COMMENTARY

Suicide

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Abstract

Suicidality is a continuum ranging from suicidal ideation to suicide attempt to completed suicide. Suicidality may mean intensification of risk factors or weakening of protective factors. Every minute one person commits suicide. Unemployment is a major risk factor. Stigma against suicide led to discrimination against victims. Situation preceding suicide is usually preceded by excess of adverse life events and stressors. Modern theories stress multifactorial causation – interaction of predisposing and precipitating factors versus protective factors. Stressor is usually state dependent (life event). Diathesis reflects trait characteristics (impulsivity). Genetics and traumatic experiences in childhood lead to trait-dependent factors which act as predisposition. In India many cases occur after examination failure or love failure among child and adolescent populations. Elderly have highest rate of suicide among all groups. Most persons communicate intent before the act. Psychiatric disorder is less common in deliberate self-harm attempters than suicide attempters. Two common approaches in treatment of suicide attempters are to treat the underlying disorder and to directly treat suicidality. No single method can prevent suicide in all persons at risk. Psychological autopsy is the method applied to suicide prevention, crisis intervention and research to identify persons at risk. *Suicide survivor* refers to *those who have lost a loved one to suicide* not to those who have attempted suicide but survived.

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Introduction and definition

"Sui caedere" in Latin means to kill oneself. Suicide is a fatal act of self-injury undertaken with a more or less conscious self-destructive intent. Suicidality is a continuum ranging from suicidal ideation to suicide attempt to completed suicide. *Suicidal ideation* is occurence of passive thoughts of wanting to be dead or active thoughts of killing oneself.[1,2] *Suicide attempt* is a potentially self-injurious behaviour with at least some intent to die as a result of the act.[3] The history of suicide goes back to the ancient times with earliest written records from Greece (Socrates, Seneca) to modern day (van Gogh, Hitler, Hemmingway).

Suicide process and the act of suicide

Suicide is fatal outcome of a long term process. It is a very individual final act of a person. It involves multiple interacting biological, cultural, social, situational and psychological factors. The suicide process model organises the complex factors associated with suicide. Suicidality may mean intensification of risk factors or weakening of protective factors. A triggering/precipitating factor may be decisive in the timing of the act. High lethality methods are guns, hanging, jump from very high buildings. Low lethality methods are poisoning, drowning, wrist cutting. Hanging is the most commonly employed method globally.

Suicide process model

Risk and protective factors like cultural, social, psychological and biological comes in contact with situational factors like recent stressors and availability and lethality of methods to cause intent to commit suicide leading ultimately to suicide attempt; death or survival is the result with its after-effects.

Epidemiology

Each year one million people commit suicide. It accounts for one to two percent of the global mortality. Global incidence is 16 per 100,000 persons (World Health Organization [WHO]). Every minute one person commits suicide. Worldwide, male rates are higher (except China) – women attempt suicide three times more but men complete suicide three times more. Suicide in people above 65 years has been declining in past 40 years (better social and health services). Younger people (15-24 years) have shown rising trends in past 40 years.

Public health aspects

Unemployment is a major risk factor. Access to methods like medications, guns, vehicles; increased substance abuse (alcohol); under treatment of illnesses like depression, schizophrenia are other risk factors. Mass media reports of suicides in TV, radio, newspaper lead to imitation suicides.

Aetiology—cultural factors

Culture defines attitude to life and death. Stigma against suicide led to discrimination against victims. Modern Western culture emphasises free will and need to shoulder responsibility of one's own life that increase in egoistic and anomic trends and disappearance of altruistic trends leading to more suicides.

Role of life events and social support

A life event is a significant occurence involving a relatively abrupt change that may produce serious and long lasting effects. Situation preceding suicide is usually preceded by excess of adverse life events and stressors. It is most common in elderly people with severe somatic illness, death of spouse, retirement; in younger men with job loss, separation, financial troubles; in women with interpersonal life events, dowry problem, cancellation of marriage. Gender difference is manifested by suicide in men being more related to recent stress than women. Women have less propensity than men to commit suicide due to psychosocial stress as compared to interpersonal life event.

Psychological theories of suicide

Edwin Schneidman focuses on unbearable mental pain (psychache) of patient that terminally develops tunnel vision when can see nothing but death as a solution.[4] Karl Menninger gave a suicidal triad of a wish to die - wish to kill - wish to be killed as a component of all suicides. Freud's early view was act represents aggression directed against a part of the self that incorporates a loss/rejection of a love object. Freud's later theory states interaction of Eros (life instinct) and Thanatos (death instinct). More recent theories focus on self in relation to others, failure of developmental/adaptational processes causing negative self-image and distorted cognitive schemas leading to hopelessness and ultimately suicidal behaviour. Modern theories stress multifactorial causation – interaction of predisposing and precipitating factors versus protective factors.[5,6]

Emile Durkheim's sociological view

He was a French sociologist. In 1897 he described four major types of suicides in his work *Le suicide etude de sociologie*.[7] In *anomic*, a person is no longer guided by society (suicide of a rejected alcoholic who has no support from society). *Egoistic* is individual decision of a person who is no longer dependent on other's control/opinion (person who arranges an assisted suicide). In *altruistic*, society influences the decision of a person to sacrifice his life (captain of Titanic ship). In *fatalistic*, society rules have proven decisive for a person (suicide by a person held as a slave). Social isolation has been used to understand the socioecological and sociopsychiatric background of suicide. Other theories have stressed the joint effects of various social factors.[8]

Stress diathesis model of suicidal behaviour

It was given by Mann *et al*.[9] Exposure to a stressor precipitates a suicidal act. Person has the suicidal propensity beforehand. Stressor is usually state dependent (life event). Diathesis reflects trait characteristics (impulsivity).

Diathesis may be genetic, early life experience, focal head injury, chronic substance/alcohol use, diet (e.g. cholesterol) or neurobiology. Stress can be acute psychiatric illness, acute drugs/alcohol, acute medical illness or acute family/social stress.

Van Heeringen model[10,11]

Genetics and traumatic experiences in childhood lead to trait-dependent factors which act as predisposition. Role of serotonergic system dysfunction is implicated in anxiety, impulsiveness and aggressiveness. Triggering events and psychosocial crisis determine state-dependent factors like acute psychiatric pathology e.g. depression. Role of noradrenergic system, hyperactivity of the hypothalamo-pituitary-adrenal (HPA) axis in response to stressful events are found. When the interaction of trait-dependent factors and state-dependent factors crosses threshold factors, suicidal behaviour occurs.

Neurobiological aspects—serotonin system

The most well studied is serotonin (5-hydroxytryptamine [5-HT]) system. Suicide attempters and completers had lower cerebrospinal fluid (CSF) 5-hydroxyindoleacetic acid (5-HIAA). Postmortem studies report less brainstem (raphe nucleus) 5- HIAA. Stained samples of serotonin neurones in brainstem reveal higher cell density in suicidal brain samples compared to non suicidal brain samples. Fenfluramine challenge reveals blunted prolactin elevation indicating low central serotonergic responsiveness. Receptor upregulation of 5-HT_{1A} and 5-HT_{2A} types in dorsal prefrontal cortex and amygdala are reported. Platelet studies reveal decreased 5-HT_{2A} in platelets. Postmortem studies report less 5-HT transporters in prefrontal cortex, hypothalamus, occipital cortex and brainstem.

Noradrenergic system

Post mortem studies report fewer noradrenergic (NA) neurones in locus ceruleus revealing lower functional reserve. Cortical NA overactivity indications are lower α and β_1 receptor binding, lower β receptor density and α_2 receptor binding in prefrontal cortex (PFC) of suicidal subjects. Lower CSF 3-methoxy-4-hydroxyphenylglycol (MHPG) in CSF of suicidal

subjects is found. Fewer NA neurones in depressed suicides accompanying exaggerated stress response resulting in huge release of NA causing depletion of NA leads to depression–hopelessness–suicidality.

Hypothalamic-pituitary-adrenal axis

Suicidal patients exhibit HPA axis abnormalities. Most common is cortisol nonsuppression after dexamethasone. Nonsuppressors were four to five times more likely to die by suicide than suppressors. Childhood abuse sufferers more likely to have dysfunctional HPA axis responses who suffer from depression and commit suicide.

Other systems

Studies with dopaminergic functioning are inconclusive; there are some reports of low dihydroxyphenylacetic acid in basal ganglia in suicides. Thyroid dysfunction in the form of abnormal thyroid stimulating hormone response to thyrotrophin releasing hormone challenge is found. Brain derived neurotrophic factor is implicated by low plasma levels and low protein levels and gene expression in hippocampus and PFC. Low cholesterol level/cholesterol lowering diet - ω3 fatty acids may be a mediator.

Genetics of suicidality

Family, twin and adoption studies point to genetic contribution to suicidality independent of psychiatric diagnosis. There is 30-50% heritability. Candidate genes' studies point to serotonergic system. *Serotonin transporter promoter gene* (5-HTTLPR) is implicated – the S allele is associated with both higher suicides and attempts especially with high lethality attempts. *Tryptophan hydroxylase* shows increased association with suicidality for TPH1 form. *Catechol-o-methyl-transferase* (COMT) has shown some association in Finnish and Japanese suicides.

Risk factors: sociodemographic variables

Male gender; elderly age; low social status; low educational status; unmarried, separated, divorced, widowed; living alone; unemployed, retired, insecure employment; weak economic status in males; farmer, female doctor, student, sailor; students, prisoners, immigrants, refugees; hospitals, prisons; uneven distribution locally by urban-rural; spring and autumn, anniversary; adverse life events such as losses and separations, criminal charges; low social support; and lacking social integration.

Suicide: clinical determinants

Family history of suicidal behaviour, mental disorders; depression, substance use disorders, personality disorders, schizophrenia; post-discharge period, psychotropic drugs; psychiatric symptoms like hopeless, helpless, depressive, psychotic, delirious, anxious, aggressive, introversive; suicidal behaviour with previous suicide attempts, suicidal ideations, death wishes, indirect gestures; physical health in terms of severe physical illness such as cancer, acquired immunodeficiency syndrome (AIDS), stroke and epilepsy; permanent sickness; availability of suicide methods like easy access to lethal methods.

Factors associated with protective effects for suicide

Children in the home, sense of responsibility to family, pregnancy, life satisfaction, reality testing ability, positive coping skills, positive problem solving skills, positive social support, positive therapeutic relationship.

Suicide in child and adolescent populations

In child and adolescent, suicidal ideas are quite common. History of sexual abuse may be associated. Underlying depression, conduct disorder, substance uses are risk factors. In India many cases occur after examination failure or love failure. They are vulnerable to "copycat" suicide, known as Werther syndrome. Suicidality is reported more with selective serotonin reuptake inhibitor (SSRI) in some studies while others give conflicting report.

Geriatric suicide

Elderly have highest rate of suicide among all groups. Persons above 65 years are five times more likely to commit compared to general population. Seventy five percent attempters are women but 60% completers are men. Method commonly used is gunshot, hanging, poisoning, slashing. Commonly underlying factors are depression, medical illness, death of spouse. Most persons communicate intent before the act.

Deliberate self harm (DSH)

DSH is an act with a non fatal outcome in which a person initiates a non habitual behaviour that without outside intervention will cause harm to themselves. Earlier thought as failed suicide but many people did not intend to kill themselves. Parasuicide is a behaviour that mostly without the intention to kill oneself, communicates some degree of suicidal intent.[12] Rates of three percent population engaging in DSH were noted in the epidemiologic catchment area (ECA) study.[13] Lifetime prevalence is three percent (females) and two percent (males) in WHO/EURO study.[14] Female: male ratio=1.5:1 seen in WHO Multicenter Study on suicidal behaviour. Psychiatric disorder is less common in DSH attempters than suicide attempters. Common methods are wrist cutting, paracetamol overdose, jumping before moving vehicle. Arensman & Kerkhof[15] reviewed DSH and categorised 3 types – mild, mixed and severe types.

Mild DSH	Severe DSH
Young age	Older age > 40 y
Less violent means	More violent means
Living together	Living alone
Few precautions to avoid discovery	Many precautions to avoid discovery
Low suicide intent	Higher suicide intent
Mild resultant physical injury	Greater resultant physical injury

Motives of DSH[16]

They are self-punishment (wrist slashers), to get relief from a terrible state of mind, wish to die (drug overdose). Aetiology is emotional turmoil leading to emotional crisis. They think that future is hopeless but still have faint hope it may improve. DSH is viewed as self-invented crisis intervention. Cognitive distortions are seen as important. There is global and stable negative anticipation present. If they remain so, there is likelihood of repetition. Key features are weak support system, poor problem solving skills and feeling of learned helplessness from where no escape is possible. Precipitants are conflict with key figures, work problem, financial difficulty and illness. Profile of DSH patients include unemployed, poor, less educated, divorced, disabled, addicted and lonely. Fifty four percent DSH attempters have had a previous attempt;[17] 40% of suicidal deaths have a past history of DSH and about ten to 15% of DSH patients die by suicide in the long run. Chance of repetition of DSH is maximum in the first year following an attempt of DSH.

Treatment of suicide attempters

Two common approaches are to treat the underlying disorder and to directly treat suicidality.[18] It is also helpful to try reducing risk factor and strengthen protective factors. Formation of empathic therapeutic alliance with patient is important. Detailed enquiry is needed about method used, precipitating factor, life event, current intent, hopelessness and insight level (*Demoralization syndrome* with increasing insight).[19] It may include combination of biological, psychological and psychosocial approaches.

Biological treatments

No single method can prevent suicide in all persons at risk. Lithium has reduced suicidal tendency in affective disorders.[20] Clozapine demonstrated significantly less suicidality in schizophrenia cases versus olanzapine in the randomised blinded control InterSePT trial.[21] SSRI may be helpful to treat depression and lessen tendency but Food and Drug Administration (FDA) black box warning to monitor for suicidal thoughts exist. Benzodiazepine and other mood stabilisers may help. Electroconvulsive therapy (ECT) may be needed for medicine refusal/intolerable side effect or non response.

Psychological therapies

Brief problem solving therapy is shown to be effective which focus on better coping skill. Cognitive behaviour therapy may reduce hopelessness and help such persons. Dialectical behaviour therapy may decrease suicidal behaviour in borderline patients. Outreach community programmes can help those with poor follow up through visit to home, phone call.

If patient commits suicide[18]

Psychiatrist must ensure all his documentation is complete. Conversation with family member is recommended which reduces grief, assist them to seek help. Confidential information of patient is not to be revealed to survivors. Not to make any self-incriminating remark.

Suicide prevention

According to World Health Organization (WHO), suicide is preventable (SUPRE global initiative). Many nations have suicide prevention programmes (England, Scotland, Finland). Haggerty & Mrazek[22] classified suicide prevention framework into: universal/selective/indicated. Universal targets whole populations and aims to favourably shift risk factors. Selective targets those who do not exhibit suicidal behaviour as yet but have risk factors. Indicated is for people already showing suicidal behaviour. Rose[23] has divided preventive approaches as population versus high risk group strategy.

Strategies for prevention of suicide

Population strategies are reducing availability of means for suicide, educating of primary care physicians, influencing media portrayal of suicide, education of the public about mental illness and its treatment, educational approaches in schools, befriending agencies and telephone helplines, addressing the economic factors associated with suicidal beaviour.

High-risk strategies are patients with psychiatric disorders, the elderly, suicide attempters, high risk occupational groups, prisoners.

Assessment of suicide attempts

Factors that should be covered are life events that preceded the attempt, motives for the act including suicidal intent and other reasons, problems faced by the patients, psychiatric disorder, personality traits and

disorder, alcohol and drug misuse, family and personal history, current circumstances like social (e.g. extent of social relationships), domestic (e.g. living alone or with others), occupational (e.g. whether employed), psychiatric history, including previous suicide attempts.

Assessments that should be made are risk of a further attempt, risk of suicide, coping resources and supports, what treatment is appropriate to the patient's needs, motivation of patient (and significant others where appropriate) to engage in treatment.

Assessment tools

The most widely used scales for rating suicidal behaviours include:

The Scale for Suicidal Ideation has good reported reliability and validity and measures three major factors - active suicidal desire, specific plans for suicide and passive suicidal desire.

The Suicide Intent Scale measures the degree of suicide intent.

The Risk-Rescue Rating Scale is an interviewer-administered measure that assesses the lethality and intent of a suicide attempt.

The Columbia-Suicide Severity Rating Scale assesses severity of suicidal ideation and tracks suicidal events.

The Beck Hopelessness Scale is a self-report inventory designed to measure three major aspects of hopelessness - feelings about the future, loss of motivation and expectations.

The Hamilton Depression Rating Scale is a clinician-applied scale rating dimensions of depression.

The Beck Depression Inventory is a multiple-choice self-report inventory that measures the severity of depression.

Factors suggesting high suicidal intent

Act carried out in isolation, act timed so that intervention unlikely, precautions taken to avoid discovery, preparations made in anticipation of death (e.g. making will, organising insurance), preparations made for the act (e.g. purchasing means, saving up tablets), communicating intent to others beforehand, extensive premeditation, leaving a note, not alerting potential helpers after the act, subsequent admission of suicidal intent.

Factors for risk of repetition of suicide attempt

Previous attempt(s), personality disorder, alcohol or drug abuse, previous psychiatric treatment, unemployment, lower social class, criminal record, history of violence, age 25-54 years, single, divorced or separated.

Factors associated with risk of suicide after an attempted suicide

Older age (females only), male gender, unemployed or retired, separated, divorced or widowed, living alone, poor physical health, psychiatric disorder (particularly depression, alcoholism, schizophrenia and 'sociopathic' personality disorder), high suicidal intent in current episode, violent method involved in current attempt (e.g. attempted hanging, shooting, jumping), leaving a note, previous attempt(s).

Psychological autopsy

It is a retrospective process in which data is collected to help reconstitute the psychosocial environment of suicide committers and better understand the circumstances of their death. The method is applied to suicide prevention, crisis intervention and research to identify persons at risk. The best time to contact friends and relatives is two to six months after the event. Mourning period would have passed and the relative's memories would not be still altered. The informant's anonymity must be respected. Parameters on which data are collected are details of death, family background, social context, life trajectory, social interaction, working conditions, physical/mental health, previous suicidal behaviour (if any), contact with helplines before committing the act and reaction of relatives and friends to the act. It could help identify recurring factors associated with suicide and may help in prevention.

Community interventions for preventing pesticide induced suicide (WHO) – safe storage

Install locked boxes for storing pesticides in farming households and encourage centralised communal storage of pesticides.

Education: Train pesticide users about health risks associated with pesticide use and about safe use, storage and disposal of pesticides. Identify key resource persons/opinion leaders from whom pesticide users obtain information about pesticides and ensure that they have the most up-to-date information on the prevention, identification and acute management of health problems associated with pesticide use. Train pesticide retailers to teach pesticide users about health risks and appropriate storage and disposal of pesticides and monitor their compliance with regulations. Encourage local media to support programmes aimed at reducing pesticide-related suicides and to decrease inappropriate reporting of suicides that can lead to copycat suicides. Train school children about safe use, storage and disposal of pesticides.

Terrorist	True suicides
Religion - motivator	Religion – protective
Goal - create terror	Goal - death/escape
Expectation - entry to paradise	Expectation - death of attempter
Revenge - common motive	Revenge - rarely a motive
Murder - common motive	Murder - rare motive
Psychiatric disorder - rarely found	Psychiatric disorder - commonly found

Psychosocial interventions: Psychosocial interventions are to augment community-based pesticide management measures.

Terrorist suicides

It is a special category with increased importance in recent times. There is no question of willingness on part of the victim. Victims are unknown to the perpetrators except in a generic sense like Jews/Westerners etc. Many terrorists are recruited from poor/less educated families. Large number of suicide bombers comes from educated, middle class and less fundamentalist families. Some suicide experts do not group these under true suicides.[24]

Victim precipitated homicide

It was described by Marvin Wolfgang.[25] This is a phenomenon in which a person uses others (usually police) to kill oneself. The psychology of such victims is not very clear. Possibly they feel that this is the only way that they can die.

Murder-suicide

These get a lot of attention as they are both tragic and dramatic. It consists of about one percent of all suicides. They reflect the high level of aggression (and depression) inherent to suicide. Sometimes a pact may be made between two truly consenting adults for such an act. More often however it is more of coercion rather than a true pact among equals. Pacts tend to be made more by females or elderly couples.

Group suicides

These have been known since ancient times of Bible (Jews at Masada) and till the 1970s by Jim Jones and followers in Jonestown, Guyana. They involve killing oneself along with others in a group for a certain cause. These suicides appear to have group and martyrdom characteristics. They are probably not simple random martyrs. Not clear if they can be classified as altruistic suicides.

Physician assisted suicide

Here a physician assists in process of ending a life when patient's request to end their lives. In most places it is illegal. It is opposed by human rights groups, premier medical organisations (American Medical Association [AMA], American Psychiatric Association [APA]). It is legalised in Holland, Oregon state of USA. Rationale given is some terminally ill (not clinically depressed) patients with incurable illness and great pain ask for ending their life. Counterargument is that such methods may be susceptible to abuse and many such patients may actually have subtle depression which may respond to antidepressants.

Surviving suicide

Suicide survivor refers to *those who have lost a loved one to suicide* not to those who have attempted suicide but survived. Survivors may have enormous emotional guilt. They often feel the loved one may have survived if only they had done something a bit differently. Children who lose parents may feel a shameful abandonment and may blame themselves. Parents who lose a child may feel having lost a part of themselves. Therapists who lose a patient to suicide comprise another group who suffer from guilt but are often ignored. Survivors of suicide self-help groups have appeared in many nations to provide mutual support. Many such groups are founded by non professional suicide survivors themselves. APA recommends psychiatric intervention to survivors shortly after the death to reduce the risk of psychiatric impairment and referral to survivor support groups.[18]

World Suicide Prevention Day

It is observed on 10th September of each year. A WHO initiative with International Association for Suicide Prevention from 2003 with the message of suicide prevention is a realistic goal. Governments worldwide should act together to find solutions to this public health problem. Slogan for 2011 is "Preventing suicide in multicultural societies."

Conclusion

Suicide is a psychiatric emergency. Multifactorial causes are involved. Prediction may be difficult. Prevention is possible to an extent by empathic and caring clinicians.

Further Reading

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