not had these contacts [18], possibly due to fear of contagion.

In the Mexican population, it is estimated that up to 50.3% of the population may present psychological distress, 15.7% symptoms of depression, and 22.6% symptoms of anxiety due to the COVID-19 outbreak [19], and these manifestations are even greater in the female population, they reveal elevated levels of psychological stress, anxiety and depression [19, 20]. In general, it is estimated that the indicators that generate more stress in the Mexican population are that the health system collapses and there are insufficient resources to care for the sick, which also generates episodes of anxiety and uncertainty [20].

Behavioral disturbance	
Sadness feelings	Difficult to focus
Apathy	Wishes to die
Indifference	Mental exhaustion
Ira	Loss of interest in daily activities
Cry frequently	Impact on decision making
Lack of appetite	Social dysfunction
Difficulty to sleep	

Table 1.
Maladaptive behaviors associated with social isolation [17].

Additionally, other studies have revealed that the greatest concerns of the Mexican population center on the possibility of contracting COVID-19, the loss of employment, and the reduction of economic income [21]. According to the international project COVIDSTRESS, the Mexican population has a moderate level of stress, and only 11% of the surveyed population shows high levels, and the data is consistent in stating that the female population is the one with the highest levels, this associated factors such as economic concerns, the risk of contagion of COVID-19, fear of being hospitalized, concern for friends and family who live far away [22], additionally this study also showed that the population showing the highest levels of stress, they are those who have followed the indications of maintaining social isolation, compared to the population that did not make changes in their social life to face the pandemic [22]. Consistently, the Universidad Iberoamericana, AC, through the Research Institute for Development with Equity (EQUIDE) conducted the Monitoring Survey of the Effects of COVID-19 on the Well-being of Mexican Households (ENCOVID-19) to learn how the crisis due to the pandemic has affected the well-being of Mexican households and reported that as of May 2020, 8.4 million people had lost their jobs, were suspended without pay, or could not go out to look for work and of these, 31.4% presented severe anxiety symptoms, mostly women [23], consistent with the studies mentioned above.

On the other hand, there are social groups that are more vulnerable to stress and mental health problems associated with the COVID-19 pandemic (**Table 2**), which have even higher levels of anxiety than the general population.

Mexican university students report that, during the confinement stage, they have suffered headaches, a feeling of lack of control and little satisfaction with carrying out their activities, others suffer from overwhelming, nervousness, bad mood, less activity and feelings of futility and sleep problems [25]. Interestingly, in this population it is men who present higher levels of anxiety; however, women present higher levels of psychosomatic symptoms, insomnia, social dysfunction, depression, and stress [25]. Frustration, high levels of stress and physical and emotional exhaustion are some of the characteristics of the population that changed their daily routine and began to work from home.

It should also be noted that the uncertainty generated by the pandemic is perceived differently, depending on the social strata. Although the fear and stress caused by the pandemic affects the entire population, definitely people in marginalized situations, with low income, in situations of poverty and extreme poverty, see stress situations intensified due to the presence of other factors such as unemployment, violence, lack of access to digital, and medical services among others [26] situations, that make this population especially vulnerable to the effects of mental health generated by the fear of suffering from COVID-19.

On the other hand, people with better economic income and in more favorable social situation can fall into a state of susceptibility and false interpretations of the symptoms, which leads them to carry out irrational behaviors such as frequently attending the health system, excessive hand washing, social withdrawal, and compulsive purchases, for example, antibacterial gel, masks, gloves, and disinfectant soap [27] generating shortages and consequently an increase in the price of these items [28], adding even more stress to the classes less favored social groups who will be unable to access disease prevention supplies.

Added to this, the misinformation generated in social networks, the media, and the false news found on the internet create alarm and concern, and this misinformation is associated with panic purchases of unnecessary medical supplies and drugs [29], which also causes states of stress, and negative emotions and thoughts that put the mental health of the population at risk [30].

In this regard, the Citizen Council for Security and Justice of Mexico City has declared that calls to the psychological support line increased by 40% compared to the records before the pandemic. Most communicating patients express fear and anxiety about contagion and agree that this situation is associated with prolonged periods of social isolation [31]. Some recommendations issued by the Council and other authors, to mitigate the effects on mental health by the COVID-19 pandemic are summarized in **Table 3**.

Vulnerable social groups in Mexico	
Population that must be exposed to contagion due to the need for employment	People with pre-existing mental disorders
Health personnel	People who lost loved ones to COVID-19
Older adults	Prisoners
Patients with chronic diseases	Homeless
Children and adolescents subjected to stressful conditions at home	People with low income

Table 2.
Social groups vulnerable in Mexico to the negative impacts of COVID-19 on mental health [24].

Recommendations	
Recognize the feelings and emotions that alter mental health	Maintain frequent contact with friends and family
Seek professional help	Have quality sleep
Consult reliable information	Sleep at the same time and approximately 8 hours
Avoid excess information	Be physically active for at least 30 minutes a day
Establish schedules to carry out activities	Maintain established mealtimes
Maintain an active routine like the one performed before isolation	Eat and drink healthy
Limit the use of sources of false information about the pandemic	Avoid substances like alcohol or drugs
Keep busy	Do recreational activities at home
Perform activities according to their priority	

Table 3.
Recommendations to mitigate mental health effects from the COVID-19 pandemic [18, 21, 32, 33].

3. Effects on education and new teaching strategies derived from social isolation due to the COVID-19 pandemic in Mexico

As a strategy of the Mexican government to reduce the spread of the virus, face-to-face classes were suspended, and measures were implemented to continue academic activities applying new teaching strategies through the use of virtual media and work from home [11].

The Ministry of Public Education implemented the project "Learn at Home on TV and Online" during the period of suspension of school activities, it was pointed out that this isolation measure would serve to prevent the spread of the virus and that students would have a learning opportunity in collaboration with the family. Contents ranging from preschool to upper secondary education were transmitted, with information based on the contents of the Free Textbooks provided by the government, and the activities planned by the teachers [34, 35].

The education program "Learn at Home" was broadcast through various open signal television channels and pay television service. The Radio Strategy for Indigenous Communities and Peoples was also implemented, which integrated auditory content for speakers of 15 different languages [36]; and in isolated communities, the National Council for Educational Development (CONAFE) delivered more than 300,000 packages of school supplies to students [37] to promote access to education.

In basic education, which is that which contemplates the minimum knowledge that a person between 6 and 14 years of age must have, booklets were delivered with activities obtained from the textbooks provided by the government, while for secondary education, that which contemplates the knowledge expected in people aged 15 to 18, the strategy consisted of increasing extracurricular tasks concerning the content provided by teachers via virtual or the broadcasts that the government carried out on television, radio frequencies or via the Internet [38].

The universities implemented actions to continue virtually or remotely, therefore the most outstanding actions were the transformation from classroom to virtual teaching, the provision of video graphic resources and videoconferences through digital technologies [39], as well as the implementation of 4 main work modalities [40], whose characteristics are summarized in **Table 4**.

Derived from social isolation associated with the pandemic, the traditional school has changed, the attendance of students in classrooms at a specific time has

University work modalities	
Modality	**Characteristics**
Teaching-learning	Generate self-study activities Monitoring and evaluation of activities Generate evidence of learning
Investigation	Activities for the care of animals, plants, crops, and laboratory supplies Maintenance of equipment and facilities Adequate activities to continue ongoing investigations
Bonding	Establish adequate agreements with third parties to continue or pause field practices, stays in companies and industries, social service, and professional practices
Organization and planning	Rethink or conclude regulations, study plans, inventories and propose strategies for the resumption of activities

Table 4.
Work modalities implemented in university education during the COVID-19 pandemic [40].

been replaced by new distance education strategies, which implies that students and teachers make use of technological tools to effectively comply with learning, using digital folders through applications such as Google Drive®, Dropbox®, OneDrive®; establishing communication through social networks such as WhatsApp® or Facebook®; and by giving lectures and virtual seminars through platforms such as ZOOM®, Google Meet®, Microsoft Teams®, Skype®, among others [41, 42]. However, for both teachers and students, social isolation and online and distance education have been a challenge.

Teachers are in a process of self-learning of new technologies to create creative and innovative content, putting their imagination to prepare a lecture, develop exercises to reinforce learning, promote student participation through forums and chats, enrich contributions of students, create debates and appropriate conclusions of the topics covered, and to verify the learning obtained, they should propose evaluations based on essays, summaries, projects, oral or written exams, as well as self-evaluations [39, 43, 44]. In this sense, evaluations cause that teachers get concern due to the fear that students consult sources of information to respond correctly and in this way the learning process is not ensured, however, open-book exams are useful and present advantages as to promote creativity, critical thinking and develop the ability to find information and interpret it correctly. Therefore, teachers can view online exams as a useful way for students to substantiate various topics based on bibliographic material and as a part of transforming their teaching-learning processes [45].

On the other hand, online education presents greatest challenges for students that involve greater responsibility, discipline, perseverance, organization, time planning, autonomy, and self-learning, causing online education to be more demanding than face-to-face education. Although virtual classes could produce a reduction in knowledge caused by lack of effective communication, and exchanging ideas, lack of feedback from teachers, or disinterest by students, as well as physical fatigue [46], students should establish a work plan with daily objectives, prioritize activities, work and rest schedules and interact efficiently with teachers when there are doubts [47].

The success of online and distance education depends on various factors, among which are the profile of the disciplines taught, the educational and academic model of the institution, the socio-economic profile of the students, the profile of the teachers (age, teacher training, digital skills and willingness to change) and financial resources [39] some recommendations for successful distance education are: continue with the usual class schedules, establish 10-minute breaks with students because long sessions are boring or tedious and promote the participation of all students [45].

4. Social isolation and its influence on academic performance

Currently, students are less physically active, spending more time in front of screens, which deteriorates their sleeping and eating habits, and these negatives effects are exacerbated by social isolation [48]. Social isolation was implemented as a preventive measure to avoid physical contact and reduce the number of infections due to the COVID-19 disease without the intention of affecting social communication, establishing new forms of social interactions, e.g., communication through virtual platforms and social networks, unfortunately the results have been different and isolation it has been presented as a stressful situation that has generated conflicts and an unfavorable environment for young people to function effectively in the new modality of distance study [41].

Unfortunately, during the stage of isolation, distance education has generated that students go through situations for which they were not adequately prepared, for example, the difficulty in organizing their time and the lack of the necessary resources to carry out their school activities, added to factors such as family dysfunctions, lack of communication and violence, subjecting them to high levels of stress, frustration, physical and emotional exhaustion [49, 50], which can lead students to develop episodes of anxiety or depression [51].

In this sense, positive emotions such as happiness or joy, hope, inspiration, interest, motivation, enthusiasm, among others, stimulate good brain function, improve concentration capacity, reasoning, memory, and decision-making [52], which influences in good academic performance, while social isolation, anxiety, and depression generate attention and memory problems and affect decision-making [53]. It has been reported that in adolescents with depressive characteristics such as low self-esteem, there is poor academic performance, difficulties in understanding content, antisocial behaviors, and a predisposition to drug abuse [51]. A student who perceives himself as a good student ensures high academic performance, on the contrary, students who make a negative evaluation of themselves avoid academic tasks for fear of failure [54], which generates low academic performance [55], similarly students with symptoms of anxiety and depression are perceived as incompetent affecting academic performance [54, 56].

Anxiety, depression, fear, and uncertainty influence the learning process, so it is recommended that teaching be flexible and adapted to the needs of each student [57]. The resilience, motivation and, skills to learn independently of everyone are important factors to obtain the knowledge imparted through the new distance education systems.

The United Nations International Children's Emergency Fund (UNICEF) in Mexico established some recommendations so that children and adolescents can maintain healthy mental health (**Table 5**).

Recommendations	
Learning activities should not exceed 20 min for children and 45 min for adolescents	Find ways to keep learning
Establish schedules to carry out activities	Be kind to people and yourself
Recognize and not repress emotions	Take care of your health by taking preventive measures
Establish communication with friends through virtual means	Attend medical attention if necessary

Table 5.
UNICEF recommendations for the maintenance of mental health in children and adolescents [58, 59].

5. Limitations of online education

In Mexico, there is great economic, social, and educational inequality, mainly in rural areas [60]. According to the National Survey on the Availability and Use of Information Technologies in Households 2019, only 43% of the population has a computer and 56.4% of households have internet access, however, access to such technologies are not equitably distributed between urban and rural areas. 49% of the Mexican population living in urban areas has access to a computer while only 22.1% of the rural population has that access, in urban homes 65.5% have access to the internet while in only 23.4% of rural areas have such access [61]. Social inequality also makes a big difference in access to information technologies, since in

people with low economic incomes (<$ 30,016 MXN per quarter) only 20.1% of the population has access to a computer and 19% have access to the internet, in contrast, among people with higher income (> $ 55,495 MXN per quarter), 76.6% have access to a computer and 89.7% of them have internet access [61, 62].

Adapting to "online" educational life has been complex, mainly due to the lack of access to computers, tablets, or smartphones, but also because the speed of Internet connection in the country is inefficient [63]. This digital gap in Mexico will lead to great challenges, especially in students who lack self-regulation and self-discipline [64].

In the new educational program implemented in response to the contingency, not all educational institutions nor all teachers have responded in the same way to the demands of online education, for example, private education institutions have greater access to digital environments [65], on the contrary, public schools have to implement other strategies such as teaching classes through open television or radio, private school teachers also have more experience and access to information technologies, the real challenge is that the online education is delivered with the highest possible quality [66] with scarce resources.

On the other hand, some institutions have not shown interest in the face of the pandemic, virtual classes are supported by tasks that are sometimes not reviewed or given feedback, and teachers have lost communication with their students [67]. On the contrary, there are teachers overwhelmed and concerned about sending educational activities, establishing effective communication with their students and trying to ensure that they acquire the best possible knowledge and skills, also there is concern for those students with limited resources who eat in school canteens and who are currently not receiving adequate food [26].

Another limitation of online education is that public institutions are not equipped or have the experience to teach online classes, or teachers are not prepared to do so [68], because there was not adequate training for teachers to integrate the information technologies to the pedagogical experience [69]. However, institutions continue to require teachers to provide evidence of evaluations and work plans to justify compliance with the educational program [67].

There are many shortcomings and inequalities, both in the availability of resources and in the preparation of teachers, at the higher level, there are few universities that have adapted efficiently to the transition to online education, implementing appropriate learning systems and with experienced academic staff [64]. A survey carried out among professors of the National Autonomous University of Mexico (UNAM), the main public institution of university education in the country, indicated that 60% of them have received support from the university to transform their distance activities, 43.3% have problems with the availability of time and class schedules or lack adequate spaces to work remotely, 39.7% indicate they have problems with access to the Internet, computer equipment or have no experience in handling of educational platforms, and 14.9% indicated having affective affections such as sadness, frustration, anxiety or fatigue [70]. In this survey, teachers comment that the biggest problems their students present are that they do not have access to the internet, they lack computer equipment or they do not know educational platforms, lack of time and adequate spaces to work remotely [70].

On the other hand, it has also been reported that students report having a computer at home, but that it is used by more than one member of the family, which makes it difficult to access to the equipment and generates feelings of frustration, anxiety, fear and insecurity [71, 72] given the uncertainty of their professional preparation.

Online education also affects children who have some type of learning disorder, the education given by parents with the help of manuals and instructions by teachers,

do not ensure that they are learning and that this remote process is as effective as the learning obtained in person by specialized teachers, causing deterioration in the academic levels of children, with implications for the future [73]. Sometimes parents are not able to guide their children in school tasks because they do not know pedagogical strategies that make it easier for them to explain various topics, or they lack the necessary knowledge simply, on the contrary, if the parents have a high educational level, these difficulties are overcome and doubts are resolved and activities are created to promote learning [50].

Parents with a higher degree of education have the advantage of being able to support their children in complex procedures, such as mathematical activities, while parents who have no academic training are at a total disadvantage, in addition, the time that parents invest in the education of their children at home is also a factor that influences learning, some parents continue to work from home and others, even with mobility restrictions, must go out to work [65].

6. Final comments

The social isolation generated by the COVID-19 pandemic has generated behavioral changes such as sadness, apathy, anguish, loss of sleep, anger, fear, among others, these maladaptive behaviors have an impact on the mental health of Mexicans, making them vulnerable to developing various disorders such as anxiety, depression or post-traumatic stress disorder, added to this, the population has had to adapt to various activities to continue with social dynamics, such as the case of education, which went from being face-to-face to being taught remotely, this has represented a challenge in a country that seeks to implement measures to provide quality education, considering that Mexico ranks 53 out of 75 countries in terms of quality of the education system, according to the Program for International Student Assessment's (PISA) with scores below the international average [74].

The new teaching strategies implied migrating to the use of information technologies, this has meant that teachers and students make use of technological tools such as applications and virtual platforms to teach or receive classes.

Online education involves great challenges of responsibility, self-learning, discipline and organization, challenges that impact positively or negatively on student performance, for example, the need to study online forces students to become disciplined and self-taught. However, unlimited access to the internet during virtual classes has several disadvantages because they can deviate from the educational purpose by entering leisure platforms, which causes lack of attention and concentration. Because population inequality in Mexico places at a disadvantage the student population that presents a low socioeconomic level and cannot have access to a computer or the internet, coupled with this demographic conditions, the lack of parental attention or the violent environments at home are factors that do not favor learning.

For these reasons, online education is a strategy that has little chance of being effective in the vulnerable population, so far the impact caused by the limitations that students face is unknown, however, the authorities must consider and plan the strategies to mitigate the effects caused.

7. Conclusion

The pandemic caused by SARS-CoV-2 has caused the population to implement prevention measures such as social isolation; however, this causes mental

health effects, placing the population in a state of susceptibility to develop various mental disorders such as anxiety or depression. Additionally, social isolation also damage academic performance of students who are currently receiving an education different from the one they are used to, online education, however, there are also other limitations such as lack of a computer and inaccessibility to internet servers, which cause that academic performance to not be satisfactorily developed, strategies must be implemented so that students receive equitably the education that they are entitled to.

Acknowledgements

This chapter was partially supported by Cátedras CONACYT Grant #1840 (National Council for Science and Technology) to Gabriel Guillén-Ruiz. Ana Karen Limón-Vázquez received fellowships from CONACYT (Reg: 752407).

Conflict of interest

The authors declare no conflict of interest.

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