New Studies on Suicide and Self-Harm

Edited by Cicek Hocaoglu

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Contributors

Alejandro Daniel Domínguez-González, Genesis Rodriguez-Rodriguez, Mary Roman-Perez, Fabiola Rodriguez-Flores, Yaritza Inostroza-Nieves, James Pease, Merve Yazici, Cicek Hocaoglu, Sadaf Konain Ansari, Aroob Fatima, Ignacio Alejandro Mendoza-Martínez, Blanca Rosa García-Rivera, Jorge Luis García Alcaraz

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Meet the editor

Cicek Hocaoglu obtained her medical degree from Bursa Uludag University Faculty of Medicine, Turkey. She received postgraduate training in psychiatry at the Medical School of Karadeniz Technical University, Trabzon, Turkey. She is currently a professor and head of the Department of Psychiatry, Recep Tayyip Erdogan University Medical School, Rize, Turkey. She has published many national/international scientific articles, book chapters, and congress papers. Her interests include consultation-liaison psychiatry, suicide, schizophrenia, anxiety disorders, bipolar disorder, and psychopharmacology.

Contents

Preface

Suicide is one of the most tragic events in human life. Every year, approximately 1 million people die from suicide worldwide. Suicide is one of the most important causes of death.

There are many reasons that lead to suicidal behavior. These include mental and medical diseases and economic, social, cultural, and religious reasons. Epidemiological risk factors for suicide have been addressed in numerous studies. Young age, male gender, being single, and economic crisis are among these risk factors. In addition, having a previous suicide attempt and a diagnosis of depression are among the important risk factors.

Another important public health problem is self-harming behavior. Self-harming behavior, which is especially common in adolescence, may occur during the course of many mental illnesses. Self-harming behavior, which has devastating social and psychological consequences, can also be confused with a suicide attempt.

This book discusses the current literature on self-harming behavior and suicide and prevention. Chapter 1 examines suicidal ideation, mood disorders, and coping strategies in medical school students. The increasing suicide rates among physicians are striking. For this reason, identifying risky individuals starting from their student years can be lifesaving. Chapter 2 discusses suicidal behavior after natural disasters. Natural disasters that have occurred almost all over the world in recent years have deeply affected the lives of many people. Increases in suicidal behavior are reported after natural disasters that lead to devastating psychological, social, and economic consequences. Chapter 3 highlights new interventions for suicide prevention. Developing new interventions for suicide prevention can play an important role in reducing suicide rates. Chapter 4 reviews current diagnostic and treatment approaches for self-harming behavior in adolescents. Early diagnosis and treatment of self-harming behavior, frequently observed in adolescents, is important. Chapter 5 examines the untamed mental well-being of children from shadow-parent families. Shadow parenting is a common problem today. The pressures of modern life, technology overload, and societal expectations contribute to emotionally distant parent–child relationships. Finally, Chapter 6 discusses psychosocial factors associated with suicidal ideation in university students during the COVID-19 pandemic.

We want to thank all the authors and publishers who contributed to the preparation of this book for their careful study. We hope it will be a valuable resource for our colleagues working in mental health.

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Cicek Hocaoglu
Recep Tayyip Erdogan University,
Rize, Turkey

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Chapter 1

Suicidal Ideation, Socioemotional Disorders and Coping Strategies in Medical Students

Alejandro Daniel Domínguez-González

Abstract

Suicide is a serious public health problem whose causes are biological, psychological, social, and cultural, factors that are mostly preventable if they are known and treated on time. In the transition from adolescence to adulthood, the university population is vulnerable to developing emotional disorders. Among them, medical students are the ones who present higher levels of anxiety, depression, and suicidal ideation. In this essay, we analyze the prevalence of emotional disorders and suicidal ideation in medical students at our university and expose the efforts made to transform some psycho-emotional determinants by providing students with coping skills and strategies that allow them to manage their emotions and generate effective support networks among the student community, to increase the individual well-being and reduce the incidence of suicidal behavior.

Keywords: anxiety, depression, self-esteem, emotional dysregulation, assertiveness, self-efficacy

1. Introduction

Medical schools have the mission of training highly qualified, ethical, critical, and humanistic doctors for the promotion and care of health. The medical school curriculum is considered one of the most academically and emotionally demanding. The high degree of stress the degree entails can negatively affect students' mental health and well-being.

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. An integral component of health and well-being underpins our individual and collective abilities to make decisions, build relationships, and shape our world. Mental health is a fundamental human right. And it is crucial to personal, community, and socio-economic development [1]. It is a state of mind characterized by emotional well-being, reasonable behavioral adjustment, relative freedom from anxiety and disabling symptoms, and a capacity to establish constructive relationships and cope with life's ordinary demands and stresses [2].

When a satisfactory state of mental health is not promoted and maintained, it can lead to social isolation, poor academic performance and achievement, school dropout, work absenteeism, low productivity and work quality, lack of healthy and functional interpersonal relationships and support networks, and stigmatization and discrimination, among other aspects [3]. Mental health deficiencies are also associated with a series of behaviors that are potentially harmful to health, such as violence (aggression, suicide, self-harm), the use and abuse of substances, and risky sexual behavior.

To achieve the global objectives set out in the WHO "Comprehensive mental health action plan 2013–2030" and the Sustainable Development Goals, we need to transform our attitudes, actions, and approaches to promote and protect mental health and to provide and care for those in need. We can and should do this by transforming the environments that influence our mental health and by developing community-based mental health services capable of achieving universal health coverage for mental health [4].

2. Socioemotional disorders in medical students

The period of university studies is a critical stage in the emotional development of young people transitioning from late adolescence to early adulthood [5]. In this period, between the ages of 17 and 24, the highest incidence of appearance of mental disorders occurs [6, 7]. Mental health problems during this period are robust predictors of low academic performance [8] and school dropout [9] and have profound consequences on interpersonal relationships [10] and the occurrence of suicidal ideation [11].

College students with mental disorders are more than twice as likely to drop out without earning a degree [12]. An international study conducted by the World Health Organization (WHO) on mental health in college students shows that more than a third of students surveyed tested positive for at least one mental disorder in their lifetime and that the vast majority of these students continued to be active cases in the last 12 months [13].

University students are vulnerable to developing emotional disorders due to the high academic demands and because they are transitioning to physical, emotional, and intellectual maturity, which is confronted and threatened by the demands of the university adult life, with its own social and work demands. Among the student community, medical students present the highest rates of anxiety and depression [14], and these rates could increase toward the last years of their academic training [15]. Systematic studies show that globally medical students have an anxiety rate of 33.8% with a 95% confidence interval of 29.2 to 38.7% [16] and depression of 27.2% with a 95% CI of 24.7 to 29.9% [17].

Major depressive disorder (MDD) has been ranked as the third leading cause of disease burden worldwide in 2008 by the WHO, which has projected that this disease will rank first by 2030 [18].

The prevalence rate of MDD in women is almost double than that in men. This divergence seems related to the physiological characteristics of women's hormonal levels and fluctuations, the different types of psychosocial stressors between men and women, and the behavioral model of learned helplessness. Although until a few decades ago, the age of manifestation of the disease was around 40 years, recent studies show trends of increasing incidence in the younger population due to the consumption of alcohol and other drugs of abuse [19].

Among university students, those studying medicine have the highest prevalence of mental disorders. The main risk factors that contribute to the development of this disorder are excessive workload, financial stress, time management, imbalances between academic and family life, health problems [20], peer competition, constant exams, medical student abuse [21], lack of sleep hygiene [22], lack of healthy eating habits [23], and frequent experiences with agony and death [24].

Studies conducted in Mexico on the prevalence of MDD in medical students show discrepancies regarding the period in which the highest rate of this disorder occurs, which can place it in the preclinical stage [25] or during clinical training [14]. However, all the studies conclude that being a woman is a risk factor for developing MDD [14, 25, 26].

Burnout syndrome was first described in 1974 [27]. It is a syndrome conceptualized as a result of chronic work stress that has not been successfully managed. It is characterized by three dimensions: (1) feelings of exhaustion; (2) increased mental distance from one's work or feelings of negativity or cynicism related to one's work; and (3) a feeling of ineffectiveness and lack of accomplishment [28].

Although the Diagnostic and Statistical Manual of Mental Disorders-5 [DSM-5] does not consider burnout syndrome as a mental illness, the International Classification of Diseases [ICD-11] recently included it as a Problem associated with employment or unemployment [29]. Certainly, it can be classified as a mental health problem. It has been reported that this condition can be established from the beginning of medical studies [30]. It is estimated that among medical students in the United States, the prevalence of burnout is between 45 and 71% and that depressive symptoms and suicidal ideation are more intense among the student population of a medical career compared to that of active doctors [31, 32].

3. Suicide

Suicide is a complex phenomenon derived from the interaction of individual vulnerabilities and socio-environmental factors, ultimately leading the individual to end their existence. It is a tragic reaction to emotional distress from stressful life events or situations. According to the National Center for Injury Prevention and Control, suicide is death caused by injuring oneself with the intent to die, and a suicide attempt is when someone harms themselves with any intent to end their life, but they do not die due to their actions [33].

Every year 703,000 people take their own life, and many more attempt suicides. Every suicide is a tragedy that affects families, communities, and entire countries and has long-lasting effects on the people left behind. Suicide occurs throughout the lifespan and was the fourth leading cause of death among 15–29 year-olds globally in 2019. Suicide does not just occur in high-income countries but is a global phenomenon in all regions of the world. In fact, over 77% of global suicides occurred in low- and middle-income countries in 2019 [34].

Suicide is conceptualized as a continuum of processes beginning with suicidal ideation, defined as the presence of recurrent thoughts of committing suicide, progressing to the elaboration of a suicide plan, a suicide attempt, and, finally, the consummation of suicide [35]. All of these stages are aspects of suicidal behavior, and to prevent suicide at an early point, it is necessary to identify the risk factors that lead the individual to engage in suicidal ideation and then continue down the suicidal path [36].

In the last 45 years, the suicide rate worldwide has increased by 60 percent [37]. The data available from the WHO show that the global average of suicides is 10.6 per 100,000 inhabitants, 7.7 for women and 13.5 for men [38].

Suicide is a complex phenomenon derived from the interaction of individual vulnerabilities and socio-environmental factors, which ultimately lead the individual to end their existence, generally as a tragic reaction to emotional distress derived from stressful life events or situations.

In the systematic review carried out by Lindenman, it is estimated that the relative risk rate of suicide among physicians is 1.1 to 3.4 for men and 2.5 to 5.7 for women, compared to the general population, and from 1.5 to 3.8 for men and 3.7 to 4.5 for women when relative risk rates are compared with other professionals [39].

A recent systematic review and meta-analysis show that the medical profession carries a high risk of suicide, particularly for female physicians [40].

However, the scientific evidence does not show that the prevalence of death by suicide is higher in medical students than in the general population or among other university students. Still, there is increasing evidence linking suicidal ideation in medical students to perfectionism, anxiety, depression, and burnout syndrome [41]. A systematic review shows that the reports in the scientific literature on the suicide rate of medical students are very scarce, and the data collection techniques are very inconsistent. Studies on the suicide rate of medical students require taking into account historical and geographical contexts. Medical students must first obtain a bachelor's degree in the United States and Canada. At the same time, in other nations, such as Latin America, they can enter after finishing high school while some students are still teenagers. In the last century, the ratio of men to women in medical schools has changed from predominantly male to majority female [42].

A multicenter study carried out in Peru shows that two out of 10 medical interns had a positive evaluation for suicide risk and that age and especially alcohol abuse were the associated variables [43]. In a recent meta-analysis on the prevalence of suicidal ideation among medical students, it was 11.1 percent [17].

Suicide prediction and prevention based on the identification of risk factors associated with suicide, including depression, poor coping skills, increased avoidance of stressors, and lack of close social relationships, have had limited success [44], due to that although many people experience similar negative situations, not all will consider suicide [45].

Emotional regulation and reaction to adverse life events have been postulated to moderate the link between mental pain and suicidal ideation [46]. Emotional regulation involves various strategies, such as cognitive reappraisal and emotional suppression, a form of response modulation involving continuous emotional expression behavior [47]. Johnson suggests that positive appraisals reduce the likelihood of stressful events leading to suicidality [48].

4. Socioemotional skills and coping styles

A systematic review and meta-analysis show that the prevalence of suicidal behavior among Brazilian undergraduate students is 9.1% [49]. Furthermore, in first-year medical students, suicide risk is significantly associated with high levels of family dysfunction and signs of depression and anxiety. It is also related to suspected alcohol problems, low self-esteem, and risk of violence [50].

Mental disorders are often accompanied by a lack of emotional regulation skills, as has been reported in studies of anxiety and depression [51], substance abuse [52], and alexithymia and self-harm [53].

Emotional regulation is related to the processes by which the person exerts an influence on the emotions they present, when they present them, and, above all, how they are experienced and expressed [54]. It can also be conceptualized as the processes that alert, assess, and modify our emotional reactions to meet our goals [55].

Generally, people activate emotional regulation processes to deal with a negative affective state, because it has become either intense or long-lasting. Sometimes, the goal may be to reduce a positive emotional state inappropriate to a given social situation, such as delivering bad news in the clinical setting.

Emotional regulation is aimed at being an adaptive process of the individual in the face of adverse affective conditions. However, people can present problematic behaviors such as alcohol abuse, illegal substance use, or self-injurious behaviors, which can be conceptualized as dysfunctional emotional regulation strategies.

From a psychological point of view, dysregulation of emotions is a transdiagnostic element for many affective disorders, the study of which has the potential to contribute significantly to the study of emerging psychopathologies [56]. Emotional dysregulation can be described as affective instability, which manifests as a vertiginous increase in emotion, with a slow return to the baseline emotional line; an overreaction to psychosocial cues with chaotic emotional turns; and overly dramatic expressions [57, 58].

The protective role of emotional regulation against anxiety and depression has been confirmed in studies conducted with various populations [59], including university students [60]. It has also been observed that there is a relationship between maladaptive emotional regulation behaviors, such as denial, avoidance, suppression, and rumination, with the increase in the severity of symptoms of emotional disorders and that adaptive emotional regulation strategies, such as reappraisal cognitive, problem solving, and acceptance, are associated with lower levels of anxiety and depression [61].

Coping strategies are cognitive or behavioral activities that aim to solve the problem and calm the emotional response that, in some cases, can be excessive and disturbing. It has been found that there is a direct relationship between negative coping and the symptoms caused by affective disorders [62].

Emotional regulation capacity is related to the emotional coping capacity, that is, to the actions that a person performs to face the demands of the environment to transform an uncomfortable situation into a more tolerable one, to less stress and conflictive charge, which allows appeasing a startled emotional response [63]. How the individual can estimate a stressful or conflictive environment and value the resources available is directly related to personal well-being. Those medical students who present healthy coping styles have low levels of anxiety and depression, while in students with maladaptive coping styles, we find higher levels of anxiety and depression [64]. Maladaptive coping styles are associated with emotional dysregulation, and functional coping strategies are correlated with positive emotional regulation skills [65].

In university students, there is a positive correlation between coping skills and emotional regulation [66]. It is observed that the participants with high emotional regulation showed high values in the use of active coping strategies such as positive reappraisal, search for support, and planning. In conflictive situations and psychological stress, medical students who use effective adaptive coping strategies have a lower

risk of suicidal ideation. In these cases, it has been seen that the ability to regulate emotions through the cognitive restructuring of a situation is a beneficial way of coping with stressful situations [36].

It has been observed that students with suicidal risk lack strategies to transfer their emotions when faced with stressful situations and tend to resort to avoidant coping strategies [67]. It is necessary to identify risk factors and situations that trigger deep emotional pain or "psychalgia" within each individual's life, poor coping skills, and a lack of close social relationships to protect the mental health of students with emotional disturbances.

5. Medical student formation

Physicians-in-training work in highly demanding physical, emotional, academic, and work environments, where stress is the constant that surrounds the environment, and the high prevalence of socioemotional disorders is the immediate consequence. In many cases, the way of dealing with these high demands involves maladaptive coping styles such as self-destructive behaviors, substance abuse, social isolation, risk behaviors, and so on.

In the medical profession, there is a profound stigmatization toward colleagues who present any emotional disorder because they assume the idea that the doctor is an infallible, unequivocal, indefectible, and safe being who, thanks to his knowledge of health, can self-care and medicate for any signs or symptoms that appear. However, this is far from reality and even more when it comes to mental problems. For this reason, for most doctors and medical students, prejudices based on negative stereotypes generate a self-stigma that makes it difficult for them to ask for help, and in many cases, they try to hide their mental suffering until it becomes severe or disabling consequences occur. Medical schools and faculties have set themselves the mission of training doctors with high ethical and humanistic standards, with extensive knowledge of the functioning of the human body and its interaction with the environment, capable of ensuring the health of the population, making progress in medical science and promoting public health with innovation and educational excellence for the benefit of human beings, the community, and the environment. Still, few of them include their preparation as integral human beings capable of overcoming the pressures of their profession and seeking the well-being of their patients and their own.

At our faculty, we consider promoting mental health as a substantive part of student training for its short-term benefits, which prevents the appearance and development of socioemotional disorders, promotes adequate emotional regulation, and allows the student to face career challenges. In the long term, training professionals with healthy mental health allows them to seek well-being and contribute productively to society.

Students who intend to study at the Mexican School of Medicine are subject to a rigorous selection system, whose last filter is a 16-week pre-medical course. This course offers scientific subjects such as Biology, Biochemistry, Anatomy, and Physiology. It has a Mental Health subject that guides students to recognize the signs and symptoms of emotional disorders that emerge during this course due to the stress generated by the high competition to obtain a place in the faculty. It also helps students identify and recognize the people who form their social support network, including family, friends, and teaching staff members.

6. Emotional coping workshop

A study carried out with the Mexican Faculty of Medicine student population shows that anxiety and emotional dysregulation has a significant direct influence on depression. Subsequently, during the COVID-19 epidemic, a longitudinal study was carried out to estimate the prevalence of emotional disorders during confinement, and it was observed that between April and December 2020, the prevalence of depression increased from 19.84 to 40.08% and that the ideation rate suicide remained relatively stable at around 18% [68].

These results reinforced the need to continue our commitment to promoting mental health among students. For this purpose, a Coping Workshop was designed for second-semester students, focused on promoting the well-being of students by equipping them with emotional coping skills that protect and help the student to manage their emotions in the face of adverse situations that favor the appearance of affective disorders such as anxiety, depression, and suicidal ideation.

The conception and design of this workshop were based on strength-focused cognitive behavioral therapy, as it is the therapeutic modality with the most significant theoretical-empirical evidence and has proven to be effective in inducing changes in the short, medium, and long terms. It has the theoretical framework of the Collaborative for Academic, Social, and Emotional Learning [Weissberg], which defines social and emotional learning as recognizing and managing emotions, solving problems effectively, and establishing positive relationships with others. It is the process by which the knowledge, attitudes, and skills necessary to learn functional emotional regulation strategies, develop empathy, make responsible decisions, establish healthy interpersonal relationships, and adaptively face situations both inside and outside the classroom are acquired and applied effectively. The key competencies of this learning are self-awareness, identification and recognition of one's own emotions and strengths, self-efficacy, and self-confidence; social awareness, empathy, respect for others, and perspective taking; responsible decision making, evaluation, reflection, and personal and ethical responsibility; self-control, impulse control, stress management, perseverance, goal setting, and intrinsic motivation; and interpersonal skills, cooperation, search, and help, providing help and communication.

The workshop is given by the psychologists who participated in the course design, which is carried out during the second semester of the medical degree, in weekly sessions of 90 minutes, with groups of no more than 17 students.

The workshop has a Work Manual for the student, which supports the activities carried out in the classroom. It has theoretical information on the topics that are reviewed; biographies of doctors, scientists, and other relevant characters who knew how to overcome the difficulties they faced and fight to achieve their goals, such as neurosurgeon Ben Carson; nurse and sex education activist during the first half of the twentieth century, Margaret Sanger; the Brazilian indigenous activist Txai Surui; and Matilde Montoya, the first Mexican woman to receive a medical degree from the National School of Medicine of Mexico in 1887. It also has self-registration sheets for monitoring and recording activities, individual self-awareness tasks, and playful activities to relax. On the last page of the Manual, there are essential contacts to which students can communicate to receive personalized attention from professionals who can provide the emotional accompaniment that the student needs during a crisis or in more severe cases such as suicide risk, which require face-to-face intervention, and refer them to specialized health centers.

The first module deals with well-being and mental health, with which the student becomes aware of the risk factors for the appearance of conduct disorders that they face during their training and that can affect interpersonal relationships and academic performance and even induce school dropout. Topics such as anxiety and depression and the associated stigmas in society and more deeply among medical personnel about mental disorders, which in many cases lead to self-stigma, are addressed.

Modules 2 and 3 focus on working with the main stressors that students face during the first stage of their training, time management, and study strategies. Written record activities are presented so that the student can identify those activities that consume a significant amount of time and affect their academic performance, such as video games and social networks, and learn to establish a maximum use time. Exercises are carried out to elaborate daily work plans and study routines. In addition, different study techniques are presented and tested so that the student can recognize the ones that best suit their individuality, allowing them to achieve significant learning and delay the forgetting curve.

Module 4 shows the physiological imbalances that stress generates and the usefulness of learning relaxation techniques to prevent stress and fatigue and generate a sense of well-being by reducing emotional tensions and favoring the disarticulation of recurring disruptive negative thoughts. Activities such as diaphragmatic breathing and Jacobson's progressive muscle relaxation are performed. So that the student can practice these and other relaxation techniques, there are QR codes to access videos and applications that reinforce the activities.

The following modules are focused on developing emotional regulation and raising awareness of its value in dealing with everyday problems, preventing the development of disorders, and promoting emotional well-being. Module 5 deals with emotions and their origin as the organism's response to an external or internal event that, after an unexpected evaluation, generates physiological, psychological, and behavioral manifestations, which, when adequately regulated, have adaptive functions aimed at developing behaviors that favor intrinsic motivation and social interaction.

This module consists of various group activities and other individual and private activities aimed at recognizing emotions and developing emotional self-knowledge to understand the usefulness of regulating emotions to develop tolerance to frustration and thereby prevent anxiety and depression. Emphasis is placed on dysfunctional forms of emotional regulation, which, although reduce the intensity of an unpleasant experience, bring along maladaptive side effects such as alcohol and drug abuse or self-harm, which, therefore, cannot be considered emotional regulation behaviors.

The origin of negative automatic thoughts and the activities aimed at aligning thought schemes are addressed in Module 6, with multiple activities focused on the experiences that medical students commonly experience related to the emergence of cognitive distortions. Module 7 deals with the importance of assertiveness for reasonable control of conflict situations, and Module 8 focuses on the different types of coping to handle difficult situations.

Strategies focused on the problem are addressed, aimed at finding alternative solutions to a conflict, a topic seen in depth in the next chapter. Coping strategies focus on the emotions caused by a problem and how to adapt well to this situation. And it analyzes how inadequate coping strategies such as avoidance, rejection, and emotional suppression can result in harmful practices that generate more intense and uncontrolled reactions, so these attempts at regulation must be assessed as a problem.

The last modules deal with the actions that enrich daily life and help the student recognize the things with which he spends happy and enjoyable times and the importance of carrying out these activities to maintain a good state of mind and develop emotional well-being. They also deal with how to prevent relapses and communicate with a partner when he is in a conflictive emotional situation.

7. Conclusions

Society demands well-prepared doctors with cutting-edge knowledge and unquestionable ethical values. Medical schools must respond to this need and recognize that medical students face highly stressful educational and personal processes during their professional training, which pose severe challenges to maintaining physical and emotional well-being.

As medical educators, we know that our students' comprehensive training is an enormous challenge. Implementing an emotional coping workshop in the second semester of the medical career responds to a need of the student population, probably more in need than ever. Supporting students to find adequate management of the stressors they face daily and to face the problems and difficulties of academic and hospital life through adequate emotional regulation will allow each of them to develop their potential and to lead a healthy, creative and productive life according to their needs and interests.

The transformation of the educational model based on studies that include the students' perspective on their own training is also required, in order to generate innovative alternatives focused on the well-being of students that take into account current social and technological advances.

Conflict of interest

"The authors declare no conflict of interest."

Author details

Alejandro Daniel Domínguez-González
La Salle University, Mexico City, Mexico

*Address all correspondence to: alejandro.dominguez@lasalle.mx

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Chapter 2

Suicidality after Natural Disasters

Genesis Rodriguez-Rodriguez, Mary Roman-Perez,
Fabiola Rodriguez-Flores and Yaritza Inostroza-Nieves

Abstract

Research on post-disaster suicidality has primarily focused on areas with substantial loss of lives and property damage. Cataclysmic events, such as hurricanes, earthquakes, and the recent events of COVID-19, have established associations with a rise in mental health disorders. Hurricanes weak the infrastructure and obstruct medical services. Earthquakes led to power outages and destruction of buildings, homes, and geological landmarks. More recently, the COVID-19 pandemic resulted in detrimental loss of social interactions with effects on people's mental health. This chapter will provide valuable information to identify and mitigate the incidence of suicidal behavior after natural disasters and provide effective assistance.

Keywords: suicidality, hurricane, earthquake, pandemic, natural disasters

1. Introduction

Natural disasters are catastrophic events that can have profound impacts on individuals, communities, and societies. These events, such as earthquakes, hurricanes, wildfires, floods, and pandemics, often result in significant economic loss, displacement, and physical harm. As a result of these phenomena, feelings of economic insecurity, stress, and anxiety arise, primarily affecting individuals who face the loss of family members, material losses, or both. According to the World Bank, disasters cause $520 billion in economic losses annually and force 26 million people into poverty [1]. In fact, between 1970 and 2019, three of the hurricanes which developed in 2017, Harvey (US$ 96.9 billion), Maria (US$ 69.4 billion), and Irma (US$ 58.2 billion) alone, accounted for 35% of the total economic damages caused by the world's top ten disasters [2].

Accordingly, economic loss and instability that emerge from these natural disasters can impact the mental health of individuals, either by developing feelings of stress, anxiety, and depression or exacerbating preexisting ones. In 2019, the World Health Organization (WHO) reported that there were 301 million people living with anxiety and 280 million people living with depression, respectively [3]. In the aftermath of the onset of the COVID-19 pandemic, preliminary assessments revealed a significant rise in the prevalence of anxiety and depression, with an increase of 26% and 28% observed between 2019 and 2020 [3]. Furthermore, the incrementation in these mental health disorders can potentially contribute to a higher occurrence of suicidal ideation and behavior. According to the Centers for Disease Control and Prevention (CDC), between the years 2000 and 2021, there was an approximate 36% increase

in suicide rates [4]. During the period from 2015 to 2019, roughly 10.6 million adults residing in the United States reported having experienced suicidal thoughts within the previous year [5]. Additionally, it was estimated that approximately 1.4 million adults had made a suicide attempt during the same time frame [5]. However, in 2021, these numbers saw a significant increase, with an estimated 12.3 suicidal thoughts reported and 1.7 million suicide attempts [4].

The relationship between natural disasters and mental health disorders is complex and multifaceted. The World Health Organization (WHO) revealed that individuals exposed to major emergencies, such as natural disasters, are at higher risk of developing mental health disorders or worsening of pre-existing mental conditions [6]. In fact, the conducted studies have reported increased rates of anxiety, depression, and post-traumatic stress syndrome (PTSD) among affected populations [6]. The adverse outcomes of natural disasters on the mental health of populations can have a profound impact on the overall well-being and functioning of individuals. These effects make it considerably challenging for individuals to cope with the aftermath of such events, consequently placing them at an increased risk of experiencing suicidal ideations and engaging in suicidal behaviors. A systematic review conducted employing data from articles published from 1990 to 2018 identified that women, adolescents, the elderly, individuals with diagnosed depression and PTSD, those suffering from low-social support, and individuals who had lost their parents exhibited heightened vulnerability to suicide in the aftermath of natural disasters [7].

Analyzing the relationship between natural disasters, mental health disorders, and suicide behaviors is imperative for the development of an effective disaster response and recovery plan. Moreover, understanding each of the risk factors for suicidal behavior and ideation that emerges from natural disasters can contribute to the implementation of appropriate prevention measures and interventions that promote the well-being of affected individuals. This review aims to offer valuable insights into the associations between natural disasters, specifically hurricanes, earthquakes, and the COVID-19 pandemic, and the risk of suicidal ideations and behaviors. Furthermore, it intends to identify underlying risk factors for such behaviors that emerge from these natural disasters and highlight the importance of comprehensive support systems and strategies in the mitigation of the adverse effects of these events on individuals' mental well-being.

2. Methods

This chapter was a systematic review probing English/Spanish language articles related to suicide and its risk factors after natural disasters and was published between 2005 and June 2023 in Google Scholar, PubMed, Web of Science, Science Direct, Scopus, and ProQuest databases. Searched terms included "suicidality" or "suicide" and "natural disasters" or "hurricane" or "earthquake" or "forest fire" or "pandemic". After reviewing and screening the collected studies by means of specific criteria, only 199 studies were qualified to enter the survey. It was found that most of these studies had investigated suicide after hurricanes, earthquakes, and the COVID-19 pandemic.

3. Suicidality after hurricanes

The National Oceanic and Atmospheric Administration (NOAA) describes a hurricane as a type of tropical cyclone with winds exceeding 74 miles per hour
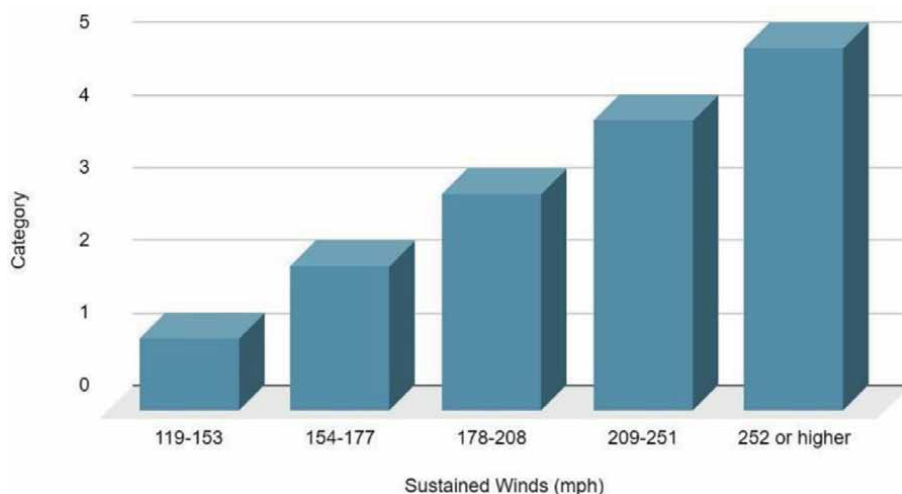
Figure 1.
The Saffir-Simpson Hurricane Wind Scale categorizes hurricanes in 1–5 according to the speed of their wind [8].

and can be categorized from 1 through 5 with the Saffir-Simpson Hurricane Wind Scale (**Figure 1**). Consequently, a category 1 hurricane causes less damage than a category 5 hurricane. Therefore, some of the worst hurricanes recorded in history are category 4 and 5; for example, one of the most devastating hurricanes in the past one hundred years was San Felipe-Okeechobee in September 1928. Starting with a direct hit to Puerto Rico, continuing throughout the Bahamas, and ending in Florida, USA. This category 5 hurricane had an estimated damage of $75,000,000 US dollars, and sadly, it took over 2000 lives in the process [9]. There have been more recent hurricanes, such as; Katrina in 2005, Ike in 2008, and Maria in 2017. Collectively, these weather abnormalities cost over $200 billion US dollars. Moreover, these deadly hurricanes claimed the lives of over four thousand people [10–12]. While the hurricane itself may impact the citizens, most of the damages are associated with the disastrous aftermath they leave, like lake surges. When the San Felipe hurricane was passing Florida, there was a six to nine feet rise in Lake Okeechobee, flooding the surrounding terrain, taking the majority of lives lost in this disaster, and dangerously rapid winds often damaging the infrastructure of the affected area [9].

Another example is when Hurricane Maria greatly damaged Puerto Rico's power grid. In 2017, Puerto Rico got hit by Hurricane Irma a couple of weeks before Hurricane Maria. Previously, the island's physical structure was weakened by Irma. Thus, Hurricane Maria solidified the damages. Puerto Rico's electricity structure consists of above-ground lines, making it extremely vulnerable to abnormal weather. Puerto Rico had the longest blackout in the United States' history since electricity was fully restored almost eleven months after Maria [13]. With the loss of electricity comes many strains. Because of this power outage, first necessity items, such as food, perished. Additionally, most streets were blocked by debris, and essential workers could not get to neighborhoods. Equally important, citizens with refrigerated medications, such as insulin-dependent diabetics, were greatly affected because their medication did not have proper storage. However, because the water plants are powered by electricity, the loss of power is directly correlated to the lack of water, which presents

two risks. Since people could not bathe, clean, or cook properly, people were drawn to use contaminated water from lakes, beaches, wells, and pits.

According to the CDC, mental health is a combination of "social, emotional, and psychological well-being" factors that affect and determine how an individual acts, perceives the world and relates to other beings [14]. As of 2019, 1 in 8 people in the world reported living with some type of mental health disorder, with the leading diseases being depression and anxiety [15]. The World Health Organization characterizes anxiety disorder as a collection of symptoms that leave the patient with irrational fear and worry [15]. As stated by NIH statistics based on the USA population, women from ages 18–29 and 30–44 years old are more likely to suffer from any form of anxiety [16]. On the contrary, depression is characterized by feelings of extreme sadness, emptiness, irritability, and anhedonia [15]. The NIH surveyed USA citizens and concluded that females from ages 18–25 years old were more likely to suffer from depression [17]. Furthermore, worldwide 280 million people currently suffer from some type of depression, reported twice as much by women than men [18]. Sadly, depression often leads to suicidal thoughts, suicide being the leading cause of death in groups ages 15–29 years old [18]. The hallmark of anxiety is increased levels of the neurotransmitter Norepinephrine but decreased levels of the neurotransmitters GABA and Serotonin. However, patients suffering from depression are notorious for having decreased levels of the neurotransmitters Dopamine, Norepinephrine, and Serotonin.

Although some may consider suicide attempts quickly after an incident, it is important to take into account how mental health and resiliency vary in the population. Therefore, in most cases, Major Depression, General Anxiety Disorder, and Post Traumatic Stress Disorder are the first toll on mental health after a hurricane that people experience [19]. While a percentage of the population may receive the help needed to battle these conditions, some may never overcome them, and the less fortunate may not have access to healthcare, to begin with. For this reason, the University of Delaware made a study based on data from the Federal Emergency Management Agency, which compared suicide rates three years before and after natural disasters [20]. They included phenomena such as hurricanes, floods (which are common aftermath of hurricanes), and ice storms. However, this study also took into account countries that only had one natural disaster in a year. Hence their data may be an underestimation of the real number of suicide rates [20]. Their data suggests that there is a 23% increase in suicide rates after these events [20]. Nevertheless, there was a difference between suicidality trends after hurricanes and floods. For instance, the spike in suicide rates increased by 26% after hurricanes occurred during the first year after the disaster, while suicidality increased by 61% for floods two years after [20]. Nonetheless, for all of the disasters, suicide rates began to fall following the third-year post-catastrophe [20].

Because Hurricane Maria was the main example of a country's aftermath, we will start by discussing Puerto Rico's statistics on suicidality after this catastrophe. From the years 2015 to 2019, 90% of the suicides were committed by men, 10% by women, for both genders, and the majority of cases were adults ages 40–69 years old [21]. The most common method to commit suicide was hanging, followed by firearms and ingestion of venom [21]. Following the same logic that the University of Delaware used, Puerto Rico's statistics portrayed the same trends their study concluded. For instance, a year before Hurricane Maria, in 2016, Puerto Rico reported the lowest suicide rates the island had seen in 10 years, with a total of 211 people committing suicide [21]. On the other hand, the following two years after Maria, suicide
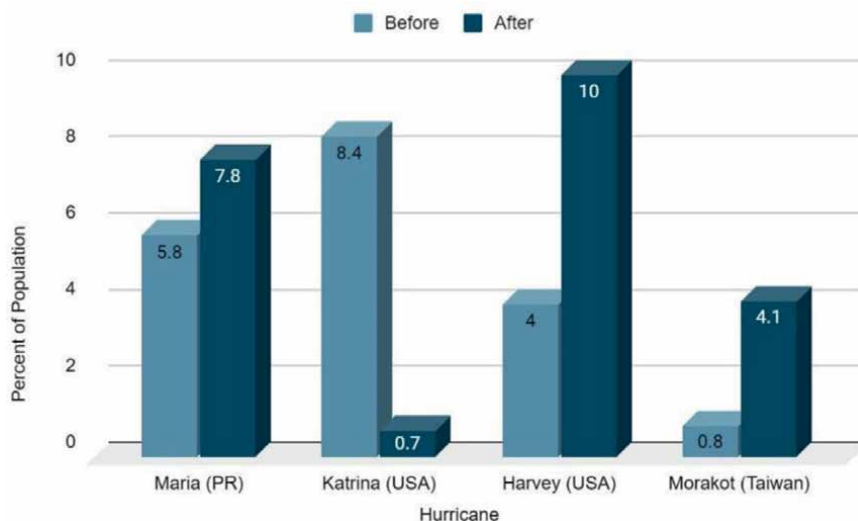
Figure 2.
Percentage of Reported Suicidal Ideations Before and After Hurricanes in Puerto Rico, United States, and Taiwan [21–25].

rates increased, with 260 suicides in 2017 and 243 suicides in 2018 [21]. The Health Department and the Statistics Institute of Puerto Rico based their crude rate on 100,000 habitants. For example, the crude rates for suicidality were 5.8 in 2016 and 7.8 in 2017 (**Figure 2**). Therefore, we can conclude that in the year Hurricane Maria hit Puerto Rico, suicidality increased by roughly 35% [21].

Hurricane Katrina, which struck the Gulf Coast of the United States in August 2005, was one of the deadliest and costliest hurricanes in U.S. history. The storm caused widespread destruction and loss of life, leaving a lasting impact on the affected communities. In the aftermath of Hurricane Katrina, various studies and reports highlighted the mental health impact on the affected communities. The National Center for Biotechnology Information (NCBI) published research indicating an increase in mental health disorders and distress among survivors in the months following the hurricane. Interestingly, suicide ideations decreased following Hurricane Katrina. A study demonstrated that the prevalence of suicidal ideation was significantly lower in the post-Katrina survey, from 8.4% before to 0.7% (**Figure 2**) [22]. In addition, plans for suicide decreased from 3.6% to 0.4% after Katrina [22]. For instance, although Hurricane Katrina was catastrophic to most states in the US, citizens felt a shared sense of purpose which helped them look at the circumstances in a positive light. Nevertheless, in a follow-up study one year later was found that suicidal ideation increased to 6.4% and suicidal plans to 5%, which is higher than before Katrina [23].

Hurricane Harvey, a category 4 hurricane, struck the Gulf Coast of Texas in August 2017, causing catastrophic flooding and widespread damage in the region. Two months after the hurricane, 10% of the survivors reported suicide ideation (**Figure 2**), 2.5 times higher than typically reported in the general population [24]. In this study, women are more at risk of suicide ideation compared to men. Additionally, the most significant risk factor is prior mental health problems [24].

Typhoon Morakot, also known as Typhoon Ketsana, struck the Philippines, Taiwan, and China in August 2009. The only difference between a hurricane and

a typhoon is the location where the storm occurs. The storm resulted in significant loss of life and widespread damage, particularly in Taiwan, where it caused severe flooding and landslides. The trauma of experiencing such a catastrophic event, losing homes and loved ones, and facing challenges in recovery and rebuilding can contribute to emotional distress and mental health issues. In a study made one year after the typhoon, 4.1% of adolescents reported trying to kill themselves (**Figure 2**) [25]. The results of this study found that among adolescents who had experienced Typhoon Morakot, the disaster exposure experiences increased suicide risk [25].

Hurricane's impact extended beyond physical damage and had significant effects on the mental health of affected individuals. After a disaster like a hurricane, people may experience emotional distress, trauma, grief, and a range of mental health issues, including depression, anxiety, and post-traumatic stress disorder (PTSD). These factors can contribute to an increased risk of suicidal thoughts for some individuals.

4. Suicidality after earthquakes

Earthquakes vary according to their magnitude and intensity. Magnitude measures the energy released by an earthquake at its epicenter [26]. The Richter Scale measures magnitude, and the Mercalli Scale measures the intensity (**Figure 3**). How it measures, the earthquake's effects on the environment is based on the damage and shocks perceived by people, buildings, and objects in the affected area and the damage they cause. As the intensity and magnitude increase, the damages increase as well.

We know that earthquakes are sudden natural phenomena that cause land shifts which later causes fires, tsunami, avalanches, and the collapse of buildings, homes, bridges, and roads. This leads people to face mental health problems, post-traumatic stress disorder, and possible death. Generally, suicidal ideation and suicide cases after earthquakes are promoted by some of these factors: damage made to the property, material losses, or simply how they handle situations [27]. Besides material losses being such a huge trigger for suicide after this catastrophe, the biggest trigger is their mental status and how it was affected. This is why it is important to be aware of mental health after a natural disaster to prevent suicide.

A study made in 2021 on the number of deaths by suicide in the Great East Japan Earthquake in 2011 observed that the suicide rate was 18% lower than the average mortality rate for the previous three years [28]. Another study which focused on the designated evacuation areas of the disaster in Japan, showed an increasing rate of male suicide immediately after the disaster occurred (**Figure 4**), and that suicide rate later decreased two years later [29]. In contrast, the female suicide rate in the evacuation areas of Japan decreased slightly after the disaster; one year later, this suicide rate increased [29]. Although there was a decrease in suicides, it was reflected in the designated evacuation areas, which greatly impacted their mental health.

In Chile, in 2010 occurred, an earthquake of a magnitude of 8.8; a study was made on suicidal ideation and post-traumatic stress after the earthquake and tsunami of 27-F. This study demonstrated and recorded 22 cases of suicidal ideation in post-earthquake respondents, 8.9% of the sample [33]. They also found in this study that there is a greater risk of suicidal ideation in women who are housewives, which shows that work would also be a trigger after the earthquakes.

Ecuador suffered a strong earthquake of magnitude 7.8 that devastated the country; as a consequence of this event, the suicides registered between January 2011
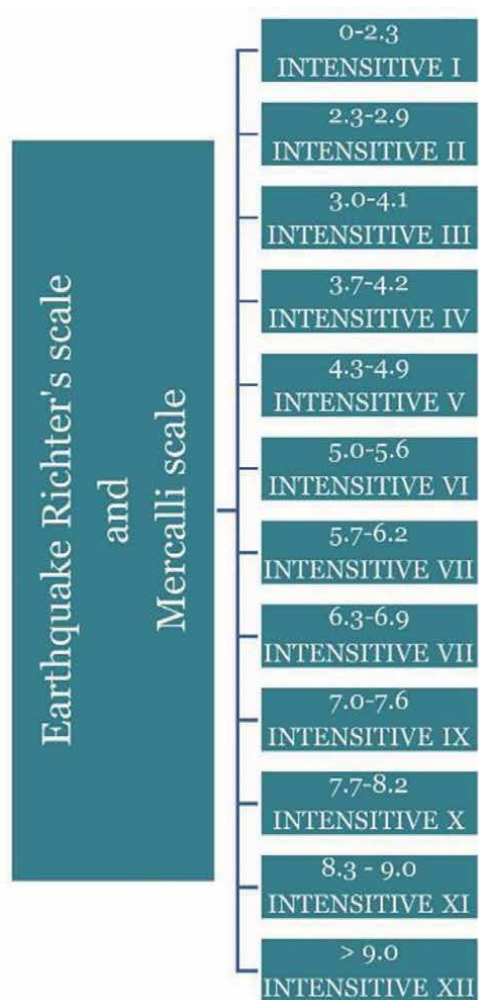
Figure 3.
Earthquakes Richter's scale and Mercalli scale [26].

and December 2020 were investigated. 10,380 cases of suicides were reported, where 8.15 were found per 100,000 inhabitants in 2011, increasing the suicide rate after the earthquake (**Figure 4**) [30].

Another example of a country whose residents suffered greatly from natural disasters was Puerto Rico. After a series of earthquakes that began at the end of 2019 and ended in January 2020, many citizens were greatly affected by this series of continuous earthquakes. The consequences of this series of earthquakes in Puerto Ricans were many, among them losing homes, running out of electricity service, losing water, and living in places that were shelters since their houses were destroyed. Besides material losses that people had, it left many people having mental health problems. The Department of Health Government of Puerto Rico, makes a monthly report of suicides that occurred on the island. We can note a comparison of suicide cases from the year 2000 to the current year. Analyzing the data for the years 2019 and 2020, we see that for the year 2020, there was a difference of 113 cases due to suicide compared with the suicide rate of 2019 [31]. Therefore, fewer suicides are
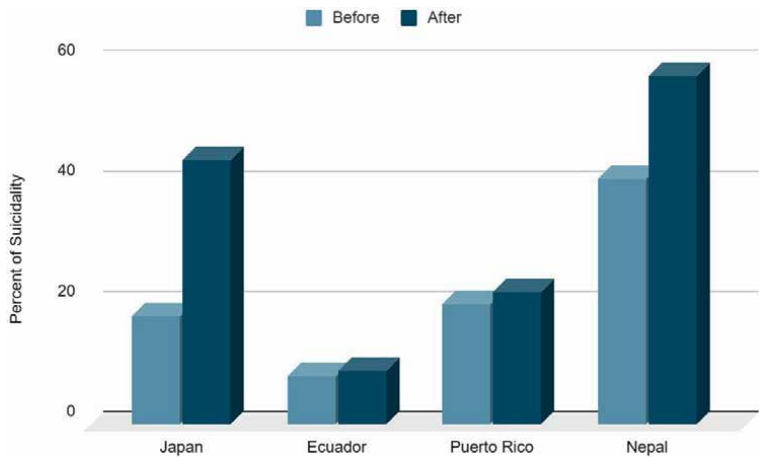
Figure 4.
Country comparison of registered suicide cases before and after the earthquakes [29–32].

reflected for the year 2020 than in 2019. It reflects the number of suicide cases per month; during the month of December 2019, 20 cases were reported suicide cases. Then, in January 2020, some 22 cases of suicide were reported, being the month with the highest number of deaths from suicide in Puerto Rico (**Figure 4**) [31]. They show that 63 suicides occurred in this time frame, 41 of which were by hanging, 16 were with firearms, 1 by poisoning, and 5- marked others. There was certainly a decline at the end of the year 2020 in deaths from suicide comparing it to the beginning of the year since most suicides occurred in January.

On the other hand, an article reports that in Nepal, after an earthquake of magnitude 7.8 that occurred in April 2015, suicides increased by 41.24% three months after the earthquake [32]. The cases of suicides that had been registered from half of January to half of April were 965. However, three months later, the cases of suicide increased to 1363 (**Figure 4**).

Undoubtedly, people, after facing natural disasters and not leaving earthquakes behind, are mentally affected, having to deal with mental disorders for the rest of their lives because of these catastrophes. These studies reflect that young people have thought about taking their own life at some point, but few commit suicide. However, it does not remove the importance of attending to post-traumatic mental disorders because of these catastrophes that affect the citizens of said countries. It is crucial that the governments of countries that have gone through catastrophes provide a mental help service to citizens and that this help is accessible to everyone. Since it is proven that after natural disasters, the mental health of the people who witnessed this catastrophe is compromised, it's important to raise awareness to countries to be able to provide the help needed. Governments of said countries can contribute to preventing suicidal thoughts from becoming suicides and reduce the rate of suicide and suicidal ideation by providing adequate help to its people after a natural disaster like an earthquake.

5. Suicidality after pandemic

Another aspect that must be considered when studying the incidence of suicidal ideation and behavior following natural disasters is the COVID-19 pandemic, which
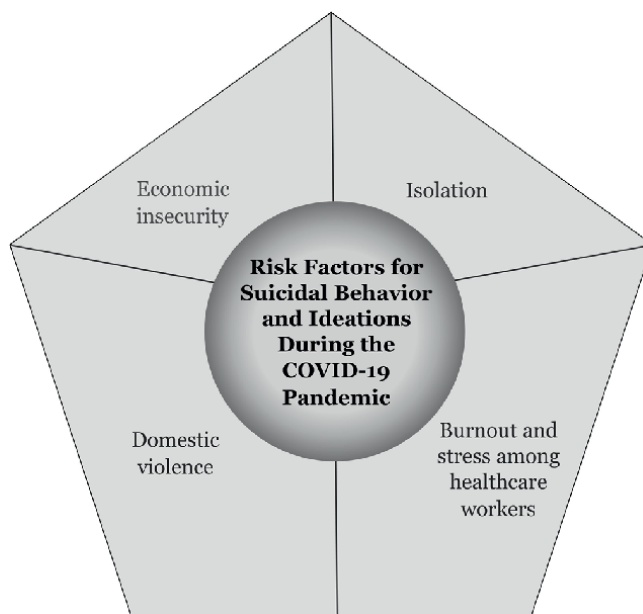
Figure 5.
Risk elements for suicidal behavior and ideations during the COVID-19 pandemic.

was declared a public health emergency on January 30, 2020, by the World Health Organization. As a result of these events, multiple risk factors for self-harm, exhibited in **Figure 5**, emerged, which contributed to the substantial decline of mental health worldwide. During the quarantine period, the COVID-19 pandemic compelled numerous companies to shutter or halt their operations, leading to high unemployment rates. This, in turn, coupled with global inflation, engendered economic insecurity within households across the globe. A study conducted to evaluate the association between food insecurity and mental health among low-income Americans during the COVID-19 pandemic established that food insecurity is linked to a significantly elevated risk of anxiety, with a 257% higher likelihood, and a similarly heightened risk of depression, with a 253% increase [34]. Moreover, the results indicated that the loss of employment during the pandemic is associated with a 32% higher risk of anxiety and a 27% higher risk of depression [34]. A more recent study performed among Shanghai residents after the lockdown of April 2022 concluded that the likelihood of experiencing depression and anxiety was linked to factors such as job loss and income loss [35]. Furthermore, moderate food insecurity was associated with over a threefold increase in the odds of screening positive for depression and anxiety and reporting suicidal thoughts, while severe food insecurity was associated with over a fivefold increase [35].

Prevention and control measures for COVID-19 incorporated a constant practice of social distancing and lockdown. Accordingly, it was anticipated that social isolation would exacerbate feelings of loneliness, thereby leading to an adverse effect on mental health. A survey conducted among 5211 participants representing all 34 provinces in Indonesia reported that within this group, 39.3% experienced self-harm and thoughts of suicide during the pandemic [36]. Following the analysis, the results of the correlational test indicated a statistically significant (p < 0.001) and positive (r = 0.51) relationship between the intensity of loneliness and incidents of suicidal
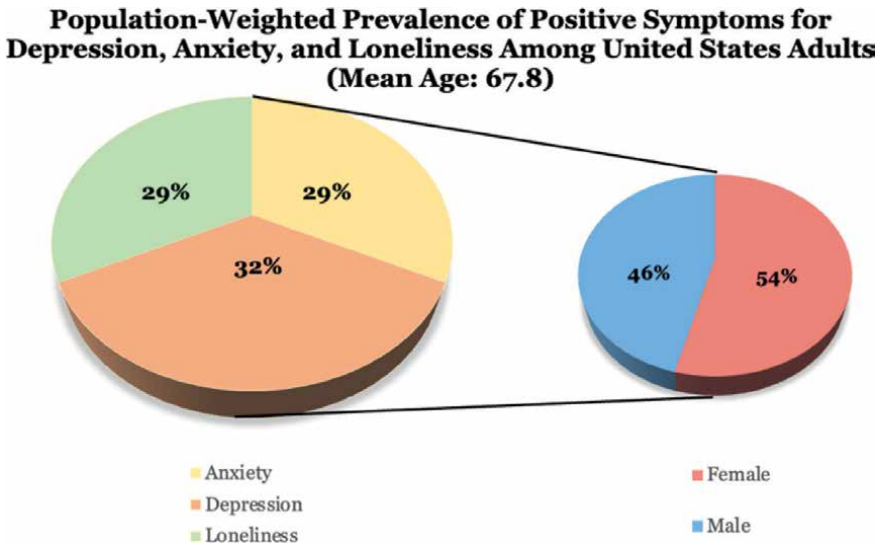
Figure 6.
Population-weighted prevalence of depression (8-item Center for Epidemiological Studies Depression Scale score ≥ 3), anxiety (5-item Beck Anxiety Inventory Scale score ≥ 10) and loneliness (3-item UCLA Loneliness Scale score ≥ 6), among U.S. adults >55 years, in which the mean age of the weighted sample was 67.8 years [37].

ideation [36]. Correspondingly, a longitudinal cohort study recruited adults aged ≥55 years from all 50 states, the District of Columbia, and Puerto Rico to investigate the impact of pandemic-related stressors, such as isolation, on the mental health and well-being of middle-aged and older adults in the United States. As shown in **Figure 6**, approximately one-third of middle-aged adults screened positive for symptoms of depression, anxiety, and loneliness [37].

An additional contributing factor to self-harm behaviors, particularly during the pandemic and the associated lockdown measures, was the increasing incidence of domestic violence. A systematic review, enclosing a comprehensive analysis of 32 studies from various regions, including North America, Europe, Asia-Pacific Area, Africa, and multinational research, has conclusively demonstrated that the COVID-19 pandemic resulted in a surge of domestic violence cases [38]. This increase was particularly notable during the initial week of the COVID-19 lockdown in each respective country [38]. Moreover, the implementation of social distancing guidance led to the cease of operations of support services for these victims, resulting in constant contact with their abusers and, hence, adverse effects on their psychological well-being. The acute impact of COVID-19 on domestic violence, along with its effect on Tunisian women's (18–79 years) mental health, was assessed on an online survey using the Depression Anxiety and Stress Scales (DASS-21). More than half the participants (57.3%) experienced extremely severe distress symptoms, as indicated by the DASS-21 assessment [39]. Individuals with a prior history of mental illness and those who reported incidents of abuse during the lockdown exhibited heightened levels of depression, anxiety, and stress symptoms [39].

Furthermore, the exponential rise in positive cases and the number of patients being admitted to hospitals resulted in a shortage of healthcare workers which exacerbated feelings of emotional distress and burnout. Working in healthcare professions inherently entails significant emotional strain and constant exposure to

stressful situations. As this public health emergency continued to escalate quickly, concerns about the severity of the disease, lack of knowledge during the first months of its onset, and scarcity of protective equipment and ventilators became the primary catalysts for exhaustion and stress among healthcare personnel. A meta-review of systematic reviews aimed to provide an overview of the general mental well-being of healthcare workers amidst the COVID-19 pandemic revealed that anxiety (16–41%), depression (14–37%), and stress/post-traumatic stress disorder (18.6–56.5%) were the most prevalent effects on mental health [40]. The most significant risk factors identified were female gender, younger age, being a nurse, and working on the frontline [40]. Between August and October 2020, approximately 3.4% of healthcare workers across Australia reported 'frequent' thoughts of suicide in the preceding two weeks, while 7.1% stated 'occasional' [41]. Similarly, a study performed among physicians in New York City reported prevalence rates for depression, suicidal ideation, and burnout of 6.2, 6.6, and 19.6%, respectively [42]. Further analysis utilizing a general linear model demonstrated that older age had a protective effect; conversely, individuals with a history of prior diagnosis or treatment for depression or anxiety, as well as those with an increased frequency of on-call duties, displayed higher scores on the Patient Health Questionnaire for Depression (PHQ-9) [42].

Overall, an increase in suicide ideation and attempts was hypothesized during the COVID-19 pandemic due to exacerbated feelings of depression, stress, and anxiety. A systematic review enclosing data mainly from the United States., India, United Kingdom, China, and Bangladesh revealed that the pooled prevalence of suicidal ideation was 12.1% [43]. Additionally, a different investigation in the UK reported that 18% of participants experienced thoughts of suicide during the first month of lockdown and that at least 5% had committed self-harm since the start of the country's lockdown [44]. Common risk factors contributing to these behaviors were socioeconomic disadvantage, mental disorders, and poor physical health [43, 44]. There was an increase of 3.7% in the number of calls related to suicide, including both ideations and attempts, received by 'Línea PAS' in Puerto Rico from 2019 to 2020, while an increase of 40.1% was observed from 2020 to 2021. This means that from 2020 to 2021, more than a three-fold increase in calls related to self-harm was observed compared to the 2019 to 2020 period.

Interestingly, the number of deaths attributed to suicides in countries such as the USA, England and Wales, Japan, and Puerto Rico exhibited fluctuations between 2019 and 2021 without following an identical pattern (**Figure** 7). In the USA and England, and Wales, there was a decline in the number of suicides from 2019 to 2020, followed by an increase in incidents from 2020 to 2021. In contrast, Japan witnessed an increase in suicides between 2019 and 2020, which was subsequently followed by a decrease in the number of incidents from 2020 to 2021. On the other hand, Puerto Rico reported a decrease in suicides from 2019 to 2020, followed by a consistent number of incidents from 2020 to 2021 [45–47].

It is of paramount importance to persevere in the study of the ramifications of natural disasters, such as the COVID-19 pandemic, on suicide patterns, as well as the ensuing risk factors. This research is vital to enable each nation or regional government to formulate a comprehensive plan that safeguards the mental well-being and welfare of its population while effectively addressing their needs. Furthermore, the identification of protective factors assumes the utmost significance for policymakers in the development of such a blueprint. Equally essential is the promotion of
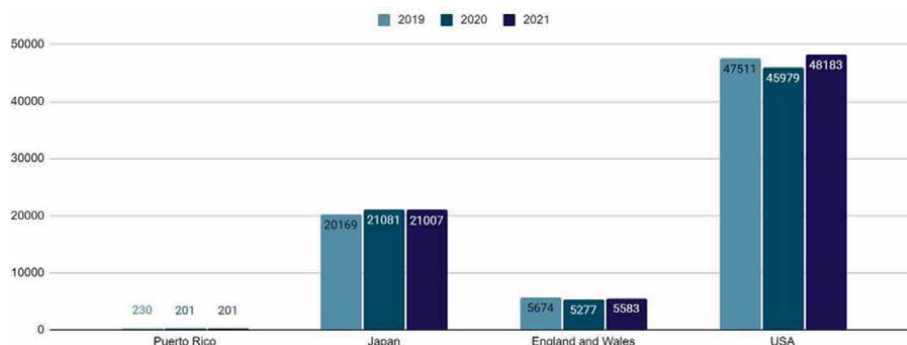
Figure 7.
Suicide incidence in Puerto Rico, Japan, England and Wales, and the USA between 2019 and 2021 [45–47].

uninterrupted availability of helplines to support individuals dealing with suicidal ideation, anxiety, depression, stress, or any other distressing circumstances. The general effectiveness of these helplines was proven by a study conducted by the Autonomous University of Santo Domingo and the School of Psychology in the Dominican Republic, which outcome revealed that the UASD COVID-19 Psychological Helpline, jointly operated by both institutions, acquired high levels of satisfaction among its users and yielded noticeable improvements in their emotional well-being [48]. Finally, supervisors of healthcare facilities must focus on creating an environment that promotes resilience and social support, which have been identified as protective factors against negative mental health outcomes for healthcare workers [49]. Hence, contributes to the improvement of anxiety, depression, stress, and burnout constantly experienced by healthcare providers.

6. Conclusion

In conclusion, the effects of natural disasters such as hurricanes, earthquakes, and pandemics on suicidality can be complex. Natural disasters can significantly impact mental health and increase the risk of suicidal ideation and behavior in affected populations. It's crucial to recognize the potential mental health impacts of natural disasters and provide appropriate support and resources to affected communities. Unfortunately, there are no studies about suicidality after forest fires. The climate change has increased the frequency and intensity of forest fires which have significant consequences on individuals' mental health. People directly affected by forest fires, such as those who lose their homes or loved ones, may experience symptoms of trauma, anxiety, depression, and post-traumatic stress disorder (PTSD) [50]. Future studies must investigate forest fire effects on suicidality.

In addition, most studies investigating the effects of natural disasters on mental health focus on first-world countries. It would be interesting to compare these effects between first-world and third-world countries and how mental health services are implemented.

Disaster response and recovery efforts should include mental health services, counseling, and community support to address the emotional toll on survivors. Additionally, friends, family, and community members can play a vital role in identifying signs of distress and providing support to those at risk.

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Conflict of interest

The authors declare no conflict of interest.

Author details

Genesis Rodriguez-Rodriguez, Mary Roman-Perez, Fabiola Rodriguez-Flores and Yaritza Inostroza-Nieves*
San Juan Bautista School of Medicine, Caguas, Puerto Rico

*Address all correspondence to: yinostroza@sanjuanbautista.edu

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Novel Interventions for Suicide Risk

James Pease

Abstract

Suicide is a leading cause of death worldwide. Assessment of individuals at risk for suicide is challenging and over the last 50 years the field has made minimal advancement in suicide prevention. Studies have shown that the ability for providers to predict who will die by suicide is no better than a coin flip. Improved interventions for those at elevated risk for suicide are needed. This chapter will explore well known and novel interventions for suicide prevention. Interventions discussed include safety planning, suicide consultation, the Collaborative Assessment and Management of Suicide (CAMS), Cognitive Processing Therapy (CPT), Cognitive Behavioral Therapy (CBT) and other promising interventions for the reduction of suicides. Also discussed is the need for suicide screening and populations outside of traditional mental health clinics.

Keywords: suicide, risk reduction, treatment and prevention, assessment, evidence based practice

1. Introduction

The interventions discussed in this chapter are for individuals who are at increased risk for suicidal behavior. They can be categorized as two types; 1) interventions that are for acute suicidal ideation or behaviors that indicate an immediate need for care, and 2) interventions for clients who experience chronic suicidal ideation and require a more extensive intervention over time. Some of the interventions can be used with clients as preventative measures while others may be used for clients that are actively suicidal. In addition, there are interventions that are designed to treat other conditions and have been shown to reduce suicidal ideation as well [1, 2]. Treatments reviewed consist of systematic, manualized treatments that are completed in multiple sessions over weeks [2]; as well as specific interventions completed in one meeting [3]. In those instances, follow up care would be based on the severity of suicidal thoughts and behaviors as well as other details specific to that client such as proximity to the clinic and availability of clinician for follow up care. Also discussed are the processes for transferring care successfully in cases where the client is seen in an emergency setting (i.e., warm handoff).

In addition to specific interventions, a review of available national and local resources is discussed that are often unknown to the general public. A public health approach to suicide would be helpful in getting the word out to the public to

increase awareness of the multiple resources that are available. Examples include crisis and chat lines, support groups form clients and/or family members, mobile crisis, smartphone applications for safety planning and other online interventions, gatekeeper training, advocacy organizations such as National Alliance on Mental Illness (NAMI), and public health organizations such as the American Association for Suicidology (AAS).

2. Safety planning

The purpose of safety planning is to manage patients who are at increased risk of suicide. Elevated suicide risk is marked by frequent suicidal thoughts and/or behaviors indicating suicide risk. Safety planning is a collaborative intervention between a clinician and patient [3]. It can take place in a variety of settings, including over the phone, in the community with Social Workers, outpatient clinics, inpatient units, and emergency room settings. The primary objective of a safety plan is to devise a plan for the patient to implement on their own to manage and decrease psychological distress and ultimately reduce the likelihood of acting on urges to harm oneself.

To complete a safety plan, the patient and client meet and document five steps they will take if distress increases in the future outside of sessions with a clinician or therapist. The rationale is to increase the coping skills of the patient, thereby increasing the patient's agency and not having to rush to the emergency room or make an emergency call to their therapist every time their distress increases. The safety plan emphasizes managing distress through coping skills and reaching out to professionals if the distress cannot be tolerated through other methods. The seven steps to safety planning include, 1) identify warning signs that the patient might be headed towards a crisis, 2) identify internal coping strategies to distract the patient from their problems, 3) identify people, places, and social settings that can distract from internal distress and possibly decrease distress, 4) identify people who you can ask for help (family, friends, co-workers), 5) identify professionals or agencies that can help when in distress, 6) making the environment safe by removing lethal means, and 7) Identifying reasons for living by naming things that are valuable to the patient and worth living for [3]. The idea behind being so deliberate with writing down the steps to the Safety Plan is that it can be called upon once a patient is starting to feel distress. Since the plan is written out, a person simply needs to pull it out and go through the predetermined plan. Given the unpredictability of the onset of a crisis, patients are encouraged to keep their Safety Plan with them either in a vehicle, bag or wallet, so they are always prepared. Phone applications have also been developed, which can be a useful way to keep a Safety Plan with you at all times.

3. Suicide consultation

Suicide consultation can be conducted in a variety of methods from less formal, impromptu one on one consultations with a colleague to formalized requests to a suicide consultation team. The purpose of consultation is dependent on the circumstances. When a clinician encounters a patient with an elevated suicide risk with a complex presentation, consultation with a colleague can be very useful. Clarifying questions and making sure the clinician gathers all the relevant history, treatment and current presentation is vital. Consultation with a colleague can help since they

are not as "close" to the therapeutic relationship and may catch elements of the assessment that were missed or overlooked. Questions such as, "Have you gathered any collateral information to verify the patient's reporting?", are common follow up questions from a consultation. Informal consultations are indicated when the clinician needs to act in a timely manner, such as the day of appointment. Working with a suicide consultation team is a more deliberate process where the team will ask for a referral question and include an exhaustive chart review and patient interview and returning recommendations [4].

4. Collaborative assessment and management of suicide (CAMS)

The Collaborative Assessment and Management of Suicide (CAMS) is an intervention that focuses on the relationship between the clinician and the patient [5]. Through an interview process with the patient, a structured suicide risk assessment is performed by the clinician to understand the underlying mechanisms that drive the suicidal thoughts and behaviors. The client and clinician then develop a safety plan to address those factors. Examples of elements that can be involved in a safety plan are restricting access to means, recognizing specific thoughts that lead to action, creating a supportive network of family, friends, and providers, and improving coping skills. The development of the safety plan is ongoing across sessions with the clinician, and the hallmark of this treatment is the collaboration between clinician and client.

5. Cognitive processing therapy (CPT)

Cognitive Processing Therapy (CPT) is a manualized therapy designed for the treatment of Post Traumatic Stress Disorder (PTSD) [6]. CPT uses a cognitive based approach to treatment. The main goal is to identify exaggerated or imbalanced thinking (stuck points) that have emerged as a result of the impact of trauma. Often, people who have experienced trauma develop extreme beliefs about the dangerousness of the world and themselves-including whether they are at fault for the trauma having occurred. CPT works to identify stuck points and to investigate whether they are true. This intervention for PTSD has also been shown to have a beneficial in reducing suicide risk [7, 8]. Research with both inpatient residential and outpatient patients, measures of suicidal ideation decreased from pre to post treatment with CPT. Although not designed for treatment of suicidal ideation, CPT targets erroneous and exaggerated beliefs, which are common cognitions among people suffering from suicidal ideation.

6. Cognitive behavioral therapy (CBT)

CBT works to increase the awareness, frequency, and intensity of suicidal thoughts. This is completed through dialog between the client and therapist. CBT is a manualized treatment but can be tailored to target the intervention for clients at increased risk of suicide. A specific CBT intervention for patients at risk for suicide is cognitive behavioral therapy for suicide prevention (CBT-SP) [9]. The intervention is designed as a preventive and risk reduction approach. It uses principles from a number of theoretical frameworks, including dialectical behavioral therapy (DBT) and CBT.

It uses chain analysis, safety planning family interventions, skills building and preventing relapse as aspects of the treatment [9]. There are worksheets that are assigned to be completed outside of sessions and reviewed in sessions. The idea behind the worksheets is to increase the autonomy and skills of the client thereby enabling them to have some control over managing future suicidal episodes outside of the therapist's office. The intervention also provides a plan so that the client can have insight into when they are at increased risk by monitoring their thoughts and feelings and moving into active engagement through a detailed safety plan to avoid suicidal behavior.

7. Dialectical behavioral therapy (DBT)

Dialectical Behavioral Therapy (DBT) is an intervention [10] that mixes group support, individual therapy, and skills training. It was designed for certain populations, such as those experiencing chronic suicidal ideation as well as individuals diagnosed with Borderline Personality Disorder (BPD). The focus of the treatment is individual skill building. A hallmark symptom of clients who are indicated for DBT is a difficulty in emotional regulation. One of the skills that is focused on is improving the ability to regulate reactions to situations. For instance, if a client were to have a conversation with a friend and perceived that they were slighted or insulted, the focus would be on how to respond appropriately without further escalating the situation. In order to respond appropriately, clients are taught to learn to curb their immediate emotional reactions through exercises such as grounding techniques and breathing exercises. Once the client can adequately regulate their emotional reaction and improve distress tolerance to difficult situations that arise, they can then move to learning interpersonal effectiveness skills. These are taught in a group setting using interpersonal scenarios and asking group members to appropriate responses to challenging situations. An example would be boundary setting, for instance, where a client had previously had difficulty maintaining a boundary in a relationship. For a specific example, consider that a friend frequently asks to borrow your vehicle, and that in past experiences they return it hours or days late, and with an empty gas tank. The group leader would facilitate a discussion on this specific example and problem solve on ways to appropriately set a boundary around the use of the client's vehicle. Interpersonal Effectiveness (IE) skills are very hands on and practical and can be very useful to clients who have difficulty with interpersonal boundaries. The logic of the inclusion of Interpersonal Effectiveness skills is that clients who suffer from BPD and experience chronic suicidal ideation conceptualize suicide as a solution to their problems. There is a tendency to avoid difficult interpersonal situations, which only increases distress when the client is not getting their needs met, and in turn the client turns to self-harm as a solution or "escape" from their problems. The inclusion of IE skills for these clients is a critical one beyond just regulating emotions because it addresses the etiology of the suicidal ideation – difficult and emotionally disturbing interpersonal interactions – and provides the client with a sense of control over difficult interactions instead of reverting to escapism and self-harm.

8. Collaborative care

Collaborative care refers to the interdisciplinary nature of healthcare that has emerged as a standard in healthcare. Often, clients or patients with chronic or

acute suicidal ideation have an array of mental, physical, or environmental conditions that contribute to or exacerbate their increased suicide risk. Collaborative care could include providers such as a Primary Care physician, Psychiatrist, Social Worker, Psychologist, Nurse Practitioner, Registered Nurse, Dietician, Occupational Therapist, and Recreational Therapist. This list is not exhaustive, and the level of care is dependent on the acuity and pervasiveness of the problems that impact the patient or client. It is not uncommon in residential settings for a patient to have numerous psychosocial and medical problems that exacerbate suicidal ideation. Evidence from the literature suggests several correlates associated with suicidal thoughts and behaviors, including but in no particular order, psychosocial problems such as economic or financial difficulties, loss of employment, divorce, death of significant other or child, as well as medical problems, including, chronic, chronic or terminal disease, and substance abuse. Other concerns that are often overlooked or not necessarily the focus in a medical facility due to time constraints and prioritization but would be appropriate in a therapy setting are the loss of meaning or purpose, difficulty with transitions or transitional periods, and reintegration into a community in one's life. A particular example of difficulty in transitions that has been shown to be highly prevalent is among military Veterans. Suicide rates among Veterans in the United States is approximately 17 per day [8]. The transition from active duty to civilian life is a common problem for military veterans due to the unclear path of transition. Skills that were gained and used daily in the military are not necessarily applicable in the civilian world. In addition, the hierarchical, chain of command, team environment of the military is somewhat antithetical to the autonomous and independent environment of modern civilian life. Disconnection and not belonging are also common correlates for increased suicide risk. Collaborative care is ideally suited to addressing the disparate needs of a client or patient with complex, chronic increased risk based on several factors. Providers specialize in different illnesses, chronic conditions and life problems. The use of collaborative care can provide holistic treatment for the patient. An important aspect of collaborative care is communication among providers. This can take many forms but ideally would go beyond simply adding the team to notes in the medical record. Regular weekly or monthly meetings to discuss each provider's specific treatment plan can be useful to others to verify that the team is working in unison towards the same goals.

9. Mobile crisis

Mobile Crisis is an innovative approach to acute care for patients who are at imminent risk for suicide or homicide in the community. It is also indicated for patients that are mentally compromised due to impairment from their psychiatric illness. A typical Mobile Crisis team consists of two Social Workers or Nurses who are mobilized within a certain jurisdiction and visit clients in their homes or community. Licensure regulations vary by states and county, but Mobile Crisis workers often have the legal authority to write a 72-hour hold on a patient they deem to be imminently suicidal, homicidal, or unable to care from themselves due to deteriorating mental health symptoms. They are then transported to the local hospital through the emergency or psychiatric emergency room and further assessed for the level of care needed. Mobile Crisis workers in some communities' work with local law enforcement, who are often the first responders to calls regarding psychiatric crisis. Mobile Crisis workers can be embedded within police district buildings and ride along with law enforcement

when a call comes in for a mental health situation. Mobile crisis members are trained in de-escalation, which can help to avoid a mental health problem escalating into a crisis. Often the encounters consist of a conversation and do not escalate to the need for a 72-hour hold. Other outcomes include connecting community members with resources such as mental health appointments or case manager appointments. Mobile Crisis clinicians also complete Safety Plans to help patients at increased risk manage their suicidal thoughts. Safety Planning also provides a road map for decision making when suicidal thoughts and impulses escalate and what steps to take.

10. Restricting lethal means

Means safety counseling is an important aspect of any means restriction practices. Limiting access to medications, firearms and other objects that could be used for self-harm is a critical component of suicide prevention. Over half of all suicides in the United States occur from a firearm [11]. Restricting access to firearms alone could help prevent innumerable suicide deaths. The focus of many suicide prevention programs is means restriction, with the rationale being that it is the most practical way to prevent suicide. The premise of means restriction is that an individual's state of mind who experiences chronic or periodic suicidal thoughts will vary over time. The baseline intensity of suicidal ideation may be quite low. When they experience periods of intense suicidal ideation, and you combine that with easy access to a firearm, you have a lethal situation. Removing access to a firearm may not change the intensity of suicidal thoughts, but it limits the ability to go through with suicide, at least in terms of firearm as a means. Other common types of means restriction includes access to medications, knives and other sharp objects, vehicles, and ropes. Means restriction is a practical and effective method of suicide prevention that should be incorporated into every clinician's treatment plan when putting together a suicide prevention treatment plan.

11. Public health approaches

To increase awareness of the prevalence and impact of suicide, public health messages regarding the prevalence and rates of suicide in the overall population are advertised through various media outlets. Like many prevalent health problems, mental health and suicide prevention are highly stigmatized, which can be an enormous obstacle to seeking treatment. This has been particularly true among military and veteran populations. In order to combat the stigma associated with suicide, public health campaigns for the Department of Defense and the Department pf Veterans Affairs have been ongoing through efforts such as the Veterans Crisis Line that has talk, text and chat functions [12].

12. Screening beyond mental health clinics

Although mental health clinics and the patients they serve are often the focus suicide prevention efforts, suicide risk is present in a number of other populations, including primary care, chronic illness patients, the elderly, and lesbian, gay, bisexual, transgender, and queer (LQBTQ) communities to name a few. One method

used to identify suicide risk among non-mental health populations is through screening instruments such as the Columbia- Suicide Severity Scale (C-SSRS), the Patient Health Questionnaire (PHQ-9), and the Brief Suicide Cognitions Scale (B-SCS) [13–15]. The purposes of these instruments are to provide a brief screening to identify patients at elevated suicide risk. A positive screen would then prompt a full assessment which in most cases would be in the form of a referral to a mental health professional. Screening instruments can be either self-report or administered by the health professional and can aid in the identification of risk in clinics that do not traditionally ask about risk for self-harm or suicide.

13. Conclusion

A number of interventions for suicide prevention are discussed in this chapter. Interventions include those for acute suicidal risk and more extensive systematic treatments over time. Interventions discussed include Safety Planning, CAMS, means restriction, CPT, CBT, DBT, suicide consultation, collaborative care, mobile crisis, and public health efforts in suicide prevention. Also discussed was the identification of populations at risk that are outside the traditional mental health populations, such as primary care, chronic illness, and LGBTQ populations. The use of screening tools aid in the identification of increased risk in an expedient manner. Future discussions could include the use of technology and artificial intelligence in interventions to assess and treat high risk individuals.
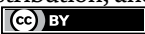
Conflict of interest

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Author details

James Pease
School of Social Work, University of Cincinnati, Cincinnati, United States

*Address all correspondence to: peasejs@ucmail.uc.edu

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Chapter 4

Self-Harming Behavior in Adolescents: Current Diagnostic and Therapeutic Approaches

Merve Yazici and Cicek Hocaoglu

Abstract

Self-harming behavior (SHB) refers to a culturally disapproved situation in which a person intentionally damages his/her own body. SHB is an important public health problem in the world, especially during adolescence, and is widely encountered in clinical practice. It can be seen together with psychopathologies such as depression and borderline personality disorders, but it can also occur without concomitant psychopathology. In addition to the fact that SHB has a high risk of recurrence and can result in negative mental health problems in the long term, it is also one of the most important risk factors for suicidal behavior. Studies on SHB have increased in recent years. However, the epidemiology and etiology of SHB have not been fully elucidated. In addition, there is no psychotherapeutic intervention method or pharmacological agent whose effectiveness for SHB has been proven yet. In this article, it is aimed to review the studies related to the definition, epidemiology, risk factors, and treatment of self-harming behavior.

Keywords: self-harm, non-suicidal self-injury, adolescents, mental health, suicide

1. Introduction

Self-harming behavior (SHB) can be defined as all behaviors that result in a person intentionally injuring himself to some extent physically and psychologically or that are performed with the foresight of this type of result [1]. In both clinical and community samples, it is a common mental health problem among adolescents and young adults [2]. Although SHB has traditionally received less attention than suicidal behaviors, it is increasingly recognized as a prominent and important clinical phenomenon. SHB manifests itself widely in forms such as cutting, scratching, hitting, striking, carving, and scraping [3]. It is stated that SHB often serves functions such as reducing negative emotions, distracting, or punishing oneself [4]. SHB does not occur only in the context of psychiatric disorders, such as mood disorder, anxiety disorder, post-traumatic stress disorder, eating disorder, substance use disorder, and borderline personality disorder. It can also occur without a comorbid psychiatric diagnosis [5, 6]. It is reported that SHB often begins in early adolescence, reaches its peak in the middle of adolescence, and its frequency decreases toward late adolescence [7, 8]. Although there is a significant decrease in the frequency of SHB from late adolescence

to early adulthood, the risks related to long-term mental health problems, suicidal tendencies, and risk-taking behaviors increase in individuals who have SHB repeatedly during their adolescent years. For this reason, prevention, diagnosis, and early intervention of SHB are important. In this article, it is aimed to review the causes and treatment of SHB in the light of current studies.

2. Definition and history of self-harming behavior

Self-harming behavior (SHB) is defined as a behavior of intentionally, directly harming a person's own body without suicidal intent [1]. Throughout history, self-harming behavior has taken place in different sources. For example, the Bible tells the story of "a man who injured himself with stones while shouting and is under the rule of elves" [9, 10]. In the tragedy of King Oedipus in Greek mythology, it is told that King Oedipus removed his eyes in feelings of guilt and sinfulness when he found out that he had married his mother after killing his father [10, 11]. In Norwegian mythology, it is mentioned that Odin gave one of his eyes to be able to drink a single sip of the water of the Mimir's Well to have wisdom and intelligence [11]. In the medical literature, on the other hand, it is first mentioned about a female patient who had removed her both eyes in feelings of guilt in 1946 [9, 11]. In early psychoanalytic studies, SHBs, which led to genital injuries and organ loss, were considered as behaviors performed to prevent fear of castration, masturbation, and deviant sexual desires. Emerson used the concept of self-mutilation for the first time in a study in which he evaluated cutting oneself as a symbolic view of masturbation [12]. In addition, in the 1930s, the psychoanalyst Karl Menninger expressed acts of self-harm as a kind of debilitated suicide, and he also used the term self-mutilation [13]. Especially in the early literature, all forms of non-fatal and intentional self-harm behaviors were considered suicide attempts, regardless of whether there was any suicidal intention in the expressed action. However, there were different opinions in this period [13]. In the 1960s, some authors stated that the vast majority of people who self-harmed did not attempt suicide [13]. In 1983, Pattison and Kahan mentioned that not all self-harming behaviors can be classified as suicide attempts, and they emphasized that a person can intentionally cause physical harm to himself even without suicidal thoughts [14]. In 1989, Favazza defined SHB as repetitive and non-life-threatening self-harming behavior [15].

A historical and current assessment of self-harming behavior was made by Favazza, and it was emphasized that self-harm and suicide were separate concepts [9]. However, Favazza also considered the cultural effects and divided the self-harming behavior into two: culturally approved self-harm and non-cultural (non-approved) self-harm [9]. The basic understanding today is that the goal of a person who attempts suicide is to put an end to all his feelings, but the goal of a person who harms himself is to try to feel better. However, it is stated that those who cut themselves repeatedly are at a high risk of suicide, and especially under the influence of drug overdose, the risk of death increases since they cannot control their self-harming behavior.

Since the date it was first expressed, SHB has been defined in different ways and different terms have been used to express it. Even when SHB is limited to non-suicidal behaviors, terms such as "parasuicide," "self-injury," "self-mutilation," "delicate self-cutting syndrome," and "considerate self-harm" or "non-fatal considerate self-harm" have been used to describe it [1, 13]. When looking at the studies conducted in recent years, it is seen that the research on self-harming behaviors is increasing, and more clear and consistent definitions and terms are used [1]. However, there is an ongoing debate on how to

correctly define "self-harming behavior" internationally. In the international diagnostic classification, SHB did not have any category until the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, fifth edition) was created. In the DSM-4, it was expressed as repetitive and dysfunctional motor movements such as "self-biting, skinning, hitting the head, hitting the body enough to disrupt functioning or require treatment" in stereotypical behavior disorder, while it was expressed as "self-destructive behaviors" in borderline personality disorder [16]. In DSM-5, as a result of emerging ideas indicating that it is a different disorder, it was considered as a separate clinical condition that would guide future studies. DSM-5 includes SHB as a new diagnostic category in the form of "self-harming history" under the heading of other situations where there is a personal history. In the criteria determined by DSM-5, SHB is defined as intentional harm to one's own body in a socially disapproved or non-destructive manner. The importance of distinguishing it from overdose drug usage, culturally approved behaviors (e.g., piercings), and stereotypical forms recurring among people with developmental disorders is emphasized. As another criterion, it is recommended that self-harming actions should have taken place on at least 5 days within the last year. Moreover, DSM-5 underlines the non-adaptive "coping strategy" nature of SHB, and it is emphasized that the individual should have the goal of achieving a better emotional state after this action (self-harming). SHB was included in the DSM-5 as a disorder that needs more research as a different syndrome [17]. With the update of the DSM-5, intentional damage to the body surface without suicidal intent has been defined as "non-suicidal self-injury (NSSI)," and it is stated that distinction of it from a suicide attempt is still controversial [18]. In definitions (especially with the NSSI definition), it is emphasized that self-harming behavior can be distinguished from a suicide attempt, in which death is consciously intended. However, some studies have reported that although it is different from a suicide attempt, 50–75% of individuals with a history of SHB have attempted suicide [19, 20]. This situation causes controversy in terms of naming SHB as "non-suicidal self-injury." While SHB includes both acts with or without suicidal intent, the term "non-suicidal self-injury" describes the intentional and direct destruction or alteration of body tissue in a way that is not socially accepted and takes place without suicidal intent, and therefore this term excludes suicide attempts [17, 21]. Although the intention behind the act of self-harming is clinically extremely important for risk assessment, the lack of empirical evidence supporting a clear distinction between self-harming with and without suicidal intent is highlighted [22]. A systematic review comparing studies using the definition of SHB with studies using the definition of NSSI suggested that there were no significant differences in the average lifetime prevalence rates and that this distinction was not obvious in the adolescent community sample [7]. In the literature, studies conducted in European countries and Australia predominantly use the term "deliberate self-harm" as a more comprehensive term for the harmful behavior of a person toward himself, regardless of suicidal intent [7, 8, 23]. In contrast, studies conducted in Canada and the United States use the term "non-suicidal self-injury," which includes only directly harmful behaviors without suicidal intent [7, 8, 23]. In this article, the term "self-harming behavior" is used to express this situation.

3. Epidemiology

In the literature, highly variable rates of SHB prevalence are reported. Since the day of its identification, it has been stated that different definitions of self-harming behavior may cause inconsistency in the data obtained in epidemiological studies.

In a systematic review of 35 articles related to SHB, it was stated that 11 different terms had been used to describe self-harming behavior, and 20 different methods had been used to measure it [24]. In the study, it was reported that definitions were particularly problematic since the distinction between suicidal and non-suicidal behaviors was not clear. In the review, it was revealed that the authors who explained these semantic differences had reported SHB prevalence rates ranging from 2.9 to 41.9% in normal populations and from 13 to 59% in clinical populations [24]. As a result of a systematic review and meta-analysis of studies conducted with nonclinical sample groups, the prevalence of SHB was reported as 17.2% in adolescents, 13.4% in young adults, and 5.5% in adults [25]. In addition, in a recent meta-analysis study involving 66 studies consisting of 686,672 children and adolescents, self-harming behavior was considered separately as NSSI and deliberate self-harm, and lifetime prevalence and 12-month prevalence were calculated. The rates were reported as 22.1 and 19.5% for NSSI, 13.7 and 14.2% for deliberate self-harm, respectively [26]. In a meta-analysis study conducted between 1990 and 2015 with 597,548 participants aged 12–18 from 41 countries, the lifetime prevalence of SHB was reported to be 16.9% (Range: 4.1–39.3%), and it was stated that the rate had increased by 2015 [27]. In contrast to these results, the prevalence of SHB was found to be lower in a sample of adolescents examined based on the criteria recommended by DSM-5, and an approximate rate between 1.5 and 6.7% was reported [28]. In a recent study conducted with 1059 primary school children (8–9 years old) by applying a 4-year follow-up process, the 12-month prevalence of SHB was found to be 3% [29]. In another study, prevalence rates ranging from 55 to 68% were reported for patients admitted to psychiatric services [30]. In the literature, it is reported that SHB is more common during adolescence and young adulthood, and this behavior mostly begins at the age of 12–14 [2, 7, 8]. However, SHB has also been reported in younger children [31]. In a study conducted by Barrocas et al., self-harming behavior was observed in 53% of the 665 children included in the study, and this rate was reported as 7.6% in 3rd grade students, 4.0% in 6th grade students, and 12.7% in 9th grade students [31]. In a study conducted with 11,814 children aged 9–10 years in the United States, the rate for SHB was reported as 9.1% [32]. In another study conducted with a preschool clinical sample group, self-harming behavior was reported as 21.3% in children between the ages of 3 and 6 [33]. Looking at the difference between the genders, the first multicenter study conducted with more than 30,000 children and adolescents in 2008 revealed that the incidence of SHB in the last year was 8.9% in girls and 2.6% in boys [34]. In many studies conducted in later years, it has been reported that SHB is more common in girls than in boys [35, 36]. However, there are also studies reporting that SHB is observed in equal proportions in females and males [37–39].

4. Etiology and risk factors

Many studies have been conducted on the causes of SHB in adolescents, and it has been emphasized that many factors (e.g., genetic, biological, psychological, physiological, social, and cultural) play a role [3].

4.1 Neurobiological factors

Research focusing on the development and continuation of self-destructive behaviors as well as neurobiological factors has been mostly conducted with adults

with borderline personality disorder [6]. However, in recent years, there has been an increasing focus on neurobiological changes in adolescents participating in NSSI. In an imaging study conducted with adolescents, it was determined that SHB was associated with a decrease in the volume of gray matter in the insula and anterior cingulate cortex [40]. In a functional MRI (fMRI) study focusing on adolescents with SHB, it was reported that significantly higher responses were observed in the bilateral amygdala, hippocampus, and anterior cingulate cortex when processing emotional stimuli compared to healthy control group and depression explained this difference; in addition, it was shown that increased activity in the amygdala and anterior cingulate cortex was more in response to negative, positive, and neutral pictures in adolescents with SHB compared to healthy controls [41]. In another FMR study focusing on depressed adolescents with SHB and a control group, social stress was applied to participants. Greater activation increases were reported in the medial prefrontal cortex and ventrolateral prefrontal cortices of depressed adolescents with SHB compared to depressed adolescents only and healthy control groups. The results indicated that social exclusion might process differently in depressed adolescents with SHB in brain regions related to the processing of previous social exclusion compared to adolescents with depression only [42]. In an fMRI study conducted with female adolescents, functional connectivity measurements of the amygdala during the task and at rest were performed, and it was found that adolescents with SHB showed atypical amygdala-frontal connectivity compared to the control group. It was revealed that there was a higher functional connection between the right amygdala and the dorsal anterior cingulate cortex and the supplementary motor area (SMA) [43]. A similar study focusing on the rest state also showed decreased amygdala activation between the anterior cingulate cortex, subcallosal cortex, paracingulate gyrus, right planum temporale, and right insula in adolescents with SHB compared to the healthy control group [44].

Considering the relationship of SHB with stressful situations, the relationship between SHB, the autonomic nervous system (OSS), and the hypothalamic-pituitary-adrenal (HPA) axis, which play a role in coping with stressful situations, was examined. OSS activity in SHB is studied by psychophysiological methods used in cardiac activities [45]. In the first study conducted with adolescents with SHB, parasympathetic activity-mediated heart rate variability (indicating the balance of sympathetic and parasympathetic activity) was examined, and it was reported that parasympathetic activity decreased at rest compared to the control group, and the parasympathetic response was lower when the negative mood was triggered [46]. A study found that there was no change in heart rate during stress induction [47]. In another study, it was reported that there was no difference in both heart rate and heart rate variability in adolescents with SHB compared to the control group [48]. In studies focusing on adolescents with SHB, it is reported that the HPA axis is affected [6]. In a study conducted by measuring saliva and hair cortisol in adolescents, it was reported that while there were no differences in hair cortisol compared to the control group, the cortisol wake-up response was higher in adolescents with SHB [49]. Another study conducted with siblings found that salivary cortisol levels in the SHB group decreased significantly after a trauma interview, while hair cortisol levels in the SHB group were significantly higher than in those without SHB [50]. Another study conducted on adolescents found that cortisol levels decreased in individuals with SHB in response to the Trier social stress test, and it was reported that this might indicate hyposensitivity of the HPA axis in adolescents with SHB in acute stress situations [6, 47]. Another recent study found that after social stress, depressed adolescents

with SHB had lower corticol levels compared to adolescents with only depression and the control groups [51]. In some studies, increased HPA axle activation has been reported after cold pain stimulation in individuals with SHB [52]. A recent study also found no statistically significant difference in terms of blood cortisol levels between individuals with and without SHB [53]. A study examining the relationship of the stress response with SHB found that stress hormones (cortisol and dehydroepiandrosterone) had a relationship with factors supporting and maintaining SHB [54].

Very little is known about the genetic factors that affect the development of SHB. Gene-environment interaction was shown in a study conducted with adolescents to investigate genetic factors in SHB. In this study, it was shown in two independent samples that the SLC6A4 gene encoding the serotonin transporter and the carrier-dependent polymorphism region (5-HTTLPR) increased the likelihood of SHB in adolescents who had at least one short allele and were exposed to stress [55]. In a community sample study conducted with Chinese male adolescents, an interaction between variants of the Monoamine Oxidase A (MAO-A) and Catechol-O-methyl transferase (COMT) genes and experiences of childhood abuse was found in the prediction of SHB. However, in a carrier subgroup with the MAO-A T allele and COMT Met allele, there was no significant relationship between abuse experiences and the development of SHB [56].

It has been found that adolescents with SHB are more physiologically stimulated, their physical responses to emotional events are more severe, and their stress resistance ability is less [57]. In addition, it is reported that the pain threshold is high in these adolescents, and therefore, their tolerance to pain is greater [58]. However, regarding the perception and processing of pain in individuals with SHB, there are differences in the results obtained from adolescent samples. In a study comparing individuals with SHB with the non-SHB group, no differentiation was shown between the groups in terms of pain processing, but more activation in reward/pain and addiction-related regions was reported in fMR results [59]. In a follow-up study conducted on pain sensitivity in adolescents, it was stated that a decrease in the frequency of SHB after 1 year is associated with increased pain tolerance, which might lead to getting rid of SHB [60]. At the biological level, the findings indicating that the perception of pain is reduced in people with SHB have led to suggestions of endogenous opioid involvement. In studies conducted on adults, it has been shown that endogenous opioids are lower in individuals with SHB [61]. A recent study conducted with adolescents similarly found low beta-endorphin levels in individuals with SHB [62].

4.2 Demographic factors

In the literature, as mentioned above, it is reported that SHB often occurs during adolescence period, is most often seen during adolescence, and often decreases after young adulthood [1, 8, 35]. It has been stated that the developmental characteristics of adolescence may be a factor in an increase in the risk for SHB [63]. It has been reported that adolescence may be a factor in SHB both because it is a period when risky behaviors are frequent and because it is a period that is fragile from a neuro-developmental point of view [3, 63, 64]. In meta-analysis studies, it is reported that in addition to age, gender (female) is also a risk factor for SHB in both adolescent and adult age groups [8, 35, 65]. It has been determined that the difference between females and males is higher in clinical populations, while this difference decreases in studies conducted with community samples [3, 35]. It has also been reported that the

method used for SHB differs between females and males; the cutting-oneself method is more common in females, while methods such as punching a wall and head-butting a wall are more common in males [31, 66].

4.3 Socioeconomic level

It has been reported that low socioeconomic level, low level of education, and lower income and poverty are risk factors for self-harming [7, 31, 67–69]. It is stated that low income can be considered as a source of stress that can affect a child's social-emotional, behavioral, and cognitive development [70, 71]. In addition, studies also report that low socioeconomic level is associated with the development and maintenance of self-harming [72].

4.4 Social and environmental factors

4.4.1 Peer bullying

In a 2.5-year follow-up study conducted by Hankin et al. [73], it was shown that dysfunctional relationships were a risk factor for SHB [73]. In the same study, it was also emphasized that peer bullying is a risk factor for SHB and SHB recurrence [73]. A study conducted with two large longitudinal sample groups (Avon Longitudinal Study of Parents and Children in the UK (ALSPAC) and Great Smoky Mountains Study in the US (GSMS)) found that exposure to peer bullying in childhood and early adolescence was associated with SHB at a higher rate during young adulthood compared to exposure to maltreatment by parents [74]. Another study involving 11 European countries (n = 12,098 adolescents) also showed that bullying was highly associated with self-harming behavior [75]. In a recent prospective study conducted with elementary school children, it was reported that the risk of SHB increased by 7 and 24 times, respectively, in 11- and 12-year-old children who had few friends and were exposed to peer bullying [29]. Also, in the same study, it was reported that peer relationships are strongly associated with self-harming behavior among elementary school children [29]. A multicenter 12-month follow-up study conducted in Europe in 2020 reported that being bullied was associated with the onset of SHB [76]. A meta-analysis study investigating bullying and including 156,284 adolescents aged 11–14 revealed that bullying and cyberbullying victimization were associated with SHB [77]. In a recent meta-analysis study on risk factors, the heterogeneity of the reviewed studies related to traditional and cyber bullying was emphasized and it was indicated it is a weak risk factor [78].

4.4.2 Social modeling

In the results of a review conducted on the relationship of SHB with social modeling, the effects of being affected by social contagion were shown, especially in the first self-harming behavior [79]. However, emphasis was placed on the fact that some of the studies had been carried out many years ago and they had methodological defects [79]. It has been reported that in line with social effects, identification with a certain youth subculture (gothic) increases the risk of SHB [80, 81]. It has been stated that young people in the subculture have both more frequent SHB and have stronger motivations, in addition, this situation cannot be explained solely by peer

influence, the temperament and personality characteristics of the young person in the subculture (e.g., more introverted temperament, and being young people who engage in impulsive and risky behaviors more often) may contribute to this relationship [80]. However, there are also authors who defend that the increase in risk for the current condition can be explained not by subculture but by peer contagion [82].

In connection with a person's internalized identity, societal norms, and societal values, his or her sexual orientation has also been shown to be a strong risk factor for SHB in many studies. It has been reported in many studies that young people who have sexual minority orientation or identify themselves as LGBT are at greater risk of SHB compared to young people who identify themselves as heterosexual [83–85].

4.4.3 Media effect

Regarding the worldwide spread of SHB, the use of the Internet and the use of social media are of interest. The Internet is seen as an applicable tool for individuals with a history of SHB in terms of sharing their life experiences and exchanging information among themselves [85]. In studies, it has been shown that adolescents with a history of SHB use the Internet more compared to those who do not have SHB history [86, 87]. A study conducted by Lewis et al. in 2014 found that terms related to SHB had been searched more than 42 million times in 1 year [88]. In the study, it was reported that 21.5% of the searched websites were health information websites, and only 9.6% of them were approved by a health or academic board [88]. Frequent searching of terms related to SHB on social media, watching videos containing SHB methods, and looking at their images have been reported to have some benefits in addition to some risks [85, 89, 90]. The most frequently mentioned benefit is to reduce social isolation. In addition, the fact that it may increase the incentive to heal, create an environment for emotional self-disclosure, and be a tool for resisting impulses have been mentioned among other benefits of it. Some issues such as the fact that it can contribute to the normalization of SHB behavior, cause the self-harming individual to internalization this identity, may increase competition through sharing, can increase the frequency and severity of SHB, can be a tool for learning new strategies, and it can also prevent recovery due to the fact that the presented emotions contain more negative elements have been reported among the risks of it [85].

4.4.4 Family characteristics and negative life events

Exposure to adverse life events is an important factor associated with SHB [91, 92]. In the literature, it has been stated that negative family emotions and negative family relationships are more frequent in adolescents with SHB [72, 93]. A 12-month follow-up study conducted with 1973 adolescents found that decreased family support predicts the continuation of self-injury, while increased family support is an important protector in terms of SHB [94]. In addition, it has been reported that adolescents who self-harm often find the family environment to be judgmental, emotionally stuffy, exclusionary, and insufficient in terms of support and care [72]. Also, in a different study, it was found that adolescents with SHB had more limited family communication, did not seek help, and could not cope with their problems, and because of this, they resorted to this method [95]. In a recent meta-analysis study on risk factors, low social support, parental substance abuse, criminalized past, history of sexual abuse, lack of religious or spiritual ties, psychological functioning of the family, and friends who had attempted suicide were considered among the risk factors associated

with SHB [78]. In a cohort study, it was also reported that there was a positive linear relationship between adverse living conditions and the risk of self-injury at the age of 16 [96]. Exposure to maltreatment in childhood (emotional, physical, and sexual abuse, as well as physical and emotional neglect) has been identified as a risk factor for SHB in the literature [97–99]. However, in recent studies, different relationships between subtypes of childhood maltreatment and SHB have been reported. While a direct relationship between emotional abuse and SHB has been reported, it has been reported that sexual and physical abuse, difficulties in expressing emotions, and difficulties in the ability to cope with negative emotions mediate this relationship [100]. In a meta-analysis study involving 45 studies, it was reported that there was a weak relationship between childhood sexual abuse and SHB [101]. In studies conducted in later years, it has been reported that the relationship between SHB and sexual abuse is mediated by factors such as low self-esteem, dissociation, alexithymia, self-criticism, and post-traumatic stress [102]. Another study found that compared to physical and sexual abuse, children whose basic physical needs are not met may face a higher risk of self-harm [103]. Exposure to negative, stressful events in childhood and adolescence, and their repetition can lead to a deviation of the developmental trajectory, an increase in the formation of emotional symptoms (difficulties in mood regulation and an increase in depressive symptoms) and affect cognitive development and the formation of personality traits [104]. In terms of biological mechanisms, it has been reported that negative life experiences may have a negative impact on brain structural changes through the HPA axis and inflammatory cytokines [105].

4.5 Individual psychological factors

Difficulties in emotion regulation are reported as the main causes of SHB in 65–80% of adolescents with a history of SHB [106]. It is stated that emotional dysregulation is high in individuals with SHB and that SHB plays a role in improving this mood and regulating emotions [36]. In a study examining the relationship between emotional dysregulation and the onset of self-harm in adolescents aged 14–15 years, it was reported that before the onset of the first self-harm, participants experienced difficulties regulating their emotions and, in particular, deficits in expressing their emotions and poor impulse control [107]. In a meta-analysis study that reviewed 48 studies examining the relationship between SHB and emotional dysregulation, it was stated that emotional dysregulation is associated with a higher risk for SHB regardless of age or gender [108]. In a meta-analysis study conducted on longitudinal risk factors for SHB, it was found that emotional dysregulation was an important but weak predictor for SHB [36]. Recently, in a study that evaluated whether emotional reactivity and inhibitory control difficulties were experienced in adolescents in response to positive and negative emotions with a two-stage laboratory task, it was shown that adolescents with SHB decreased emotional sensitivity and showed lower levels of inhibitory control in response to images depicting negative emotional content; but these results were not determined in images depicting positive emotional content [109]. In addition, in the study, a relationship was found between emotional inhibitory control problems and the severity of SHB [109].

In the Biosocial Model proposed to explain borderline personality disorder, it is assumed that impulsivity, emotional vulnerability, resulting in emotional dysregulation, and interacting with an invalidating environment due to a biological predisposition can lead to SHB in young people [110, 111]. It is stated that an invalidating environment emerges in situations where emotional needs are not met appropriately,

as well as it emerges in families exhibiting maltreatment. This theoretical model coincides with the literature that reveals that maltreatment in childhood can often lead to bad consequences, including emotional dysregulation and SHB [99, 100, 112].

Current approaches to SHB integrate emotional processing and social-cognitive theory to explain why some individuals are more likely to self-harm than others [113, 114]. According to the Cognitive-Emotional Model of SHB, being highly reactive to negative emotions is the mechanism by which individuals learn SHB is an effective strategy for regulating these emotions when they experience difficulties in regulating these emotions (e.g., they perceive that they have several strategies for dealing with their emotions). Conversely, it has been stated that individuals who believe that they can tolerate distress, resist the urge to self-harm, and use different strategies to manage their emotions will be less likely to self-harm [113]. According to the Benefits and Barriers Model, individuals who see themselves positively and perceive SHB as a painful, useless, and inhibitory behavior are less likely to see SHB as a useful way to cope with negative emotions. Therefore, they are also less likely to self-harm. In contrast, it has been stated that individuals who criticize themselves for not meeting high standards and experiencing low self-esteem are more likely to self-harm [114]. In accordance with this, it has been reported in the literature that individuals with a history of SHB have higher negative and lower positive characteristics, more emotional reactivity, psychological distress, difficulties in managing negative emotions, and negative schemas [108, 115–118].

4.6 Recurring self-harming behavior

The recurrence risk of SHB is quite high. In review and meta-analysis studies, it has been reported that the most important risk factor for SHB is previous SHB [8, 36]. In addition, it is reported that psychiatric diagnosis is more common in adolescents with a history of recurrent SHB [8]. In a meta-analysis study in which 177 articles were reviewed, the recurrence risk of SHB was reported as 16.3% within 1 year and 22.4% within 5 years [119]. It has been stated that individuals who receive psychosocial support have an 18% reduced recurrence risk of SHB within 1 year [120]. A follow-up study conducted with a community sample found that 6.2% of young people aged 15–16 had self-harmed for 6 months, 2.6% of this rate had self-harmed for the first time and 3.6% had a repeated episode [121]. In addition, in a study in which SHB and suicide attempts were investigated in those with a history of SHB, it was found that the frequency of SHB predicts suicide [114].

5. Functions of self-harming behavior

Although various mechanisms related to the function of SHB have been proposed historically, the function of emotion regulation is one of the functions that receive the strongest empirical support [122]. It is stated that SHB is associated with decreases in negative emotions such as tension, fear, and sadness [122]. It is reported that although SHB is primarily considered as a way to reduce the negative effect, it also produces a positive effect, and the increased positive effect following SHB is associated with the recurrence of the behavior [122]. Nock and Prinstein proposed a four-function model approach related to behavior for the functions of SHB [1]. This approach suggests that behavior is caused by events that precede and follow it, and there are four possible reinforcement mediations of self-harm. The reinforcers that can support SHB both

positively and negatively, as well as the personal (automatic) consequences of SHB in addition to the interpersonal (social) consequences are also described. For example, as an automatic negative reinforcement, SHB serves the function of reducing negative emotions or thoughts and helping a person to regulate their internal state (e.g., relieving tension, reducing feelings of anger), while as an automatic positive reinforcement, it allows a person to achieve pleasant or positive emotions or thoughts during or after SHB (feeling alive). Social positive reinforcement helps to reinforce social interaction (getting attention or sending messages to others), while social negative reinforcement helps to avoid unpleasant social interactions (e.g., parents stopping arguing, stopping peer bullying, not attending sports classes) [1]. This four-function model helps to organize and understand the definitions of self-harming behavior, and is supported by personal notification, behavioral and physiological data collected from various studies, examples, and contexts [1]. In the first clinical descriptions of self-harming, the stress-reducing features of this behavior were described in detail. In some cases, self-harming behavior has been defined as a means of signaling a person's need for help or support [1, 14, 15]. Similarly, in more recent studies, the functions of self-harming behavior have been examined both in clinician interviews and in self-report scales, and it has been clearly shown that the results are consistent with the four-function model [1, 21, 123, 124].

6. Self-harming behavior as independent diagnosis

Although SHB has traditionally received less attention than suicidal behaviors, it is increasingly recognized as an important clinical phenomenon. It is mentioned that for a behavior to be classified as SHB, there must be will and intention (according to both the definition of Favazza and the DSM-5 diagnostic criteria). Accidentally cutting yourself is not SHB. However, in some cases, it can be difficult to determine the role of intentionality. For example, SHB can sometimes occur during dissociative episodes [125]. If a person engages in SHB when he/she is detached from reality, can SHB be considered intentional? In similar situations, if the motivation for self-harming is to feel something, then perhaps a degree of intentionality can be assumed. However, the example of self-harm occurring in the context of dissociation highlights the importance of developing a clearer definition for intentionality to the extent that this is possible [13]. Although there have been numerous studies about the nature of the relationship between SHB and suicide, there is still debate about this relationship. Although both SHB and suicidal behavior are forms of self-harming behaviors, it has been stated that there are some differences between them, such as intention, severity, and frequency [126–128]. It is mentioned that the most basic difference between SHB and suicidal behavior is related to the person's intention [1, 128]. It is also stated, unlike suicidal behavior, in the SHB, the individual does not intend to end his own life and cannot perceive that his behavior will result in death [20, 128]. Although both behaviors involve avoidance of distressing emotional situations, suicidal behavior, unlike SHB, has the intention of ending one's life [128]. Another difference between these two behaviors is caused by the methods used. It is stated that SHB usually involves methods with a lower risk of death (e.g., cutting, burning, biting), while suicidal behavior involves methods with a higher risk of death (e.g., overdose, wrist cutting, hanging) [1, 20, 128]. Another difference is related to the incidence; SHB is reported to be more common in both clinical samples and community-based studies compared to suicidal behavior [128]. In addition to the important differences between

SHB and suicidal behavior, many findings have been obtained in the studies on the relationship of these behaviors to each other, and it is stated that these two disorders cannot be considered separate from each other [128]. Although the lack of suicidal intent was emphasized when defining SHD, it has been reported that in adolescents, SHD is often accompanied by suicidal thoughts, and this is an important risk factor for later suicidal thoughts and attempts [129, 130]. In studies, it has been shown that SHB is associated with suicidal behavior and is an important predictor of both recurrent SHB and suicide attempt [126, 131–137]. It has been reported that both the onset and recurrence of SHB during adolescence predict suicidal thoughts and behavior in late adolescence [138]. Moreover, any self-harm in adolescence has been associated with higher mortality and an increased risk of suicide even after 15 years [139, 140]. In addition, it has been stated in studies that both SHB and suicide can be seen simultaneously in most adolescents [141]. It is stated that many of the adolescents with SHB have also attempted suicide [19]. SHB has been reported as an important predictor of suicide attempt in young people with depressive disorder [131, 134]. In a meta-analysis of longitudinal follow-up studies, it was reported that people with SHB had 4.27 times increased risk of later suicide attempts and 1.51 times increased risk of death by suicide, regardless of suicidal intent [142].

7. Assessment tools

When assessing adolescents with SHB, a physical examination should be performed, it should be determined whether there is a priority need for emergency or surgical intervention, and the severity and frequency of SHB should be assessed [143]. It is recommended to discuss SHB separately with the teenager and family and to take a detailed history about it. Taking comorbid mental disorders into account, a complete mental state examination should be performed [143]. In addition, the risk of recurrence of SHB and the risk of suicide should be assessed during the SHB examination. During the interview, validity and reliability assessment tools are used to evaluate the SHB. Some scales that can be used in adolescents are deliberate self-harm inventory [37], functional assessment of self-mutilation [144], inventory of statements about self-injury [145], self-harm behavior questionnaire [146], self-injurious thoughts and behavior interviews [147]. However, the use of risk assessment tools and scales to predict future suicide or recurrence of self-harm is not recommended by the NICE (National Institute of Health and Clinical Excellence) guidelines [148].

8. Treatment approaches

There is no treatment that is considered the gold standard for SHB in children and adolescents [143]. Evaluation of the patient in different etiological dimensions and determination of additional psychiatric diagnoses are considered important in terms of the treatment process [149]. Individual psychotherapies, including cognitive-behavioral therapy and dialectical behavioral therapies, and psychopharmacological agents such as selective serotonin reuptake inhibitors (SSRIs) may be preferred based on the relevant psychopathology [150]. In this section, information obtained from studies on psychotherapeutic interventions and pharmacological agents is presented.

8.1 Psychotherapeutic interventions

Psychotherapeutic interventions for SHD in children and adolescents include a wide range of therapeutic approaches and orientations, including cognitive-behavioral therapies (CBT), dialectical behavioral therapy (DBT), interpersonal therapy, psychodynamic therapies, family therapies, and parent education interventions [151]. In review and meta-analysis studies, the evidence of effective psychosocial treatment interventions for SHB has been evaluated. It has been stated that the meta-analysis studies focused on psychotherapeutic approaches as well as pharmacological treatments and showed the clinical effects of interventions such as DBT and CBT, but the results obtained were insufficient to determine the treatment protocol [150, 151]. A review of 11 studies conducted in 2015 highlighted the lack of evidence level, and there was little evidence to support the effectiveness of group therapy, while mentalization-based therapy (MBT) and DBT were indicated as treatments that should be further investigated [152]. In a review of 19 randomized controlled studies conducted with adolescents and focusing on suicide attempts or self-harm, it was found that the proportion of adolescents who self-harmed during the follow-up period was lower in intervention groups (28%) compared to the control group (33%). It has been reported to be effective for DBT, CBT, and MBT. However, when the intervention conditions and normal treatment were compared, it was reported that there was no statistically significant difference [153]. In a meta-analysis study conducted by adding nine new studies to the study conducted in 2015, it was found that DBT in adolescents meets the standard to be classified as a "well-established intervention" to reduce SHB, and it was classified as "probably effective" in reducing SHB [154, 155]. In addition, it has been shown that certain elements such as a family-centered approach, the inclusion of skill training, and a longer treatment duration increase the effectiveness of treatment in interventions [155]. In another study evaluating 17 studies, evidence for the effectiveness of DBT was reported, while insufficient evidence for the beneficial effects of CBT, MBT, adaptation development approaches, family interventions, or remote contact interventions was reported [156]. In a meta-analysis study in which 25 randomized controlled studies were included, it was reported that DBT had moderate effects on SHB and showed clinically significant differences. In the study, it was found that other types of therapeutic interventions did not show improvement compared to active control interventions [22]. In a recent review in which 112 randomized controlled studies conducted with child adolescents were reviewed, it was reported that the effects of all intervention methods for SHB were not significant [157]. In the study, it was stated that despite increasing research in recent years, intervention methods do not provide effective improvement [157]. In another recent study in which 26 articles and 23 short intervention methods for short interventions (total duration not exceeding 240 minutes) were examined, only six intervention methods were reported as positively effective, and only one of them was described as "probably effective" [158]. As a result, despite more than 50 years of research on prevention and treatment, it seems that current intervention methods are not very effective [158].

8.2 Pharmacological treatment

There is currently no evidence-based pharmacological treatment method for SHB [157]. In the guidelines, it is reported that studies conducted in adolescents related to SHB are incomplete and a specific treatment agent cannot be recommended with

the available data [143, 159]. It is also stated that treatment with pharmacological agents is generally less common compared to psychosocial interventions due to concerns about the risk of increasing the severity of SHB [156, 159]. It is mentioned that in the pharmacological treatment of SHB, the treatment of psychiatric disorders observed in SHB is at the forefront [143, 150, 159]. For example, it has been reported that although the first preferred treatment option in depressed adolescents is the pharmacological agent SSRIs, they have little effect on SHB, but they do not increase SHB rates [159]. However, a 2018 report published by the FDA claimed that there is a potential increase in suicidal thoughts and behavior in adolescents due to antidepressant treatment interventions (as discussed in a US Food and Drug Administration-FDA- warning in 2004). In studies related to antipsychotics, it has been reported that their effects on SHB in child adolescents are insufficient and there are not enough studies [160]. A review of 251 studies evaluating the effectiveness of psychotropic drugs for SHB reported that there was an 8% decrease in the rate of SHB and a 0.2% decrease in symptom severity, as well as antipsychotics, citalopram, and ketamine had a larger-than-average effect size [161]. In addition, all age groups were included in the study, and it was determined that children and adolescents had a lower treatment effect size compared to adults [161]. It is stated that in SHB, pharmacological sedation can be used when acute psychopharmacological intervention is needed, especially in cases of severe internal tension (with an urge to self-injure) [143]. However, some points should also be emphasized. Higher rates of SHB have been reported in people taking benzodiazepines in the TORDIA study [162]. In a different study, it was reported that there was a lack of efficacy in the treatment of SHB with benzodiazepines [163]. In the guidelines for the treatment of SHB in children and adolescents, it has been reported that the use of benzodiazepines should be limited to clearly defined cases, inpatients can be evaluated due to the ease of follow-up, and the risk-benefit ratio should be evaluated individually. In addition, it has been stated that if they are tolerated, conventional antipsychotics with lower potency can be administered [143]. Moreover, some agents also take place in the search for new treatments. One of them, N-acetylcysteine (NAC), is a dietary supplement that is being studied as a potential treatment for various psychiatric disorders, largely due to its ability to cross the blood/brain barrier and increase levels of glutathione, the main antioxidant in the brain. In a study conducted with adolescents, it was reported that the frequency of SHB decreased after 8 weeks of NAC treatment (n = 35) [164]. In the study, it was reported that there was no relationship between the decrease in the frequency of SHB and the decrease in the depression scale, and based on this, it was stated that the role of NAC in reducing SHB and reducing depression may be independent of each other [164]. However, interpretation of the results of the study is limited due to the absence of a placebo control group and the open-label nature of the study. As a result, the pharmacological agent to be selected for the treatment of SHB is based on personal variables, potential interactions with other drugs, and environmental characteristics [143].

9. Preventing self-harming behavior

Given the early age of onset of SHB, it is stated that prevention efforts should be made during early adolescence, especially during elementary and secondary school years, and considering the number of hours students spend in school, school environments are ideal environments for implementing prevention programs. Regarding

prevention, the guidelines state that the effectiveness of prevention programs cannot be interpreted due to the lack of available studies [143]. There are various primary and secondary prevention programs focusing on mental health in general (e.g., Happyles and DBT in schools) and studies focusing on suicide prevention in schools (e.g., the Saving and Empowering Young Lives in Europe (SEYLE) [165]), but the effectiveness of these studies in terms of SHB is unclear [166]. Although there has been an increase in studies on SHB in recent years, it is emphasized that there is a lack of studies that are accessible to more people in particular. In a school-based prevention program (The Signs of Self-Injury (SOSI)) conducted by Muehlenkamp et al., it was aimed to increase knowledge about SHB, improve help-seeking attitudes and behaviors, and reduce SHB through psychoeducation for both students and school staff [167]. In this study, where a total of 274 adolescents were evaluated, and pre and post were compared, it was shown that the prevention program increased knowledge among students, improved their attitudes and intentions to seek help, and did not cause an iatrogenic effect (i.e., an increase in SHB thinking and behavior), but the rate of seeking help did not change [167]. Recently, a two-stage study was carried out in a school-based prevention program conducted with 651 school students [166]. This prevention program (Happyles), which focuses on improving general mental well-being and social ties, consisted of a combination of the SHB psychoeducation module (HappylesPLUS) in the second stage [166]. In the results of the study, it was reported that there was no iatrogenic effect, there was a decrease in SHB rates in the future, and emotional awareness increased, but there was no change in seeking help for mental illness [166]. A program consisting of modules on adolescent transformation, body image self-esteem, and emotion regulation with a psychoanalytic approach was implemented in a school-based peer education program for adolescents (NSSI-PEP) conducted during the COVID period [168]. In the results of the study, significant changes in emotion regulation abilities, self-esteem, and body perception were reported [168]. Also, the protocol of the first randomized controlled study (DUDE – Du und deine Emotionen/You and your emotions), which develops and evaluates a universal prevention program with follow-up measurements to prevent NSSI, has been published in the literature. According to this protocol, it is planned to work with 3200 young people in the study, including treatment and active control group, based on a skill-based approach, and it is planned to implement the "Stress-free through the school day" intervention program developed on the basis of DBT and CBT [169].

10. Conclusion

SHB is an important mental health problem that is common during adolescence all over the world. Epidemiological studies have reported that this disorder may begin in childhood, and it has also been shown that it is not limited to adolescence due to its negative consequences, such as other long-term mental disorders and suicide. SHB can emerge alone, as well as it can also occur in the course of many mental disorders. In the DSM-5, it was classified as a disorder for which more research was needed. However, there are still discussions in the literature about its denomination and its place in the diagnostic classification. This situation causes difficulties in the diagnosis and differential diagnosis of SHB. In studies on risk factors, it has been associated with bullying, media influence, family-related factors, and adverse life events in childhood. Although there have been studies related to the HPA axis and the endogenous opioid system in its neurobiology, the clear etiology has not been clarified. SHB

is important in terms of its diagnosis, treatment, detection of its risk factors, and prevention, both because of its repetitive nature, its association with other mental disorders, and because it is an important predictor for suicidal behavior. Despite the increasing studies on its treatment in recent years, a clear treatment guide has not been created. Although efficacy has been shown in its treatment, especially with DBT, MBT, and CBT-based treatments, it is reported that more studies are needed for verification. In addition, for the pharmacological treatment of SHB, there is not enough evidence yet.

Author details

Merve Yazici[1]* and Cicek Hocaoglu[2]

1 Department of Child and Adolescent Psychiatry, Recep Tayyip Erdoğan University School of Medicine, Rize, Turkey

2 Psyhiatry Department, Recep Tayyip Erdoğan University School of Medicine, Rize, Turkey

*Address all correspondence to: merve.yazici@erdogan.edu.tr

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Chapter 5

Untamed Mental Well-Being of Children from Shadow Parenting Families

Sadaf Konain Ansari and Aroob Fatima

Abstract

Shadow parenting is a prevalent issue in today's fast-paced world. The pressures of modern life, technology overload, and societal expectations contribute to emotionally distant parent-child relationships. The consequences of shadow parenting can be detrimental to a child's psychological, emotional, and social development. However, with conscious effort and a focus on meaningful connections, parents can overcome shadow parenting by prioritizing their child's emotional well-being and creating nurturing environments that foster growth, resilience, and emotional connection. Shadow parenting behavior is a complex and multifaceted issue that stems from childhood experiences of neglect and emotional unavailability. Understanding the theoretical framework underlying this behavior provides insight into the lasting effects it can have on individuals' lives. By seeking therapy, building supportive relationships, and acquiring parenting education, individuals who have grown up under the shadow parenting influence can break the cycle and create healthier and more fulfilling lives for themselves and their own families. In conclusion, shadow parenting has a significant and lasting impact on a child's psychological development. The emotional absence and neglect experienced in shadow parenting can lead to attachment issues, low self-esteem, poor emotional regulation, anxiety, depression, and behavioral problems. These effects can extend well into adulthood, impacting individuals' ability to form secure and healthy relationships and affecting their overall psychological well-being.

Keywords: shadow, parents, psychological issue, children mental health, suicides, anxiety, helicopter parenting, self-harm

1. Introduction

Shadow parenting refers to the phenomenon in which parents are physically present, yet emotionally absent in their children's lives. It is a form of parenting characterized by minimal involvement, lack of emotional connection, and limited engagement in the child's daily activities. While these parents might fulfill their basic responsibilities, such as providing food and shelter, their absence in emotional support and guidance leaves a void in the child's development [1].

One of the primary reasons for shadow parenting is the increasing demands of modern life. With the rise in dual-income families, parents often find themselves overwhelmed with work commitments and other responsibilities. This leaves little time or energy to devote to their children. In such situations, parents resort to "helicopter parenting," wherein they hover over their children, ensuring their physical well-being, but fail to address their emotional needs. Consequently, children may find themselves lacking the support and guidance essential for their growth and development.

Another factor contributing to shadow parenting is the pervasive use of technology. Parents today are constantly connected to their smartphones, tablets, and laptops, leaving little room for genuine and quality interactions with their children. Technology has not only made parents accessible to work at all times, but it has also become a means of distraction for both parents and children alike. As a result, children are left to entertain themselves without the necessary emotional guidance and nurturing from their parents [2].

Furthermore, high expectations and societal pressures also play a significant role in shadow parenting. In today's competitive world, parents may prioritize their child's academic achievements and success above everything else. This focus on performance can lead to parents neglecting their child's emotional well-being. Parents may become more concerned with grades, extracurricular activities, and future prospects, leaving little time for emotional connection and meaningful conversations with their children. This, in turn, hinders the child's overall development, leading to feelings of loneliness and insecurity.

The consequences of shadow parenting can be far-reaching and impactful. Children growing up in emotionally distant households may experience a range of negative effects on their mental, emotional, and social well-being. They may struggle with low self-esteem, difficulty forming emotional bonds with others, and exhibit behavioral issues [2]. Moreover, the lack of emotional guidance from parents may result in poor decision-making skills and an inability to cope with adversity or stress.

To address the issue of shadow parenting, parents need to consciously prioritize emotional connection and engagement with their children. This can be achieved through simple yet effective measures. Spending quality time together, such as having regular family meals or engaging in shared activities, can foster a sense of belonging and emotional attachment. Active listening and open communication also play a crucial role in creating a supportive environment. By actively engaging in their child's interests, parents can show genuine interest and provide the emotional support necessary for healthy development [3].

Incorporating mindfulness and setting boundaries regarding technology usage is another essential step toward reducing shadow parenting. By consciously setting aside distractions and being present with their children, parents can create meaningful interactions that fulfill their children's emotional needs. Additionally, seeking support through parenting classes, therapy, or support groups can provide parents with the tools and resources needed to enhance their parenting skills and address the challenges associated with shadow parenting [3].

2. The theory behind shadow parenting behavior: an analysis

Shadow parenting behavior is a concept that refers to the actions and patterns exhibited by individuals who have grown up in households where parents were either absent physically or emotionally.

2.1 Historical context

Understanding shadow parenting behavior requires examining its roots within the broader field of psychology and sociology. Renowned psychologist Sigmund Freud proposed the importance of early childhood experiences in shaping individuals' personalities and behaviors. His theory of psychosexual development highlighted the critical role parents play in their children's upbringing [4]. Building upon Freud's work, other theorists, such as Erik Erikson [5] and John Bowlby [6], emphasized the significance of attachment and the impact of parental figures on child development.

2.2 Shadow parenting behavior defined

Shadow parenting behavior can manifest in various ways, including neglect, emotional unavailability, and inconsistency. Children who experience these forms of parenting grow up with a sense of feeling unseen, unheard, or unimportant. They may struggle with forming secure attachments, developing trust, and maintaining healthy relationships.

2.3 Origins and psychological development

Psychologists assert that shadow parenting behavior often results from a combination of factors. These include parents' own unresolved trauma, substance abuse issues, mental health problems, or circumstances that hinder their ability to provide consistent care. Such a childhood environment, characterized by inadequate parenting, can negatively impact the child's psychological development.

2.4 Effects of shadow parenting behavior on children

a. **Attachment Issues:** Children who grow up with shadow parents may develop attachment issues, resulting in difficulties forming meaningful connections with others in adulthood. This could manifest as either avoidance or anxious attachment styles [6].

b. **Low Self-Esteem and Emotional Development:** A lack of parental support and validation can lead to low self-esteem and emotional difficulties. These individuals may struggle with expressing emotions, asserting themselves, and trusting their own judgment.

c. **Codependency and Relationship Patterns:** Shadow parenting behavior often contributes to the development of codependency in adulthood. Individuals may unconsciously seek out relationships that resemble their childhood dynamics, perpetuating a cycle of unhealthy patterns.

d. **Breaking the Cycle:** While growing up under shadow parenting behavior may have long-lasting effects, there are strategies to break the cycle and foster healing:

   i. **Therapy and Self-Reflection:** Seeking professional therapy or counseling can provide individuals with a safe space to explore and process their childhood experiences. Through therapy, they can gain insights into their patterns, challenge negative beliefs, and develop healthier coping mechanisms.

ii. **Building Supportive Relationships:** Forming healthy connections, such as friendships and romantic relationships, can provide a supportive network that helps individuals heal from their past and develop healthier relationship patterns.

iii. **Parenting Education and Support:** For those who become parents themselves, access to parenting education and support groups can be crucial. Learning effective parenting techniques, such as active listening, empathetic communication, and setting boundaries, can help break the cycle and provide a nurturing environment for their own children.

3. Untamed relationship of psychological issues

Shadow parenting can have a significant detrimental impact on a child's psychological well-being. The emotional absence of parents in the formative years of a child's life can lead to various psychological issues that persist into adulthood.

One of the primary ways in which shadow parenting damages a child's psychology is through the development of attachment issues. Attachment theory proposes that a child's early interactions with their primary caregivers, typically their parents, shape their ability to form secure, and healthy relationships later in life. When parents are emotionally absent, children may experience a lack of trust and security, leading to difficulties in forming secure attachments with others. This can result in a lifelong pattern of struggling with intimacy, trust, and maintaining healthy relationships [7].

Additionally, shadow parenting can contribute to poor self-esteem and a negative self-image in children. When parents are consistently emotionally distant, children may internalize this as a reflection of their self-worth. They may feel unimportant, unloved, and undeserving of affection and attention. As a result, children may develop a negative self-perception and struggle with feelings of inadequacy, which can manifest in various areas of their lives, such as academic performance, social interactions, and overall self-confidence.

Moreover, children who experience shadow parenting often struggle with emotional regulation. Without the guidance and support of emotionally available parents, children may struggle to understand and manage their own emotions effectively. They may have difficulty expressing their feelings, understanding the emotions of others, and regulating their emotional responses in different situations. This can lead to impulsive behavior, emotional outbursts, and an inability to cope with stress and adversity.

Furthermore, shadow parenting can contribute to the development of anxiety and depression in children. The emotional neglect and lack of support from parents can create feelings of loneliness, isolation, and insecurity. Children may experience a constant sense of emptiness and dissatisfaction, as their emotional needs are not adequately met. This can lead to a heightened vulnerability to mental health issues, such as generalized anxiety disorder, social anxiety, and depression [8].

Additionally, children who grow up with shadow parenting may also exhibit behavioral issues. The lack of emotional guidance and boundaries can result in children seeking attention through disruptive or destructive behavior. They may engage in attention-seeking behaviors, defiance, or aggression, as they attempt to compensate for the emotional void left by their parents. These behavioral issues can further escalate, leading to difficulties in school, strained relationships with peers, and a negative impact on their overall functioning [8].

Furthermore, the long-term effects of shadow parenting are not limited to childhood but can continue to affect individuals well into adulthood. The unresolved emotional wounds and the lack of healthy coping mechanisms can leave lasting scars on individuals' psychological well-being. Adults who experience shadow parenting may struggle with intimacy, trust, self-worth, and maintaining healthy relationships. They may also display patterns of emotional detachment or emotional overdependence in their adult relationships, perpetuating the cycle of shadow parenting in their own families.

4. Important mental health problems

The chances of children of shadow parents developing mental health problems are significantly higher compared to those with emotionally available parents. The emotional neglect and absence experienced during their formative years can have a profound impact on their psychological well-being, leading to a greater vulnerability to mental health issues.

First, children who grow up with shadow parents are at a heightened risk of developing anxiety disorders. The lack of emotional support and secure attachment can create a constant state of fear and insecurity in their lives. This chronic anxiety can manifest as generalized anxiety disorder (GAD) [9], characterized by excessive worry and apprehension about various aspects of life. Children may become overly anxious about their academic performance, social interactions, and future, leading to persistent feelings of distress and unease.

Second, depression is another common mental health problem that often arises in children of shadow parents. The emotional neglect, feelings of abandonment, and low self-esteem that result from shadow parenting can contribute to a deep sense of sadness, hopelessness, and anhedonia (loss of interest or pleasure in activities). These children may struggle with feelings of emptiness, worthlessness, and a lack of motivation. Such emotional turmoil can escalate into major depressive disorder, impacting their overall functioning and quality of life.

Moreover, children of shadow parents may also develop attachment disorders. As they grow older, the lack of emotional connection and trust with their parents can hinder their ability to form secure attachments with others. This can result in reactive attachment disorder (RAD) [10] or disinhibited social engagement disorder (DSED) [11], characterized by difficulty forming and maintaining healthy relationships. These children may exhibit clingy or excessively friendly behavior toward strangers or demonstrate an avoidant and distant attitude, thereby impairing their social functioning and leading to interpersonal difficulties.

Additionally, shadow parenting can contribute to the development of self-destructive behaviors and substance abuse issues in children. The lack of emotional support and positive coping mechanisms can drive them to seek solace in harmful activities or substances as a means of escape or self-medication. They may engage in self-harming behaviors, such as cutting or drug experimentation, to numb emotional pain and gain a sense of control. These maladaptive coping strategies can pave the way for addictive behaviors and further exacerbate their mental health problems.

Besides, the impact of shadow parenting on a child's mental health extends into adulthood. The unresolved emotional wounds from childhood often persist, leaving them susceptible to long-term mental health issues. Adults who experience shadow parenting may be at a higher risk for developing conditions such as chronic depression,

anxiety disorders, borderline personality disorder, and complex post-traumatic stress disorder (C-PTSD) [12]. It is important to note that while children of shadow parents have an increased likelihood of developing mental health problems, it does not mean that they are destined for a lifetime of psychological struggles. Early intervention, therapy, and a supportive environment can mitigate the long-term effects of shadow parenting. By providing emotional nourishment, validation, and guidance, it is possible to help these individuals heal and develop healthier coping mechanisms, ultimately reducing the chances of mental health problems in the future. In conclusion, the chances of children of shadow parents developing mental health problems, such as anxiety disorders, depression, attachment disorders, self-destructive behaviors, and substance abuse issues, are significantly higher compared to those with emotionally available parents. Recognizing the impacts of shadow parenting and providing appropriate support and interventions are crucial in order to safeguard the well-being of these children and mitigate the long-term psychological consequences.

5. Steps to treat suicidal and self-harm behaviors among children of shadow parents

Children growing up in shadow families, where parents struggle with addiction, mental illness, or other serious problems, often face numerous challenges and are at a higher risk of developing suicidal tendencies or engaging in self-harm behaviors. As a society, it is our responsibility to support these vulnerable children and provide them with the necessary intervention and treatment to alleviate their distress [13].

5.1 Early identification and assessment

The first critical step is to identify warning signs and symptoms early on. Educating teachers, guidance counselors, coaches, and other professionals who regularly interact with children can help detect signs of self-harm or suicidal tendencies. A comprehensive assessment conducted by mental health professionals can provide an accurate diagnosis, evaluate risk factors, and guide appropriate interventions.

5.2 Building a supportive network

Creating a supportive network is crucial for children and adolescents whose parents struggle with shadow issues. Engaging supportive adults, such as relatives, mentors, or positive role models, can provide stability, guidance, and emotional support. Additionally, establishing support groups or programs where children can share their experiences with peers who have faced similar challenges can help reduce feelings of isolation [14].

5.3 Individual therapy

Individual therapy is an essential component of treating children suffering from self-harm and suicidal ideation. By working closely with a qualified therapist, children can develop coping skills, explore their emotions, and learn healthy ways to express themselves. Therapists can help children understand that their parents' struggles do not define their worth and can provide them a safe space to process their experiences.

5.4 Family therapy and parental involvement

Engaging parents and offering family therapy is vital to creating a positive and nurturing environment for the child. Family therapy sessions help the entire family understand and address the underlying issues, strengthen familial bonds, and promote healthier patterns of communication and behavior. Additionally, providing shadow parents with access to resources and support programs to address their own struggles is crucial to reducing the impact on their children [14].

5.5 Safety plans and crisis support

Children facing suicidal thoughts or self-harm urges need strategies to manage their crises effectively. Mental health professionals can help develop personalized safety plans that children can follow during moments of distress. These plans often include coping strategies, trusted support contacts, hotlines, and emergency procedures. Ensuring that children have access to immediate support and guidance during crises is essential in preventing self-harm and suicide attempts.

5.6 Psychoeducation and resilience-building

It is vital to educate children about mental health, addiction, and shadow issues to combat stigma and misconceptions. Psychoeducation allows children to develop a better understanding of their parents' struggles and helps them separate their own identities from their parents' issues. Additionally, promoting resilience-building activities, such as mindfulness practices, healthy lifestyle choices, and engaging in hobbies, can enhance emotional well-being and provide children with effective coping mechanisms [7, 14].

5.7 Collaborative care

Treating suicidal and self-harm behaviors necessitates a holistic approach involving multiple professionals and agencies. Collaboration between mental health practitioners, pediatricians, schools, social services, and other community resources is crucial to creating a comprehensive care plan. Sharing information and collaborating helps ensure that intervention is consistent, barriers to accessing help are minimized, and all parties are working toward the child's best interest.

6. Discussion and conclusion

Treating suicidal and self-harm behaviors among children of shadow parents requires a multi-faceted approach, combining early identification, professional intervention, and a supportive network. By implementing these steps, we can provide the necessary tools and resources to help these children navigate their challenging circumstances and provide them with hope for a brighter and healthier future. Society's investment in their well-being protects not only vulnerable lives but also contributes to breaking the cycle of shadow issues, fostering resilience, and promoting mental health awareness.

However, the superiority and dissimilarity of this study from the other previous studies can be highlighted by many aspects such as; many of these children adopt the

role of caregiver. Children's shadow parenting refers to a situation wherein a child assumes adult-like responsibilities and takes on the role of the primary caregiver for their siblings or even their parents. This phenomenon is closely associated with various mental health issues that can have long-term negative effects on the well-being of these children. In order to understand the theoretical underpinnings of mental health issues in children's shadow parenting, it is necessary to explore several key theories and perspectives.

6.1 Attachment theory

Attachment theory, developed by John Bowlby, emphasizes the crucial role of early relationships and the bond between a child and their primary caregiver. Children who take on the responsibilities of parenting often lack sufficient nurturing and emotional support from the actual adult caregivers, which can disrupt the formation of secure attachment bonds. This disruption can lead to psychological distress, emotional instability, and increased vulnerability to mental health issues [6].

6.2 Social learning theory

Social learning theory, formulated by Albert Bandura, suggests that individuals acquire and develop behaviors by observing and imitating others. In the context of children's shadow parenting, children may learn and internalize unhealthy coping mechanisms or maladaptive behaviors by observing their adult caregivers. These behaviors can manifest as anxiety, depression, or disruptive conduct disorders [15].

6.3 Family systems theory

Family systems theory emphasizes the interconnectedness of family members and how each individual's behaviors and actions impact the overall system. Children's shadow parenting disrupts the family system, as the child's assumed responsibilities can lead to role confusion, emotional strain, and interpersonal conflicts. The resulting dissonance within the family system can significantly contribute to mental health issues in both the child and other family members [16].

6.4 Trauma theory

Trauma theory posits that experiences of trauma, such as exposure to abuse, neglect, or chronic stress, can have long-lasting psychological effects. In the case of children's shadow parenting, the child may encounter traumatic events, including taking on responsibilities beyond their developmental capacity, witnessing domestic violence, or being exposed to unstable and unsafe environments. Such traumatic experiences can result in various mental health conditions, such as post-traumatic stress disorder (PTSD), anxiety disorders, or depression [17].

6.5 Resilience theory

Resilience theory focuses on understanding how individuals adapt, cope, and recover from adversity. While children engaged in shadow parenting face numerous challenges, not all of them develop mental health issues. Resilience theory suggests that protective factors, such as having a supportive network of peers, access to mental

health interventions, and resilient coping skills, can mitigate the adverse effects of shadow parenting. Identifying and strengthening these protective factors is crucial in aiding children's psychological well-being [18].

7. Future recommendation

Children's shadow parenting exposes children to a range of mental health issues, which can stem from various theoretical perspectives. It is essential to recognize the interconnectedness of these theories to gain a comprehensive understanding of the underlying factors contributing to mental health issues in children engaged in shadow parenting. By applying these theoretical frameworks, researchers, practitioners, and caregivers can effectively develop interventions, support systems, and promote resilience in children to minimize the long-term impacts of shadow parenting on their mental health. Ultimately, fostering a nurturing environment and providing appropriate support to these children is paramount to ensuring their overall well-being.

8. Limitation of study

The current study provides a holistic picture and not a comparison or case study of a particular family's cultural norms thus it is a generalized overview of the mental health problems and not a hallmark toward a significant key point of shadow parents untamed mental health decline. Therefore, a cohort study of a specific cultural norms and social habits of that regional area will be the next main objective to highlight any single health issue that can be prevented with education, awareness, and open communication.

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Sadaf Konain Ansari: Concept, design, review literature search, writing and editing final version.
Aroob Fatima: Literature search, writing primary draft of chapter and editing final work.

Conflict of interest

The authors declare no conflict of interest and no competing interests.

Author details

Sadaf Konain Ansari[1]* and Aroob Fatima[2]

1 Medical Education Department, Niazi Medical and Dental College, Sargodha, Pakistan

2 Fazaia Medical College, Air University, Islamabad, Pakistan

*Address all correspondence to: sdf_ansari@yahoo.com

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Exploring the Dynamics of Suicidal Ideation, Negative Emotional States, Uncertainty, Work Overload, Illusion for Study, and Persistence among University Students during COVID-19: A Comprehensive Study

Ignacio Alejandro Mendoza-Martínez,

Blanca Rosa García-Rivera and Jorge Luis García Alcaraz

Abstract

This study explores the complex interplay of suicidal ideation, negative emotional states, uncertainty due to COVID-19, remote work overload, illusion for study, and persistence among university students during the initial peak of the COVID-19 pandemic. Utilizing a sample of 17,057 Mexican university students. This research uses a structural equation modeling to determine the influence of uncertainty due to COVID-19 as a latent variable in the negative emotional states and persistence (as mediating variables) vs. suicidal ideation as a dependent variable. The six variables are related through hypotheses and tested using partial least squares and path analysis. We used an adapted questionnaire sent by email. Findings show that uncertainty due to COVID-19 had a direct and significant influence on Negative Emotional States and a significant inverse effect on persistence; in the trajectory, suicidal ideation is explained. Our findings highlight the indirect impact of persistence on suicidal ideation through the lens of COVID-19-induced uncertainty. Additionally, we emphasize the substantial relationships between suicidal intent on negative emotional states and remote work overload. These results underscore the need to integrate these factors into the design of prevention and therapeutic interventions.

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1. Introduction

The outbreak of COVID-19 (Coronavirus disease 2019) caused the emergence of a severe acute respiratory syndrome type-2 (SARS-CoV-2), posing a significant global threat. In March 2020, the World Health Organization (WHO) officially designated the situation as a pandemic, urging all nations to implement urgent measures. Mexico witnessed its first cases in April 2020, prompting an immediate healthcare system response that included quarantine measures. Initially, there was an expectation that "normal activity" would resume without risks by mid-2020. However, the situation remained on high alert. While cases initially subsided after a substantial portion of the population received vaccination, subsequent waves of infections have maintained a state of continuous global vigilance [1]. Many families lost dear members or had to deal with COVID-19 recovery. Faculty students were anxious and worried, having to spend more than a year in solitude and isolation, going through depression and Negative Emotional States, many of them with suicidal ideation [2].

This crisis has garnered substantial media attention, propelling it to unprecedented levels of coverage [3]. A search on Scopus yields 137,969 results with the term "COVID-19" in the title and 191,045 results with the term in the abstract, title, or keyword sections. Despite the volume of information available, the majority of publications have taken the form of guides, manuals, and clinical reports. Few technical and scientific papers have focused on the realm of suicidal ideation and its association with negative emotional states, uncertainty due to COVID-19, remote work overload, illusion for study, and persistence among students.

In the year 2019, the global count of lives lost to suicide surpassed a troubling mark of 700,000, a concerning statistic that predates the onset of the pandemic. Paradoxically, in the tumultuous year of 2020, defined by the impact of COVID-19, suicide rates demonstrated a modest reduction across various nations, including the United States. This intriguing trend echoes historical patterns observed during earlier crises such as World War II and instances of terrorist attacks, challenging conventional assumptions about suicide's prevalence during periods of upheaval [3]. However, in 2021, suicide rates raised again. Research in the field of suicidal ideation involving young individuals serves the purpose of shedding light on the true extent of this issue. Suicidal thoughts and actions in adolescents and young people are the result of intricate processes deeply ingrained in various aspects of their lives and functioning [4, 5]. Several factors contribute to suicidal ideation, including anxiety disorders, which are diagnosed in a significant proportion of adolescents who attempt suicide [6], as well as depressive disorders [7, 8]. It is important to note that environmental factors such as early-life trauma, neglect, inadequate parenting, and persistent stress, elevate the risk of developing anxiety, depression, and other stress-related disorders [9]. Of particular concern are the prospects for adolescents with depressive disorders. Current observations suggest that a substantial portion of these young individuals may be at a heightened risk of attempting suicide in adulthood [10]. Adolescents are especially vulnerable to depressive and anxiety disorders due to dynamic biological and emotional changes (e.g., emotional volatility and altered perception of stimuli) as well as social factors (e.g., a perceived lack of support and impulsive behaviors). These factors collectively make it challenging for young people to adapt to the evolving demands of their surrounding world [11].

COVID-19 pandemics exacerbated factors associated with depression, anxiety, and PTSD symptomatology in young adult mental health, mainly in university students

[12–15]. This pandemic developed a tendency to worry and fear uncertainty, and students had to copy a big deal of topics during the quarantine [16–18].

1.1 Objective

To determine the impact of COVID-19-induced uncertainty on factors such as persistence, negative emotional states, illusion for study, and remote work overload, and to explain its connection to suicidal ideation, we employed structural modeling with latent variables in a sample of Mexican students comprising 17,057 individuals.

1.2 Research hypothesis

On **Table 1**, the expected influence of the exogenous variables related to the endogenous variables is shown as proposed below in the hypotheses:

It is observed in **Table 1** that there is an inverse and direct influence of exogenous variables toward endogenous variables according to their expected theoretical correspondence.

1.2.1 Negative emotional states

The pandemic-induced social distancing measures led to various psychosocial effects characterized by uncertainty, a sense of threat, and confinement. Consequently, individuals have experienced a range of negative emotional states, including anger, frustration, insomnia, stress, anxiety, and depression [19]. Prolonged periods of concern and uncertainty have been linked to heightened levels of anxiety and depression [21]. It has been observed that among university students, these negative emotional states are more prevalent among women than men; however, literature mentions that males have a tendency to suicide [22]. Therefore, it is of utmost importance to assess the current mental well-being of university students and understand how various factors impact their mental health. These factors may include isolation, family pressures, exposure to violence, overcrowding, excessive academic and work demands, individual traits, physical living conditions, and available financial resources.

Hypothesis	Exogenous variables	Influence	Sign	Endogenous variables
H1:	Uncertainty during COVID-19	====>>	—	Persistence
H2:	Uncertainty during COVID-19	====>>	—	Illusion for study
H3:	Uncertainty during COVID-19	====>>	+	Work overload
H4:	Uncertainty during COVID-19	====>>	+	Negative emotional states
H5:	Persistence	====>>	—	Suicide ideation
H6:	Negative emotional states	====>>	+	Suicide ideation
H7:	Illusion for study	====>>	—	Suicide ideation
H8:	Work overload	====>>	—	Suicide ideation

Source: *Self-elaboration.*

Table 1.
Expected influence of the independent variable (exogenous) in connection with the dependent variables (endogenous).

For these reasons, we have chosen to examine potential predictors of suicidal ideation such as persistence, negative emotional states, remote work overload, and illusion for study in our sampled student population. Previous research has indicated that uncertainty played a significant role in triggering Negative Emotional States among university students during COVID-19 [23]. Recent studies have shown that over 50% of the students in our sample have experienced a decline in psychological well-being as a result of the lockdowns and social isolation [24]. Furthermore, more than 80% of the students have reported symptoms of depression [25]. These findings underscore a notable surge in depression and anxiety among students, largely attributed to prolonged unemployment, financial instability, and family-related uncertainties. In light of these empirical findings, we propose Hypotheses 1–4 as follows:

H1: "There is a statistically negative significant influence of Uncertainty during COVID-19 on Persistence".

H2: "There is a statistically negative significant influence of Uncertainty during COVID-19 on Illusion for Study".

H3: "There is a statistically positive significant influence of Uncertainty during COVID-19 on Remote Work Overload".

H4: "There is a statistically positive significant influence of Uncertainty during COVID-19 on Negative Emotional States".

These hypotheses are observed in **Table 1** and **Figure 1**.

1.2.2 Suicidal ideation

Suicidal ideation has become a topic of global concern [26]. Currently, almost 1,000,000 individuals take their own lives each year [27, 28]. Notably, among those aged 15–29, suicide ranks as the second leading cause of death worldwide [29], with males being particularly susceptible [30, 31]. Research has indicated that various factors contribute to suicidal thoughts among university students. These factors include academic overload, inadequate rest, the pressure to meet responsibilities, depressive and anxiety disorders, stress, and other psychosocial risk factors they
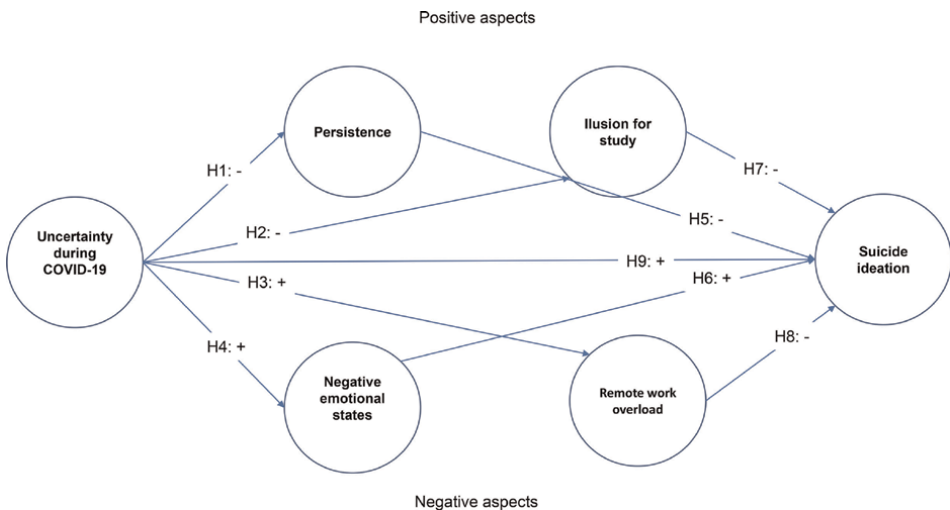

Figure 1.
Structural equations model with latent variables (SEM).

encounter. Additionally, family issues, socioeconomic constraints, and substance and alcohol abuse, among others, are often linked to suicidal ideation [32].

Suicidal ideation is characterized by recurrent thoughts and planning related to taking one's own life, although these thoughts are not acted upon [33]. Scholars have reached a consensus that suicidal ideation typically progresses through stages, starting with a desire to die, followed by passive thoughts of suicide, and ultimately leading to concrete suicidal ideation without a specific method [34].

In the scientific literature, it is observed that Latin American countries, including Mexico, report lower rates of suicidal ideation, suicide attempts, and completed suicides compared to Europe and the United States. Generally, in Latin America, the rate of suicidal ideation among non-medical students ranges from 10 to 15%. However, medical students tend to exhibit higher rates, ranging from 17 to 22% [35]. Given the current circumstances of isolation and uncertainty stemming from the pandemic, it is crucial to assess whether suicidal ideation has increased and to identify potential risk profiles that warrant attention and support [36].

Despite the extensive body of research on suicidal ideation, there is a notable dearth of studies in Mexico. Therefore, there is a pressing need to investigate suicidal ideation among students by analyzing various variables, including gender, substance and alcohol abuse, other sociodemographic characteristics, and mediating factors that may help explain higher rates of suicidal ideation. Recent studies have revealed elevated levels of somatization, obsessive-compulsive disorder, anxiety, phobic anxiety, paranoia, and suicidal ideation, as well as a general severity index among sampled students during the COVID-19 pandemic [37]. Research also demonstrates a direct relationship between uncertainty and suicidal ideation, anxiety, and obsessive-compulsive disorders [38]. Furthermore, negative emotional states have been found to contribute to suicidal ideation [39]. Building upon this research, we propose Hypothesis 4–9 as follows, as seen in **Table 1** and **Figure 1**:

H5: "There is a statistically negative significant influence of Persistence on Suicidal Ideation".

H6: "There is a statistically positive significant influence of Negative Emotional States on Suicidal Ideation".

H7: "There is a statistically negative significant influence of Illusion for Study on Suicidal Ideation".

H8: "There is a statistically positive significant influence of Remote Work Overload on Suicidal Ideation".

H9: "There is a statistically positive significant influence of Uncertainty during COVID-19 on Suicidal Ideation".

A structural modeling (SEM) with latent variables is proposed under the method of Partial least squares (PLS) considering the research hypothesis, which is presented in **Figure 1**.

Figure 1 shows the expected trajectories of each of the exogenous variables comprehensively toward each of the endogenous variables according to the hypotheses of the SEM model.

This article is divided into four sections. The first section is a general introduction to the research topic, variables, and context, as well as the objective and hypotheses proposal. The second section describes the methods and sample procedure followed. In the third section, we present the results, and finally, in the fourth section, we analyze the discussion of all the implications, limitations, and areas of opportunity for future research and conclude with some recommendations.

2. Methods

2.1 Study design

This study is a cross-sectional analysis of data. Ex post facto, non-experimental, explanatory design that was conducted through an online survey. Structural equations with latent variables under the method of partial least squares were used for the analysis.

2.2 Unit of analysis

Mexican University Students n = 17,046. Their sociodemographic data was: gender 63.9% (f = 10,255 women), whereas 36.1% (f = 6791 men); marital status 91.3% (f = 15,575 Single), 3.8% (f = 646 civil union), 3.8% (f = 655 married), 1% (f = 170 other); scholarity 90.3% (f = 15, 396 Bachelor's degree), 6.4% (f = 1088 specialization), 2.3% (f = 392 Master's degree); 1% (f = 170) other; age 73.2% (f = 12,488 aged 17 to 22; 19.4% (f = 3314 aged 23 to 27 years old); 7.3% (f = 1244 28 to more than 63). All students received detailed information regarding the purpose of the study and provided online informed consent to participate. No money or fees were paid to the students who participated in the study.

2.3 Data collection

The instrument was sent electronically from the beginning of April 2020 to the end of May 2020 to University students enrolled. We sent the questionnaire to the total population of Students and Professors of the Mexican Northern Universities with a resulting sample of Students of n = 17,057. Professors were not included in this manuscript. The information from the answered questionnaires was uploaded into a database that was edited and analyzed in the Statistical Package for the Social Sciences (IBM SPSS) version 23 for Windows and the Smart PLS version 3.

2.4 Instruments

The instrument used for data collection included the following sections:

- Student's questions regarding their sociodemographic characteristics including gender, marital status, age, scholars, and academic demographic information such as academic program and scholarship status to categorize the demographic variables.

- Covid-19 pandemic uncertainty: we developed this part completely using five questions to measure uncertainty as a unidimensional variable with a Likert scale of five points. Examples of the questions used are: "I was afraid when facing the pandemics", "I felt that life is very fragile", "I feared to be infected", "I was terrified to imagine someone dear was going to die". While this instrument was never validated in Mexico before since it was our creation, we did test the Internal Consistency with Cronbach's Alpha Value as well as Content Validity, Construct Validity and Concurrent Validity obtaining reliable results. The reliability of the constructs measured by the instruments was scientifically

fulfilled: all the Alpha and Rho c coefficients of the subscales were higher or 0.70, so they are consistent. For the validity, the AVE score (Average Explanation Variance) considering convergent validity; all the subscales obtained scores equal to and greater than 0.50, while the discriminant coefficients obtained scores above 0.70, as well as consistency with the Fornell-Larcker criterion.

- Resilience scale CD-RISC25 [Connor-Davidson]. Focused on determining resilience. Resilience is the ability of human beings to adapt and overcome adverse situations, measured through their level of positive response to risk situations as a multidimensional construct. This instrument consists of 25 items that must be answered on a 5-point Likert scale (1 to 5). We used only persistence/tenacity/self-efficacy dimension (items 10,11, 16, 23–25). This scale was tested and validated in Latin America and Mexico with acceptable results (Also, the reliability of the constructs measured by the instruments was scientifically fulfilled: all the Alpha and Rho c coefficients of the subscales were higher or 0.70, so they are consistent. For the validity, the AVE score (Average Explanation Variance) considering convergent validity; all the subscales obtained scores equal to and greater than 0.50, while the discriminant coefficients obtained scores above 0.70, as well as consistency with the Fornell-Larcker criterion.

- SBI (Gil-Monte) questionnaire of burnout. This scale has four dimensions. We used only the illusion for the study dimension (items 1,5,10,15,19). This scale was tested and validated in Latin America and Mexico with acceptable results [20]. Also, the reliability of the constructs measured by the instruments was scientifically fulfilled: all the Alpha and Rho c coefficients of the subscales were higher or 0.70, so they are consistent. For the validity, the AVE score (Average Explanation Variance) considering convergent validity; all the subscales obtained scores equal to and greater than 0.50, while the discriminant coefficients obtained scores above 0.70, as well as consistency with the Fornell-Larcker criterion.

- Adaptation of the Scale for Suicide Ideation SSI-W. Focused on determining the suicide ideas of students in the face of the pandemic. It is based on the Scale for Suicide Ideation (SSI-W), and it consists of six questions that must be answered in a range of one to two [21]. While this suicidal ideation scale in the United States has seen widespread use ever since it was standardized for use with psychiatric patients [21], as well as in outpatient contexts [21]. Furthermore, this scale has been barely applied to university students in the Mexican context. We found a few studies that applied the scale in Mexico with good results [22]; however, the reliability of the constructs measured by the instruments was scientifically fulfilled: all the Alpha and Rho c coefficients of the subscales were higher or 0.70, so they are consistent. For the validity, the AVE score (Average Explanation Variance) considering convergent validity; all the subscales obtained scores equal to and greater than 0.50, while the discriminant coefficients obtained scores above 0.70, as well as consistency with the Fornell-Larcker criterion.

3. Results

The expected results include revealing the intricate relationships between suicidal ideation, study excitement, remote work overload, negative emotions, uncertainty

during COVID-19, and persistence. The above implies the analysis of positive aspects such as Persistence and illusion for studying, as opposed to negative aspects such as negative emotional states and remote work overload, being influenced by uncertainty during COVID-19 wanting to explain suicidal ideation. The results of structural modeling are seen in **Figure 2** and **Table 2**.
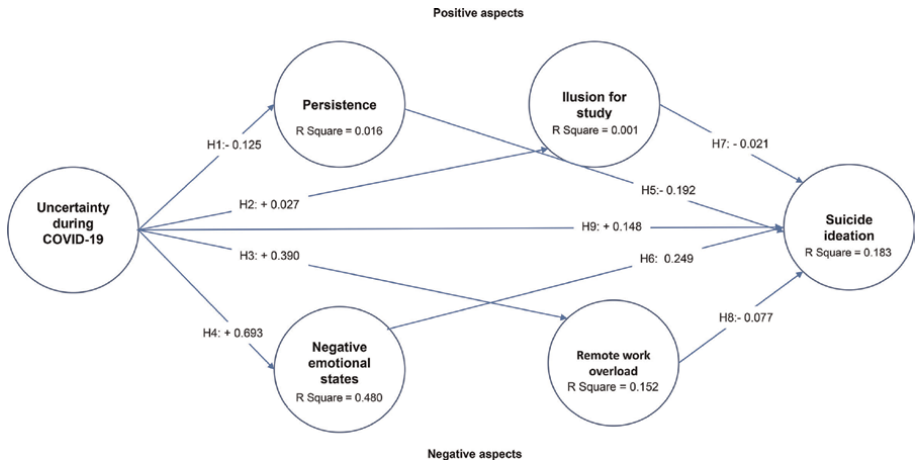
Figure 2.
Restructured structural equations modeling. Source: *Own elaboration.*

Hypothesis	Exogenous variables	Influence	Loadings of the regression coefficients	Endogenous variables	R-Square	Decision
H1:	Uncertainty during COVID-19	====>>	−0.124	Persistence	0.015	Accept
H2:	Uncertainty during COVID-19	====>>	0.073	Illusion for study	0.005	Decline
H3:	Uncertainty during COVID-19	====>>	0.39	Work overload	0.152	Accept
H4:	Uncertainty during COVID-19	====>>	0.692	Negative emotional states	0.479	Accept
H5:	Persistence	====>>	−0.197	Suicide ideation	0.173	Accept
H6:	Negative emotional states	====>>	0.353			Accept
H7:	Illusion for study	====>>				Decline
H8:	Work overload	====>>	−0.075			Accept
Source: *Self-elaboration.*						

Table 2.
Results of hypotheses testing.

Figure 2 and **Table 2** show the results of the Structural Equation Model where the nine hypotheses were verified, as follows:

As noticed in **Table 2**, the hypotheses were tested and results are commented on below:

Hypothesis 1: The results show a significant inverse influence of uncertainty during COVID-19 toward persistence with a standardized regression coefficient of −0.125; explaining approximately 0.016% of the variance of the R-square. Therefore, this hypothesis was accepted.

Hypothesis 2: The results showed a significant direct influence of uncertainty during COVID-19 toward illusion for study with a standardized regression coefficient of 0.027, explaining approximately 1% of the variance explained from its R-square. Therefore, this hypothesis was rejected. It is important to note that although it was statistically correct being significant, a significant inverse influence was expected from a theoretical point of view.

Hypothesis 3: The results demonstrated a significant direct influence of uncertainty during COVID-19 toward remote work overload with a standardized regression coefficient of 0.390, explaining approximately 15% of the variance explained from its R-square. Therefore, this hypothesis was accepted.

Hypothesis 4: The results demonstrated a significant direct influence of uncertainty during COVID-19 toward Negative emotional states with a standardized regression coefficient of 0.693, explaining approximately 48% of the variance explained from its R-square. Therefore, this hypothesis was accepted.

Hypothesis 5: The results demonstrated a significant inverse of persistence toward suicide ideation with a standardized regression coefficient of - 0.192. Therefore, this hypothesis was accepted.

Hypothesis 6: The results demonstrated a significant direct influence of negative emotional states toward suicide ideation with a standardized regression coefficient of 0.249. Therefore, this hypothesis was accepted.

Hypothesis 7: The results demonstrated a significant inverse of illusion for study toward suicide ideation with a standardized regression coefficient of – 0.021. Therefore, this hypothesis was accepted.

Hypothesis 8: The results demonstrated a significant inverse of remote work overload for the study toward suicide ideation with a standardized regression coefficient of – 0.077. Therefore, this hypothesis was accepted.

Hypothesis 9: The results demonstrated a significant direct influence of uncertainty during COVID-19 toward suicide ideation with a standardized regression coefficient of 0.148. Therefore, this hypothesis was accepted.

The influence of each of the variables from hypotheses H5: to H9: toward suicidal ideation, allowed us to explain approximately 18% of the variance from its R-Square.

Complementing the validation of the model and its hypotheses, it was necessary to run Bootstrapping with 500 samples, as seen in **Table 3**.

The bootstrapping of 500 samples in **Table 3** confirms all statistically significant paths or influences of the SEM model at a confidence interval of 0.95.

3.1 Descriptive statistics, reliability, and validity of the model

3.1.1 Descriptive statistics

Table 4 presents the descriptive statistics, reliability, and validity indexes, and the Pearson Moment-Product bivariate correlations between the subscales.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Illusion for study - > Suicide ideation	−0.021	−0.022	0.01	2.2	0.028
Negative emotional states - > Suicide ideation	0.249	0.249	0.01	24.161	0
Persistence - > Suicide ideation	−0.192	−0.192	0.011	18.252	0
Remote work overload - > Suicide ideation	−0.077	−0.077	0.008	9.868	0
Uncertainty during COVID-19 - > Ilusion for study	0.027	0.027	0.009	3.009	0.003
Uncertainty during COVID-19 - > Negative emotional states	0.693	0.693	0.004	163.462	0
Uncertainty during COVID-19 - > Persistence	−0.125	−0.125	0.008	14.942	0
Uncertainty during COVID-19 - > Remote work overload	0.39	0.39	0.007	58.875	0
Uncertainty during COVID-19 - > Suicide ideation	0.148	0.148	0.009	16.51	0

Source: *Own elaboration.*

Table 3.
Bootstrapping of the SEM models.

As noticed in **Table 4**, significant bivariate correlations are observed. It is important to highlight these correlations, since they support the expected theoretical coherence with empirical evidence in the present study. Correlations are:

Significant inverse correlations that correspond to the theoretical foundation: illusion for studying with negative emotional states (−0.10), persistence with negative emotional states (−0.25); suicidal ideation with illusion for study (−0.15), suicidal ideation with persistence; suicidal ideation with remote work overload (−0.13); illusion for study with remote work overload (−0.02); uncertainty during COVID-19 with persistence (−0.13); as well as persistence with remote work overload (−0.07).

Significant positive correlations that correspond to the theoretical foundations: negative emotional states with suicidal ideation (0.36); negative emotional states with uncertainty during COVID-19 (0.69); negative emotional states with remote work overload (0.54); suicidal ideation with uncertainty during COVID-19 (0.31); illusion for study with uncertainty during COVID-19 (0.03); illusion for study with persistence (0.54); as well as uncertainty during COVID-19 with remote work overload (0.39).

4. Reliability and validity

Also, as seen in **Table 4**, the reliability and validity indexes are as follows:

Subscales	Mean	Standard deviation	Interval confidence		Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)	Negative emotional states	Suicide ideation	Illusion for study	Uncertainty during COVID-19	Persistence	Work overload
			Lower	Upper									
Negative emotional states	2.80	1.16	2.78	2.81	0.92	0.93	0.67	**0.82**					
Suicide ideation	1.21	0.47	1.20	1.21	0.87	0.90	0.65	0.36	**0.81**				
Illusion for study	4.17	0.92	4.16	4.19	0.82	0.91	0.84	−0.04	−0.12	**0.91**			
Uncertainty during COVID-19	2.88	1.16	2.86	2.90	0.87	0.90	0.65	0.69	0.31	0.07	**0.81**		
Persistence	4.01	0.83	3.99	4.02	0.86	0.90	0.64	−0.25	−0.28	0.46	−0.12	**0.80**	
Remote work overload	3.61	1.00	3.60	3.63	0.89	0.91	0.64	0.54	0.13	0.02	0.39	−0.07	**0.80**

Source: *self-elaboration.*

Table 4.
Descriptive statistics, convergent and discriminant validity.

Uncertainty during COVID-19: Alpha = 0.87, Composite Rho_c = 0.90, Average variance extracted (AVE) = 0.65, Discriminant = 0.81.

Persistence: Alpha = 0.86, Composite Rho_c = 0.90, Average variance extracted (AVE) = 0.64, Discriminant = 0.80.

Remote work overload: Alpha = 0.89, Composite Rho_c = 0.91, Average variance extracted (AVE) = 0.64, Discriminant = 0.80.

Negative emotional states: Alpha = 0.92, Composite Rho_c = 0.93, Average variance extracted (AVE) = 0.67, Discriminant = 0.82.

Illusion for study: Alpha = 0.89, Composite Rho c = 0.93, Average variance extracted (AVE) = 0.76, Discriminant = 0.87.

Suicide ideation: Alpha = 0.87, Composite Rho c = 0.90, Average variance extracted (AVE) = 0.65, Discriminant = 0.81.

As noticed in **Tables 2, 4**, and **5**, the reliability and validity of the constructs measured by the instruments were scientifically fulfilled; all the Alpha and Rho c coefficients of the subscales were higher or 0.70, so they are consistent. For the validity, the AVE score (Average Explanation Variance) considering convergent validity; all the subscales obtained scores equal to and greater than 0.50, while the discriminant coefficients obtained scores above 0.70, as well as consistency with the Fornell-Larcker criterion. In the main diagonal of **Table 4**, the discriminant coefficients of each of the subscales of the SEM model are observed.

In addition, an analysis of the standardized regression loadings was made to check the congruence of each of the items with respect to their group or theoretical construct of Structural Equation Modeling. Standardized regression coefficients are observed in all items being equal to or greater than 0.70; which confirms the validity of each construct or factors of the model. These standardized regression coefficients are presented in order for each of the subscales of the SEM model in **Table 5**.

Items	Remote work overload	Negative emotional states	Uncertainty during COVID-19	Illusion for study	Suicide ideation	Persistence
Q20R1	0.80					
Q20R2	0.77					
Q20R3	0.85					
Q20R4	0.82					
Q20R5	0.74					
Q20R6	0.81					
Q21R1		0.75				
Q21R2		0.87				
Q21R3		0.79				
Q21R4		0.84				
Q21R5		0.84				
Q21R6		0.80				
Q21R7		0.85				
Q22R1			0.82			

Items	Remote work overload	Negative emotional states	Uncertainty during COVID-19	Illusion for study	Suicide ideation	Persistence
Q22R2			0.87			
Q22R3			0.82			
Q22R4			0.78			
Q22R5			0.73			
Q27R2				0.84		
Q27R3				0.89		
Q27R4				0.88		
Q27R5				0.87		
Q36R1					0.75	
Q36R2					0.81	
Q36R3					0.85	
Q36R4					0.85	
Q36R6					0.77	
Q45R10						0.77
Q45R11						0.85
Q45R23						0.75
Q45R24						0.82
Q45R25						0.80

Source: *Self-elaboration.*

Table 5.
Standardized loadings of the regression coefficients by factors.

The main findings derived from the specific SEM hypotheses were:

- Uncertainty during COVID-19 had very little significant inverse influence on the positive aspects of the study such as persistence (−0.125) and illusion for study (0.027), explaining very little of its variance from its R-square respectively (0.016) and (0.001). These results were observed for Hypotheses 1 and 2.

- On the contrary, uncertainty during COVID-19 greatly influenced negative emotional states (0.693) and remote work overload (0.152), explaining high scores of their variance from their R-squared (0.480) and (0.152), respectively. We affirm that uncertainty during COVID-19 increased the levels of negative emotional states and remote work overload, relevantly and significantly influencing suicidal ideation. These results were observed in Hypotheses 3 and 4.

- Persistence had greater influence (− 0.192), compared to illusion for study (− 0.021) to reduce suicidal ideation, counteracting the direct effects of uncertainty during COVID-19 (0.148), as well as the indirect effects of negative emotional states (0.249). On the other hand, remote work overload (− 0.077)

had a very small influence in reducing suicidal ideation. These results were
observed in Hypotheses 5, 6, 7, 8 and 9.

- Comprehensively, uncertainty during COVID-19 (0.148), persistence (0.192),
illusion for study (−0.021), negative emotional states (0.249), and remote
work overload (− 0.077) explain approximately 18% of suicide ideation.
Considering that suicide ideation is a psychological aspect prior to suicide,
this finding is pertinent and relevant because it allows us to intervene before it
is too late.

Concerning our first hypothesis, consistent with the literature, uncertainty during
COVID-19 in students was negatively related to persistence, but positively related to
illusion for study; contrary to the theory and to what we were expecting, it seemed
that uncertainty boosted illusion for study in students.

5. Discussion

Individuals afflicted with mental disorders face an elevated susceptibility to psy-
chological distress amid the COVID-19 pandemic. Nonetheless, there exists a dearth of
comprehensive research scrutinizing the determinants linked to suicidal ideation,
recognized as the most influential precursor to suicidal actions, particularly within the
demographic of university students. Anticipations regarding the substantial influence
of the COVID-19 pandemic and its associated lockdown measures on suicidal tenden-
cies were made. Nevertheless, extant studies have yielded incongruous results, and
there is a scarcity of longitudinal data tracking these trends. While this study was not
longitudinal, it aimed to investigate the factors perceived to be linked with suicidal
ideation among university students during the COVID-19 pandemic. This research
underscores the heightened vulnerability of individuals with mental disorders during
the COVID-19 crisis and highlights the significant gap in the literature concerning the
determinants of suicidal ideation, a critical precursor to actual suicidal behaviors,
specifically among university students. The text emphasizes the initial predictions
regarding the pandemic's impact on suicidal tendencies, which have yielded contra-
dictory results and lacked temporal context. It articulates the study's intention to
explore the factors associated with suicidal ideation within the context of the pan-
demic among university students as a very important topic.

The COVID-19 pandemic brought about unprecedented challenges for the educa-
tion sector worldwide, and Mexico was no exception. Universities in the country had
to quickly adapt to the new reality by shifting to online teaching to ensure the safety of
students and staff. This abrupt transition exposed students to a level of uncertainty
that they had never experienced before.

One critical aspect examined in this research was the influence of uncertainty
during COVID-19 on several psychological variables, including persistence, negative
emotional states, illusion for study, and remote work overload, with the ultimate goal
of understanding its potential connection to suicide ideation among students.

One of the immediate consequences of the pandemic and the shift to online
learning was the disruption of campus life. The physical separation from the univer-
sity environment, fellow students, and the daily routine was a significant change that
impacted students differently. Many students faced challenges such as a lack of access
to necessary equipment and a suitable study environment at home. As a result,

attending classes online became a challenge for some, which further contributed to the overall uncertainty they were experiencing.

The concept of "illusion for study" is an important dimension to consider in this context. It is essentially a measure of how motivated and enthusiastic students are about their studies. The study finds that this dimension was affected by the uncertainties brought about by the pandemic, as expected; however, Students' enthusiasm and motivation to study were not easily dampened by the sudden changes and the challenges they faced in adapting to the new learning format. The observation that uncertainty somewhat enhances students' illusion for study, suggesting heightened motivation to engage with their studies, is somewhat in line with certain psychological theories. Self-determination theory posits that individuals can be intrinsically motivated to pursue activities, such as learning, when they perceive them as personally meaningful. Some previous research has found that individuals may engage more deeply in learning when faced with challenges or uncertainties, as they seek to make sense of and adapt to new situations. However, it is important to note that this finding contradicts the conventional notion that uncertainty generally hampers motivation, and further exploration is needed to understand the underlying mechanisms and boundary conditions.

This research utilizes a structural equation model to explore the complex relationships between uncertainty during COVID-19, psychological variables, and suicide ideation among Mexican university students. It highlights the significant impact of the pandemic on students' lives, from the challenges of remote learning to the potential negative consequences on their psychological well-being. Understanding these dynamics is crucial for developing strategies to support students during and after the pandemic, as they navigate the "new normal" in the realm of education.

The findings of this study provide valuable insights into the complex interplay between various psychological variables and their impact on students' well-being during the COVID-19 pandemic. Our structural equation model (SEM) analysis revealed several important relationships and implications for both academia and policy development.

However, the same uncertainty had a substantial and significant influence on negative emotional states and remote work overload. This suggests that the psychological toll of uncertainty was felt more strongly in terms of increased negative emotions and the burden of adapting to remote learning environments. Importantly, these negative emotional states and remote work overload significantly contributed to suicidal ideation, emphasizing the critical need for mental health support for students facing such challenges. The substantial and significant influence of uncertainty on negative emotional states aligns with a body of literature suggesting that uncertainty and ambiguity can trigger stress and anxiety. Numerous studies conducted during the pandemic have reported elevated levels of anxiety, depression, and other negative emotions among students and the general population. This finding reinforces the idea that the psychological toll of uncertainty during the pandemic has had far-reaching effects on individuals' emotional well-being. The link between negative emotional states, remote work overload, and suicidal ideation is consistent with broader research on mental health during the pandemic. Several studies have highlighted the heightened risk of mental health challenges, including suicidal ideation, among university students as a result of the disruptions caused by COVID-19. The multifaceted impact of the pandemic, encompassing social isolation, academic stress, and economic uncertainties, has created a fertile ground for mental health struggles.

Our study also revealed that persistence played a crucial role in reducing suicidal ideation. It had a greater influence compared to illusion for study, highlighting the importance of students' determination and resilience in the face of adversity.

Persistence acted as a counteractive force, mitigating the direct and indirect effects of uncertainty and negative emotional states.

In summary, while some aspects of the findings are consistent with prior research, such as the association between uncertainty and negative emotional states, the observation that uncertainty enhances the illusion for study is somewhat novel and intriguing. These results underscore the complexity of human responses to crises like the COVID-19 pandemic and emphasize the need for multifaceted support systems for students, encompassing both academic and mental health components. Further research is warranted to delve deeper into the mechanisms underlying these relationships and to explore potential interventions to mitigate the adverse effects of uncertainty and negative emotions on students' mental well-being.

5.1 Overall implications and opportunities for further research

These findings have significant implications for universities and policymakers in their efforts to support students during the ongoing pandemic and future crises. The results emphasize the importance of comprehensive student support systems that address not only academic challenges but also the emotional and psychological well-being of students. Institutions should consider strategies to enhance students' persistence and resilience while providing resources for coping with negative emotional states and remote work overload.

Furthermore, this study opens up several avenues for future research. The adaptive mechanisms developed by students during the pandemic are an intriguing area of study, as these mechanisms may have long-term implications for their academic and mental health outcomes. Additionally, tracking the changes in these variables over time through repeated assessments can provide valuable insights into the evolving challenges faced by students as they continue to navigate the uncertainties of the pandemic.

Also, our findings have significant implications for universities and policymakers striving to bolster student support systems during the pandemic. By identifying pivotal factors that impact student well-being and academic engagement, institutions can tailor interventions that address the unique challenges posed by the ongoing crisis; for example, Certainly, supporting student well-being and academic engagement during the pandemic is crucial for maintaining their mental health and educational success.

The present COVID-19 pandemic context presents various research avenues centered around the adaptive mechanisms' students are acquiring. It is crucial to assess the levels of uncertainty and persistence students have cultivated as part of their adaptation and how these factors influence their coping strategies and overall response to this pandemic. Additionally, it is advisable to administer the instrument a second time to examine how these variables change over time.

In conclusion, this study underscores the importance of understanding the psychological experiences of students during the COVID-19 pandemic and the potential consequences on their mental health. By addressing these issues proactively, universities and policymakers can better support students and intervene in a timely manner to prevent and mitigate suicidal ideation, ultimately safeguarding the well-being and success of their student populations.

5.2 Limitations to this research

One drawback, as mentioned above, is conducting cross-sectional research at a single point in time, which prevents the comparison of how variables may evolve at

various stages of this pandemic. On the other hand, not having inclusion and exclusion criteria for the study was a limitation. For example, those receiving psychiatric treatment were not excluded from the study. Future research should exclude any students receiving treatment.

6. Conclusions and recommendations

This study contributes to the expanding realm of research regarding the impact of COVID-19 on university students. It delves into the intricate relationships between suicidal ideation, illusion for study, work overload, negative emotions, uncertainty, and persistence. Through a comprehensive approach, we aim to illuminate the distinctive challenges faced by students during these unprecedented times. Ultimately, our findings seek to guide the development of strategies that foster resilience, well-being, and academic achievement within the context of the pandemic.

Students who take their own life impact their faculty members, families, friends, and the local community deeply. It goes beyond the immense pain and sorrow experienced by loved ones; it extends to have far-reaching and enduring effects on all those connected. Everybody around them feel guilt and sorrow for not noticing on time the signs of suicidal ideation and intent [40, 41]. It is crucial to recognize that suicide is not an inevitable outcome. Suicidal deaths typically result from a complex history of suicidal ideation caused by distress, trauma, bullying, loneliness and isolation, lack of social support, experiences of abuse, experiences of disaster, discrimination, gender (male), chronic pain, self-harm behaviors, feelings of hopelessness and despair – key symptoms of suicidal ideation – and adversity. As stated before, young people who faced mental and emotional health difficulties during COVID-19 were at higher probability of having suicidal ideation. Young men are at higher risk than young women. They occur not because someone desires to die but rather because they believe they can no longer endure their circumstances [41, 42]. While no single initiative or organization can single-handedly prevent suicide, there are numerous ways in which our services, communities, individuals, and society as a whole can collaboratively strive toward this goal [43–45].

Here are some interventions that universities and institutions can consider implementing:

- Mental Health Services and Counseling: Provide accessible and virtual mental health services, including counseling, therapy, and support groups, to help students cope with stress, anxiety, and other mental health challenges.

- Online Well-Being Workshops: Offer virtual workshops and webinars that focus on building resilience, managing stress, improving sleep, practicing mindfulness, and promoting overall well-being.

- Peer Support Programs: Establish peer mentorship or support programs where experienced students can connect with and offer guidance to their peers, creating a sense of community and belonging.

- Flexible Academic Policies: Implement flexible academic policies, such as extending assignment deadlines, providing options for pass/fail grading, and allowing students to withdraw from courses without academic penalties.

- Adaptive Online Learning: Provide training and resources to instructors to help them adapt their teaching methods for online learning, making use of engaging and interactive tools to enhance student engagement.

- Digital Social Spaces: Create virtual spaces for students to connect with their peers, participate in online clubs or interest groups, and engage in social activities to combat feelings of isolation.

- Physical and Mental Wellness Challenges: Organize wellness challenges that encourage students to engage in physical activities, practice mindfulness, and share their experiences with their peers.

- Regular Communication and Updates: Maintain transparent communication with students through regular updates on safety measures, academic changes, and available support services.

- Online Academic Support: Provide online tutoring, academic coaching, and study skills workshops to help students adapt to the online learning environment and succeed academically.

- Virtual Career Services: Offer virtual career counseling, resume workshops, and networking opportunities to help students plan for their future despite the uncertainty.

- Inclusive Technology Access: Ensure that all students have access to the necessary technology and internet resources to participate in online learning and access support services.

- Promote Self-Care Strategies: Educate students about self-care strategies, time management, and maintaining a healthy work-life balance to prevent burnout.

- Wellness Apps and Resources: Share resources, apps, and online tools that can help students manage stress, anxiety, and maintain their mental well-being.

- Peer Support Networks: Encourage students to form study groups, virtual study sessions, and peer accountability partnerships to stay connected and motivated.

- Faculty–Student Interaction: Encourage professors to maintain open lines of communication with students, providing opportunities for virtual office hours and one-on-one discussions.

- Holistic Health Initiatives: Promote healthy habits through initiatives that focus on nutrition, exercise, sleep hygiene, and overall wellness.

Remember that each institution and student population is unique, so it is important to tailor these interventions to your specific context and the needs of the students. Regular feedback and evaluation of the effectiveness of these interventions will help refine and improve the support provided.

Conflict of interest

The authors declare no conflict of interest.

Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki. The final questionnaire was presented to the Ethics and Bioethics Commission of the Universidad Autonoma de Baja California for its evaluation and authorization, according to NOM-0035.

Author details

Ignacio Alejandro Mendoza-Martínez[1], Blanca Rosa García-Rivera[2]* and
Jorge Luis García Alcaraz[3]

1 Universidad Anahuac Mexico, Mexico City, Mexico

2 Faculty of Administrative and Social Sciences, Universidad Autonoma de Baja
California, Valle Dorado, Ensenada, Mexico

3 Department of Industrial Engineering, Universidad Autonoma de Ciudad Juarez,
Mexico

*Address all correspondence to: blanca_garcia@uabc.edu.mx

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Suicide is one of the most important causes of death worldwide. As such, assessing the risk of suicidal behavior and identifying protective factors and suicide prevention strategies can reduce suicide-related deaths. Self-harming behavior, which is frequently seen in adolescents and can be confused with suicide attempts, is an important public health problem. This book has been prepared to assist mental health professionals with evaluating individuals with suicide and self-harm behavior, identifying risk factors, and applying prevention strategies. It provides up-to-date knowledge and skills on suicide and self-harm behavior in adolescents. *New Studies on Suicide and Self-Harm* is designed to help those who work with patients with suicidal behavior and intentional self-harm behavior.

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