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Human suicide, risk factors and new perspective

Abstract

Human suicide commonly leads to approximately 1.3% of human mortality. Due to this dangerous and harmful character, human suicide study is growing importance. With a complex and long term of suicide origin and pathogenesis processes, different aspects of risk factors and other networks are evaluated for past history, epidemics, pathology, prevention and therapeutics in this article.

Keywords: suicide, mental disorder, social integration, risk factors

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Introduction

Clinical situation

Human suicide, a mystery, dangerous and complex event leads to approximately 1.3% human mortality globally.[1,2] As driver from socio-economic forces and mental co-morbidity, suicide ideation and behaviors in critical conditions may cause high human mortality (0.5-1.2 million annually worldwide).

Due to this dangerous character and behavior, human suicide witnesses the development of high quality, multi-level and biomarker diagnostics. To accomplish this modern approach, an association and relationship between different types of risk factors should be solidified- including mental disorder, surrounding pressure, depressive condition, psychiatric instability, viral infection, demanding parents, family disharmony, self-esteem, fatal disease suffering and feeling of long-term of social isolation.[3-6]

Global situation

Apart from high human mortality, a great amount of money and human resources are demanded.[6-8] All countries worldwide have suicide incidence and deaths. It meant that human suicide is wide-spread phenomenon that does not happen only in poverty and deprivation. This is also a biomedical issue that needs creative ideas and development of both diagnosis and therapeutics.

Possible risk factors

To improvement of this noteworthy subject, different risk factors is focused for suicide study. Different variables should be observed in broader-range. Biological understanding of suicide origins (multi-disciplinary study) should be initiated. This Article addresses the context and evaluation of major risk factors, diagnostic widening and potential therapies.

Historic & epidemic review

Earliest reports of human suicide

The topic about human melancholy (depression in current terminology) was initiated over 2000 years (literatures in Egypt, Greek and Rome).[9,10] Melancholy-induced self-killing was then regarded as anti-social and unlawful behaviors. Outside stereotype and social stigma shadowed the victims. In the ancient Greece and Roma, suicide was not allowed and victim-bodies were prohibited for being buried in public cemetery. The dead-bodies of human suicide victim were casted into wildness to be eaten by beasts in Egypt.[10] Thence, this type of social stigma was gradually eased by medical knowledge enrichment and distributions. Therapeutic promotion and technical advancement worldwide were happened since 1642.[11] It is not until 1642 in the UK, the human suicide was comprehended as a normal human illness.

Neuropsychiatric evidence

In addition, the outside stresses (socioeconomic forces, such as marriage problems, job losses or others) may trigger the cascade of human psychiatric instability, symptoms and finally neurotoxicity. By these neuropsychiatric studies, we may enhance our understanding and capabilities for suicide prediction, prevention and therapeutics.[12,13] It therefore supported the past hypothetic linkages between suicide and mental health problems. As a result, more diagnostic or therapeutic linkage between suicide and mental diseases may be evaluated by biomedical infrastructure and technique breakthroughs.

Demographic analysis

Demographic data and information for human suicide worldwide is diversified by a great variety of references, such as Latin America, Greece, Japan, South Korea, Europe, Australia and the US.[14-20]

Since there is a great variation of suicide rating and ranking of different countries caused by different authors and period of times, suicide rating comparison worldwide is difficult. There is up and down of economy and government regimes of different period of times in same country. The natural environmental and economic conditions influence the rate of suicide behaviors and mortality because there is a big variation for various risk factors—geological location, governmental regimes, patient's ages, gender and professions.

Biology causality

Genetics

Apart from social and economic factors, plethora patho-physiological pathways (genomic, epi-genetic and polygenic variations) are widely translating into modern medicines (diagnostic advances and therapeutic paradigms.[21-25] Unfortunately, these translational achievements are still far from success until now. Among different possibility and translational pathways, gene-associated pathways should be implemented first.[26-32] Detailed information could be seen Table 1 and 2.

Causality outline

The modern suicide diagnostic and therapeutic paradigms are based on clinical neuropsychiatric evidence, databases and parameters.[30,31] Suicide predictive systems are not well prepared according to current

diagnostic and technical advances. Past experience and wider range of suicide risk factors must be carefully analyzed and calculated from modern medicines (Table 1).[26–40]

Table 1 The potential causality for human suicides

Disease types	Targets and pathways	Reference
Psychiatric	Affective disorders	4
	Cognitive disability	
Genomic factors	Genetic variation	26–33
	Co-morbidity	
Viral infection	Viral-induced brain damage	34
Drug induction	Gut-microbe-brain axis	26–30
	Antibiotics	
Behavior	Sleep problems	35
	Inactivity (obesity)	
Chronic diseases	Traumatic-suffering	36,37
	Negative feeling (long-term)	
Parent problem	High-expectation	38
	Divorce	
Social	Self-esteem	12,39,40
	Dissociable	

Causality categorization

Causative domains

Mood disorder and suicide origins come from different causative categories.[41-46] We divided them into four categories. From current pharmacologic points of view, should each causative category be treated or managed by relevant drug targets, mechanisms or social reforms? (Table 2) As a result, the relationship between behaviors and molecules should be boosted in the future.

Table 2 Different dimension for mood disorders or suicide

Social	Cognitive	Behaviors	Physical
Marriage	Worthlessness	Alcoholic	Pain
Interpersonal	Hopelessness	Social-contact	Appetite
Work & residence	Helplessness	Risk-taking	Concentration
Financial	Self-blame	Rumination-impair	Weakness

Psychiatric evidence

The quests for suicide causality, categories and technology began with mental disorders. During the long course of suicide exploration, many diagnostic and therapeutic systems are based on psychiatric architecture and framework. Many key issues have not been settled among medical disciplines and circles.[6] As a result, suicide demographic comparison is at the surface. In clinical settings, psychiatric syndrome and evidence is varied within a large volume of human popular and different biological targets (genetics, molecules and neural circuitry). In the past reports, schizophrenia and other mental disorders are quantified in South Korea;[8]

Schizophrenia RR=14.70

Sleep disorder RR=11.93

Depression disease RR=9.27

Bipolar=9.03

Anxiety=6.92

Viral infection

Bacterial- or viral-infection on human brains can sometimes trigger a cascade of inflammatory hormone release, glial dysfunction, synaptic alterations and brain-damages in infectious patients. With these pathological processes and pathways, a high-ratio of human suicides was reported.[34] In the future, more such examples and evidence will be identified.

Gut-brain axis

Drug-induce mania and suicide was occasionally reported in literature.[25-28] This psychiatric symptom has been associated with a variation of human genome. It is possible that antibiotics kill the gut-bacterial community and disrupt nutritional components into blood-brain-barriers (BBB) by which brain and cerebral function will be abnormality (microbiota).[29]

Human genomic variation

Pharmaceutical study.[33] New sequencing techniques open a new era for neurobiological genomic exploration since 2010 (the advent of next-generation sequencing). Great progresses by this biomedical technology and low cost accelerate suicide genomic researches in unprecedented speed.[26]

Behaviors and life-style

Human life-style or custom (alcoholic, gambling, over-eating, risk-taking and others) may affect states of human mind and behaviors (sleep difficulty, hyperlipidemia and self-injury). Behavior managements may help to reduce unexpected tragedy of repeating self-harm or suicide. Many biomedical features and profiling will be discussed.

Sleep difficult and problem

Sleep problem is strongly associated with human suicide (rates and mortality). It can trigger great painful feelings in human beings, which drive mental insanity or loss their courage for further living. Gut-brain axis is also a current discovery for brain nutrition, functionality and resting. Vegetable, milk and fresh fruit consumption are major pathways for symptom alleviation.[29]

Traumatic episode

Traumatic episode and long-term physical disables in human being may gradually accumulate negative-feeling, sometimes suicide-ideation and finally lead to a high-rate of suicide episode.[36,37] Many people who do not want to live longer due to persistent pain, cancer and negative feelings will lead to repeat suicides. This form of pathological pathways and therapeutic paradigms needs to be identified in the future.

Social problem in new living environments

New comers are often met with hostile and unfriendly atmosphere. Life austerity and poor contacting with neighbors also trigger human suicide ideation, events and victims, especially in western society.[10] Social reforms and harmony can ease this kind of unfavorable situation gradually.[40]

New perspectives

Biological modality

So much causation and risk factorials can lead to human suicide. What is their universal pathway in biological basis? The pathological

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progress of human suicide is important task for biological modality establishment and therapeutic targets (Figure 1). This diagram shows how the suicide is generated and further progressed. Further discovery, insights and perspectives will be identified in later.

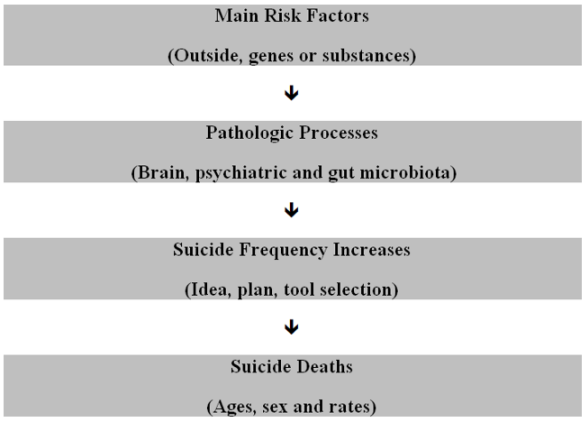

Figure 1 Pathological progresses of human suicides.

Modern diagnostic paradigms

Genomic sequencing, multi-omics profiling and/or brain imaging are growing popular now. In the last millennium, psychiatrists and clinician can consider major environmental, economic conditions, nursery or physical conditions as risk factors. Psychiatrists and clinicians at that moment could not rely on modern biological information and data for therapeutic purposes. Across the history, quick and proper diagnosis is the key for suicide management.[2]

Biological bases for suicide

The human suicide causalities have been long disputed due to lack of biomedical knowledge. Is there an association between suicide behaviors and neuropsychiatry? From this ideology, advance has been made in clinical trials. Though this topic has been lasting over two decades, no big breakthrough has been made until now. To achieve neuropsychiatric knowledge, clinical phenomenon and properties should be evaluated in the future.

Outlook for diagnostic-therapeutic relations

Due to many complex causative factors, biological origin and molecular pathology for human suicide are commonly covered by specific pathways in Figure 2. It is an initial step to establish novel drug evaluative systems and clinical applications. The relationship and knowledge gap between elements of suicide origin, pathologically progressive pathways and relevant therapeutics to patients should be established in new perspectives (Figure 2).

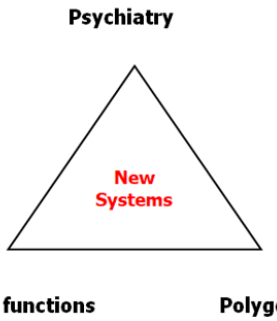

Figure 2 Different neurobiology advances from suicide-related diagnosis and study.

Therapeutic diversity

In general sense, drug development is the only choice for disease management.[41–44] However, many different options are proposed for suicide management. They are;

(i) Education[23]

(ii) Mood stimulation—pleasant games, movies or sports[45]

(iii) Social integration and regulation[40]

(iv) Nursery supports[46,47]

(v) Artificial intelligence supports[48-50]

Conclusion

Human suicidal prediction and prevention is a difficult thing, especially aspects of neurobiological diagnoses. Despite a great variety of diagnostic information, data and statistics available, most of which are outside information (symptom-based) rather than molecular-based paradigms up to now. Thus, it needs a great deal of comparative work in molecular-based medications via systematic analysis of different risk-factors.

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Conflicts of interest

Authors declare there is no conflicts of interest with other institutes and academies.

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