Changing the direction of suicide prevention research

A necessity for true population impact

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Introduction

Suicide rates in most Western countries have not decreased in the last decade, a finding that compares unfavourably with the progress made in other areas, such as breast and skin cancers, human immunodeficiency virus, and automobile accidents, for which the rates have decreased by 40% to 80%. Preventing suicide is not easy. The base rate of suicide is low, making it hard to determine which individuals are at risk. Our current approach to the epidemiologic risk factors has failed because prediction studies have no clinical utility—even the highest odds ratio is not informative at the individual level. Decades of research on predicting suicides failed to identify any new predictors, despite the large numbers of studies. A previous suicide attempt is our best marker of a future attempt, but 60% of suicides are by persons who had made no previous attempts. Although recent studies in cognitive neuroscience have shed light on the cognitive "lesions" that underlie suicide risk, especially deficits in executive functioning, we have no biological markers of suicide risk, or indeed of any mental illness.

For those who seek help, current treatments can be effective but are not optimal. Novel treatments through repurposing drugs such as ketamine hydrochloride may provide new opportunities. However, people at risk of suicide do not seek help. Eighty percent of people at risk have been in contact with health services prior to their attempts, but they do not identify themselves, largely because they do not think that they need help.

Integrated approaches to suicide prevention

There is often a schism between the treatments offered in medical settings and the interventions delivered through the community. Community interventions include gatekeeper training, school programs, media reporting, and actions to reduce access to the means of suicide. Medical interventions include treatment and follow-up. Multifaceted systems approaches to suicide are likely to do better than single-intervention approaches alone. Modelling studies have shown that if all evidence-based suicide prevention strategies were integrated into 1 multifaceted systems approach, about 20% to 25% of all suicides might be prevented (Figure). We need larger studies at country or state levels to prove that these interventions have statistically meaningful results with regard to suicide rates.

Scale is important. Cardiovascular disease and cancer have studies that include hundreds of thousands of patients. The public health importance of suicide requires similarly powered studies to understand the complexity of suicides, the personalized approaches to interventions, and the effects achieved by multifaceted interventions.

New technologies and suicide prevention

As clinicians, we know something about the long-term risk factors for suicide, but we are much less able to disambiguate short-term risk or high-risk factors from the background of
long-term risk factors. That is where real time monitoring of behaviour could have an impact on identifying those persons at high risk and in need of rapid intervention.

Prediction will be better achieved by understanding proximal rather than distal risk factors. Less than 1% of risk factor studies examine the weeks before suicide attempts. Mobile phones are available to monitor relationships between psychological risk and suicide ideation, and to deliver interventions in real time in response to changes in mood. It is known that certain phrases and the use of personal pronouns, for example, predict depression status in blogs. We are currently looking at this longitudinally, validating against standard self-report measures, to see what might predict change for each of the individuals in the study. Digital footprints left on Twitter can be examined in real time using machine learning. Although the accuracy is not good enough yet for practical interventions (with too many false positives), it is known that machines can learn to detect concerning tweets. Data mining of hospital records may help us detect better risk profiles.

Facial and voice characteristics may become physical markers, and social withdrawal is now detectable using smartphones. Help-seeking may well be assisted by using social media. Online social networks such as Facebook can be used to provide peer support and to change community attitudes in the ways already used by marketing industries.

We can use the networks of “influencers” to modify attitudes and behaviour in specific high-risk groups, such as the military, where suicide rates are high, or “captive audiences” in schools.

Disseminating effective programs is no longer difficult using online mental health programs. Although some early suicide apps and websites have been tested, better online interventions are needed that can respond to temporal fluctuations in suicide risk. The power of short-term prediction tools should be combined with the timely delivery of unobtrusive online or app personalised programs.

However, if these developments are not supported by government or industry and implemented at a population level, they will remain missed opportunities.

Technology offers more than scale. By combining the power of big data analysis with the information gathered digitally at the time of risk, we can, with technology, reveal individual-level risk profiles that can be provided to the individual (within appropriate ethical frameworks) and clinicians. None of this would have been possible without recent advances in machine learning, Twitter, Facebook, online apps, and smartphone technologies.

Large-scale trials are also needed. Even if we did all of these things, large-scale research programs with millions of people are required, and technology by itself will not be enough. Although new large trials show that the effects of community programs can be effective, studies need to be bigger, combining all evidence based medical and community strategies, using technology effectively to reduce costs of identification and treatment. Combining all of the suicide prevention strategies has been shown to be effective in other areas of public health. If we really want to reduce suicide rates, we need to implement the science on a larger scale with the needed policy development and economic modelling.
Conclusions

The biggest risk in suicide research is that we simply continue the approach taken over the last few decades. Suicide rates are potentially reducible worldwide, but we need a new ambitious approach combining technology with trials on a scale that has not been seen before, together with the realization that suicide prevention research must change. A reduction in suicide rates of 20% has become a realistic ambition, and the lives of hundreds of thousands of people in the next few decades may be saved.

References


