VIEWPOINT

Battling the Modern Behavioral Epidemic of Loneliness
Suggestions for Research and Interventions

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Since ancient times, millions of people have died of epidemics of plague, flu, cholera, and other infections caused by bacteria, viruses, or other microorganisms. Major advances in medicine have largely eliminated these mass killers with vaccines and antibiotics. However, modern societies are facing a new kind of epidemics: behavioral epidemics. The annual rates of mortality by suicides and opioid overdose have been escalating over the last 2 decades and today are responsible for the death of 1 American every 5.5 minutes. Consequently, the average US life span, which had been rising progressively since mid-1950s, has fallen for the first time.[1]

Contributing to these epidemics of suicides and opioid use is not a pathogenic microbe, but rather a hard to detect and lethal behavioral toxin of loneliness. *Loneliness* may be defined as subjective distress resulting from a discrepancy between desired and perceived social relationships.[2] Loneliness (or perceived social isolation) is associated with but distinct from objective social isolation, which is defined by the number of persons in the environment. Loneliness is a subjective state and a personality trait determined by genetics and hormonal and cerebral pathophysiology. Perceived and objective social isolation increase the risk of mortality comparable with smoking and obesity.[3] An annual mortality of 162 000 Americans is attributable to social isolation, exceeding the number of deaths from cancer or stroke.[4] In the United Kingdom, the economic association of loneliness with businesses was estimated at more than $3 billion annually, leading to the establishment of a Ministry of Loneliness.

According to the British historian Alberti, the term *loneliness* did not exist in the English language until 1800 (https://www.theguardian.com/commentisfree/2018/nov/01/loneliness-illness-body-mind-epidemic). The word that described a similar state was *oneliness*, which meant being alone without distress. According to Alberti, beginning at the turn of the 19th century, industrialization reduced social connectedness and spawned loneliness. This problem has grown exponentially over the past couple of decades, with a doubling of the prevalence of loneliness. Our recent study[5] found that 76% of adult Californians experienced moderate to severe loneliness that was associated with worse physical, cognitive, and mental health. Loneliness peaked in the late 1920s, mid-1950s, and late 1980s.[5] Another study of older adults in rural Anhui, China, reported estimates of 57% for moderate loneliness and 21% for moderate to severe loneliness.[2,6]

Why has this unprecedented worldwide rise in loneliness, suicides, and opioid use developed during recent years? While multiple factors are responsible for each of these behavioral epidemics and a demonstration of direct causality is difficult, there is probably a common underlying thread of social anomie and disconnection resulting from the rapid growth of technology, social media, globalization, and polarization of societies. Although technology and globalization have improved the quality of life in many ways, they have also upended social mores and disrupted traditional social connections. Information overload, 24-hour connectivity, countless but superficial and sometimes harmful social media relationships, and heightened competition have elevated the level of stress in the modern society. A recent Gallup poll reported a 25% increase in self-reported stress and worry in the United States over the past 12 years (https://www.gallup.com/analytics/248909/gallup-2019-global-emotions-report-pdf.aspx).

While loneliness is prevalent in the general population, it is more common and more severe in persons with serious mental illnesses.[7] Below we discuss suggestions for research and interventions associated with loneliness at individual and societal levels, including psychiatric patients.

Suggestions for Research Agendas

1. Being a subjective construct, reliable and valid assessment of loneliness is critical. Technology may be helpful in determining indicators of moderate and severe loneliness, such as changes in specific psychomotor activity, sleep, or mood.
2. Loneliness (specifically sensitivity to social pain) is a partially heritable trait. Current knowledge of the genetics of loneliness is based on a few studies with large samples but limited phenotypic data. Cross-cultural genomic investigations with comprehensive phenomenology that include psychosocial, neurocognitive, and health-associated measures are necessary. Genetic predisposition toward loneliness is also associated with cardiovascular, metabolic, and psychiatric disorders. A better understanding of these associations will help us learn more about the mechanisms involved in such associations.
3. Some genes associated with loneliness are expressed in brain regions that control emotional expression and behavior, such as ventral striatum. However, functional neuroimaging studies of more individuals with vs without loneliness are needed to decipher possible neurocircuitries involved in perceived and objective social isolations.
4. Longitudinal investigations have shown that loneliness is a risk factor for generalized anxiety disorder, major depression, and dementia.[8] Determining the underlying processes is critical for identifying tar-

gets for preventing psychiatric morbidity in individuals with loneliness.
5. The high medical comorbidity and mortality raise the possibility of loneliness resulting in accelerated biological aging, as has been postulated for serious mental illnesses like schizophrenia for which loneliness is especially common.[7] Postulated mechanisms for accelerated aging, including inflammaging and oxidative stress, should be explored in persons with loneliness.
6. Loneliness is more common among racial, ethnic, and sexual orientation minorities. The extent to which stigma and other social factors contribute to this finding needs to be evaluated.
7. Research is also warranted on "oneliness" (ie, being alone but feeling contented). This may help develop interventions that target the distress associated with loneliness by facilitating positive aspects of being alone.

Suggestions for Individual-Level Interventions

1. Proposed interventions to reduce loneliness include those that seek to improve social skills, enhance social support, increase opportunities for social interactions, and address maladaptive social cognition.[9,10] Home visitation and daily contact programs may be useful for older people or people with disabilities who have loneliness. Trials of such intervention trials are warranted in people with serious mental illnesses.
2. A new finding from our investigation was that loneliness was strongly but inversely associated with levels of wisdom even after controlling for other variables.[5] People who scored high on a validated scale for measuring wisdom did not feel lonely. Wisdom is a personality trait that includes several specific components, including empathy and compassion, emotional regulation, the ability to self-reflect, acceptance of diverse perspectives, and spirituality. It is possible to increase the levels of these individual components with behavioral interventions. However, this type of research is lacking in patients with serious mental illnesses.
3. As we develop a deeper understanding of the biology of loneliness, it may be possible to develop pharmacological interventions.

Suggestions for Societal-Level Interventions

1. There has been growing concern about increased numbers of suicides in various sectors of society. One target of implementable prevention strategies affecting many youth should be educational institutions. It is important to test the effectiveness of regular courses on stress reduction, emotional regulation, empathy, and self-compassion from elementary schools to medical and other professional schools.
2. Social media outlets have been beneficial in many ways for people who feel socially isolated. Yet, they have also had adverse effects on vulnerable youth. As society develops regulations and policies regarding technologies and social media, mental health experts need to play a major role in ensuring that people with loneliness with mental illnesses are helped and protected.

By fighting the loneliness epidemic with health care professions at the forefront, we can help enhance individual and societal well-being; lower the risk of anxiety disorders, depression, dementia, and other psychiatric illnesses; and promote well-being, health, and even longevity of the population.

ARTICLE INFORMATION

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