

Epidemiology of Childhood and Adult Mental Illness



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KEYWORDS

• Vaccination • Neuro-epidemiology • Public health

KEY POINTS

- Mental illness in adults accounts for a greater proportion of disability in developed countries than any other group of illnesses, including cancer and heart disease.
- Population-based surveys and surveillance provide much of the evidence needed to understand mental health promotion, mental illness prevention, and treatment programs in the United States.
- Childhood mental health disorders present serious deviations from expected cognitive, social, and emotional development are an important public health issue in the United States.
- Suicide is among the most important manifestation of mental illness in children, interacting with other factors resulting in an overall suicide rate of 4.5 per 100,000 in 2010.
- Mental illness can be managed effectively with increased access to mental health treatment services to reduced associated morbidity.

INTRODUCTION

The *term mental illness* refers to all diagnosable mental disorders and is characterized by sustained, abnormal alterations in thinking, mood, or behavior associated with distress and impaired functioning.¹ Mental illness is an important domestic and global public health problem because the condition it is associated with other chronic diseases, further increasing their morbidity and mortality. According to the World Health Organization (WHO), mental illness accounts for more disability in developed countries than any other group of illnesses, including cancer and heart disease.² Kessler and colleagues^{3–5} noted that up to one-fourth of adults in the United States (US) reported symptoms of mental illness with one-half developing at least 1 mental illness during their lifetime, the commonest of which were anxiety and mood disorders. The impact of mental illness in children ranges from minor to severe disruptions in daily

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functioning, with serious deviations from expected cognitive, social, and emotional development to incapacitating personal and social impairments. Mental illness in children is further associated with a life-long risk of anxiety, depression, and suicide.⁶ In adults, mental illness leads to significant occupational impairments,⁷⁻⁹ heightened morbidity, and premature mortality from concurrent chronic diseases. Mental illness may further increase the risk for adverse health outcomes associated with cardiovascular disease, diabetes, obesity, asthma, epilepsy, and cancer¹⁰⁻¹² owing to lesser use of medical care and treatment adherence^{13,14} and concomitant abuse of tobacco and alcohol products.¹⁵ Moreover, the rates for injuries, both intentional (homicide and suicide) and unintentional (motor vehicle) increased by 2- to 4-fold in those with mental illness compared with the general population.^{16,17}

This paper reviews data from selected Centers for Disease Control and Prevention (CDC) surveillance and information systems that measured mental illness and the associated effects in US children⁶ and adults,⁷ and the global impact of mental illness.

METHODOLOGY OF SURVEILLANCE

Reeves and colleagues⁷ provide an overview of public health surveillance in adult mental illness. Perou and colleagues⁶ describe mental health surveillance in children. Surveillance in both reports involves the ongoing and systematic collection, analysis, interpretation, and dissemination of data used to develop public health interventions to reduce morbidity and mortality and improve health in their respective populations. The derived data are essential to the public health goals of reducing the incidence, prevalence, severity, and economic impact of mental illnesses. That information is used by public health officials, academicians, health care providers, and advocacy groups to track trends in mental illness prevalence and severity. It is also used to assess associations between mental illness and other chronic medical conditions in adults such as obesity, diabetes, heart disease, and alcohol and substance abuse; to identify populations at high risk for mental illness and target interventions, and prevention measures; and to provide outcome measures for evaluating mental illness interventions.

National Population Surveys and Reporting Systems

Adults and children

The National Health Interview Survey The National Health Interview Survey (NHIS) is a national survey administered by the National Center for Health Statistics on the health of the civilian noninstitutionalized US population. Its main objective is to monitor the health of the US population through the collection and analysis of data on a broad range of health topics by in-person household interviews. Approximately 40,000 households per year were interviewed as of 2010.

The National Health and Nutrition Examination Survey The National Health and Nutrition Examination Survey (NHANES), administered by the National Center for Health Statistics, is designed to assess the health and nutritional status of adults and children in the US. It collects information derived from interviews, physical examinations, laboratory tests, nutritional assessment, and DNA repositories. As of 2008, approximately 5000 persons per year were interviewed.

National Vital Statistics System The National Vital Statistics System assembles mortality statistics from death certificates filed in the US and is processed by the CDC.

National Violent Death Reporting System The National Violent Death Reporting System (NVDRS) is a population-based active surveillance system among participating

states administered by the CDC to provide a census of violent deaths that occur within participating states, including child maltreatment deaths, intimate partner homicides, and suicides, and legal intervention deaths such as when a decedent is killed by a police officer authorized to use deadly force.

National Survey on Drug Use and Health The National Survey on Drug Use and Health (NSDUH) is the primary source of statistical information on the use of alcohol, tobacco, illicit drugs, and nonmedical use of prescription drugs in the US. It collects data through in-person interviews with a representative sample of the noninstitutionalized population.

Adults

National Ambulatory Medical Care and the National Hospital Ambulatory Medical Care Surveys Two ambulatory surveillance surveys, the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey administered by the National Center for Health Statistics, collect sample data on the provision of ambulatory medical care services respectively in nonfederal, employed, office-based physician offices, and emergency room and outpatient departments of noninstitutionalized general and short-stay hospitals. In 2007, data were provided to the National Ambulatory Medical Care Survey on 32,778 visits. Survey data for the National Hospital Ambulatory Medical Care Survey is based on a nationally representative sample of 500 nonfederal short-stay (<30 days) hospitals.

Two other surveys, the National Hospital Discharge Survey and the National Nursing Home Survey, both administered by the National Centers for Health Statistics, provide national survey sample characteristics of inpatients discharged from nonfederal short-stay hospitals and Medicare or Medicaid licensed nursing homes.

Children alone

Autism and Developmental Disability Monitoring Network The Autism and Developmental Disabilities Monitoring network is a surveillance system conducted by the CDC to estimate the prevalence of autism spectrum disorders in 14 population-based sites. It uses health and educational records from health providers and schools.

National Survey of Children's Health The National Survey of Children's Health (NSCH) is a cross-sectional, random-digit, population-based telephone survey that collects information on the physical and emotional health of noninstitutionalized children age 17 years or younger to produce state and national estimates of child health and well-being.

School-Associated Violent Death Surveillance Study The School-Associated Violent Death Surveillance Study, conducted by the CDC in collaboration with the US Department of Education and the Department of Justice, describes the epidemiology of school-associated violent deaths and the potential risk factors for the deaths.

National Youth Risk Behavior Survey The National Youth Risk Behavior Survey (YRBS) monitors health risk behaviors that contribute substantially to the leading causes of death, disability, and social problems among children and young adults in the US using a 3-stage cluster design to produce a representative sample of public and private high school students in grades 9 through 12.

State-Based Surveys

Adults

The Behavioral Risk Factor Surveillance System The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of health surveys administered by

the Public Health Surveillance Program Office. It collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury through telephone interviews of 1 person (aged ≥ 18 years) from each household.

DIAGNOSTIC CLASSIFICATION OF MENTAL ILLNESS

Surveillance survey tools estimate the prevalence and trends in adult mental illness relying on symptom patterns. The diagnostic terminology used to describe mental illness diagnostic categories may vary. For example, depression could include major and minor depression, psychotic depression, depression not otherwise specified, bipolar disorder, dysthymia, moderate to severe depression, and mild depression. The American Psychiatric Association recognizes diagnostic categories based on symptoms observed by a health care professional or reported by the patient and classified mental disorders that are published in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)*.¹⁸ The WHO *International Classification of Diseases, 10th Revision, Clinical Modification*¹⁹ has defined mental illness categories that are congruent with but not identical to those in the DSM-IV-TR.

Childhood mental disorders include several categories that can be defined by the DSM-IV-TR,¹⁸ some of which are primary mental illnesses and others of which have a close association with a mental disorder. Attention deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder are behavioral disorders that frequently occur together characterized by developmentally inappropriate levels of inattention, hyperactivity, impulsivity, or a combination thereof that impairs functioning in multiple settings. The autism spectrum disorders are a group of neurodevelopmental disorders characterized by impairments in social interactions and communications, as well as restricted repetitive and stereotypical patterns of behavior that emerge in the first few years of life. Mood and anxiety disorders include a range of conditions commonly characterized by feelings of depression, exaggerated anxiety or fear, low self-esteem, or all of them that persist or repeat over period of months or years. Substance use disorders and substance use refers to the use of alcohol and illicit drugs such as marijuana and inhalants, which among children have social, financial, and health consequences. Tic disorders include chronic motor or chronic vocal tics, transient tic disorder, and Tourette syndrome, the latter characterized by persistent motor and vocal tics that last for at least a year. Although not a primary mental disorder, Tourette syndrome may have mental illness as an associated feature.

RESULTS

Adults

Population surveys

Among 10,279 adults in the NHANES the prevalence of depression was 6.8% (95% confidence interval, 5.8–7.8), higher in women (8.4%) than men (4.9%), age 40 to 59 years (8.4%) compared with those age 18 to 39 years (6.2%) or 60 years (5.1%). Non-Hispanic blacks showed higher prevalence of depression (9.7%) than Mexican Americans (7.2%) or non-Hispanics white (6.2%), with a preponderance in Southeastern states ($>10\%$). Among 198,678 adults in the BRFSS, the prevalence of depression was 8.2% (95% confidence interval, 7.8–8.6), higher in women (9.8%) than men (6.6%) age 40 to 59 years and 18 to 24 years (both 10.2%) than those 25 to 34 and 35 to 44 years (both 8.3%), or others greater than 55 years (6.1%) with a similar preponderance in Southeastern states. Psychological distress registered by the NHIS and the BRFSS 30 days before the survey was noted respectively in 3.2%

and 3.9% of respondents during 2009, with a preponderance in Southeastern states. An average of 3.5 mentally unhealthy days were reported in the BRFSS during the preceding 30 days; a lifetime diagnosis of anxiety was noted in 12.3% of adults in 2008. The NHIS reported a lifetime diagnosis of bipolar disorder and schizophrenia in 1.7% and 0.6% of adults in 2007, respectively.

Among 29,212 adults surveyed by the BRFSS for adverse childhood experiences during 2009 in 5 Southeastern states, 59.4% of respondents had at least 1 adverse childhood experience, and 8.7% reported 5 or more adverse childhood experiences, among them verbal, physical, sexual, and family dysfunction owing to incarceration, mental illness, substance abusing family member, domestic violence, or absence of a parent owing to divorce or separation.²⁰

National Health Care Surveys

According to the National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, during 2007 to 2008 an estimated 47.8 million ambulatory care visits were made by patients with primary mental illness, constituting 5% of all ambulatory care services in the US during that time period, of which the greatest proportion (31%) were for depression, followed by schizophrenia and other psychotic disorders (23%). According to the National Hospital Discharge Survey, mental illness was a primary diagnosis in 97.9 per 10,000 patients discharged from nonfederal short-stay hospitals in adults age 18 to 64 years. Mood disorders were the most common diagnosis followed by alcohol and drug use disorders so noted in 46.0 per 10,000 population age 18 to 44 years and 19.2 per 10,000 population in persons 65 years or older. Dementia and Alzheimer disease were the commonest diagnoses among nursing home residents with a primary diagnosis of mental illness, each increasing with age, mood disorders, and dementia in residents age 65 to 84 years.

Children

Data from the most recent NSCH estimated the prevalence of depression among children age 3 to 17 years as 3% in 2007. NSDUH and NHANES estimated the prevalence of lifetime and past year major depressive episode from 2010 to 2012 to be 12.8% and 8.1%, respectively, among adolescents age 12 to 17 years, with a prevalence of depression in the preceding 2 weeks of 6.7%. According to the NHIS, 7.1% of children age 12 to 17 years ever had a diagnosis of depression, 3.5% had current depression, and 5.1% for had a diagnosis of depression in the past year. In 2011, the YRBS reported that during the past year, 28.5% of high school students age 14 to 18 years reported feeling so sad or hopeless every day for 2 weeks or more in a row that they stopped doing usual activities. This feeling was higher among girls (35.9%) than boys (21.5%), and higher among Hispanic students (32.6%) than white non-Hispanic (27.2%) or black non-Hispanic students (24.7%). The overall estimate of 28.5% of children feeling sad or hopeless was much higher than NSDUH for lifetime or past year MDA estimates of 12.8%, a finding that could have been related to differences in survey methodologies, including the setting and mode of completing the YRBS at school through a paper survey compared with a household member completing the NSDUH, as well as the assessment by YRBS of only a single symptom of depression, whereas NSDUH assessed whether individuals met criteria for an major depressive episode using formal criteria.

Parent-reported anxiety among children in the US estimated by the NSCH, focusing primarily on phobias in children age 2 to 17 years noted a prevalence of 4.7% ever having anxiety and 3% prevalence of current anxiety disorders. NHANES noted that the prevalence of self-reported generalized anxiety disorder in 0.7% and phobias

and fears in 2.6% of respondents. NHANES estimated that a prevalence of 8.3% of adolescents age 12 to 17 years who self-reported 14 or more mentally unhealthy days in the past month as a marker of mental distress.

Data on suicide gathered from the National Vital Statistics System and NVDRS in 16 states reported an overall suicide rate for children age 10 to 19 years of 4.5 per 100,000 in 2010 (National Vital Statistics System), and 4.2 suicides per 100,000 between 2005 and to 2009 (NVDRS). White non-Hispanic children and non-Hispanic children of other races had higher rates of suicide than black non-Hispanic and Hispanic children, with the commonest modes of injury being hanging, suffocation, and firearms. Among those who died of suicide reported by the NVDRS, 29.5% disclosed an intent to die by suicide before the act, 35.5% had a diagnosed mental disorder at the time of death, and 26.4% were under treatment for a current mental disorder at the time of death with 21% overall having made a previous attempt.

DISCUSSION

The CDC national surveys such as the NHANES and NHIS and numerous other national tracking systems are useful for developing national policies and tracking progress toward national health goals for children and adults. The CDC BRFSS survey provides data at the state and substate and local levels that can be used for both national and state-level planning. Mental health disorders are substantial public health concerns because of their prevalence, early onset, impact, and associated costs to the child, family, and community. A total of 13% to 20% of children living in the US experienced a mental disorder in a given year and surveillance during 1994 to 2011.⁶ The findings of this new report from the CDC are the first to describe the number of US children age 3 to 17 years who have specific mental disorders where there is recent or ongoing monitoring. There were, however, notable variations depending on whether the children or parents self-reported as well as the mental health descriptor that was used, notably in depression and anxiety disorders. For example, based on self-reporting in the NSDUH, the prevalence of lifetime and past year major depressive episode among adolescents from 2010 to 2011 was 12.8% and 8.1%, respectively. Parent reporting data from NSCH and NHIS noted a prevalence of ever having a diagnosed depression of 7.1% among adolescents age 12 to 17 years. The prevalence of unhealthy days for 2 or more weeks in the past month was 6.7% according to NHANES, with 28.5% of high school students age 14 to 18 years self-reporting sadness or hopelessness almost every day for 2 weeks or more causing them to stop usual activities (YRBS). Depression was higher among adolescent girls, and higher among Hispanic than white non-Hispanic or black non-Hispanic students.

The prevalence of parent-reported anxiety among children age 2 to 17 years was 4.7% for ever being anxious and 3% for a current anxiety disorder. The prevalence of self-reported mentally unhealthy days dichotomized at 2 or more weeks in the past month as an indicator of the severity of depression and anxiety disorders was 8.3% overall. The overall suicide rate for persons aged 10 to 19 years was 4.5 suicides per 100,000 persons in 2010. Adolescent boys age 12 to 17 years were more likely than girls to die by suicide, as were white non-Hispanic children and non-Hispanic children of other races than black non-Hispanic and Hispanic children. The commonest modes of suicide were hanging, suffocation, and firearm-related injury.

An estimated 25% of adults in the US had a mental illness in the previous year, and 6.8% of adults reported moderate to severe depression in the 2 weeks before completing a survey according to the NHANES. Although the present surveys focused on depression, the National Epidemiologic Survey on Alcohol and Related conditions

and the National Comorbidity Survey Replication estimates 14% and 18%, respectively, suffered from an anxiety disorder.^{5,21} Anxiety disorders were as common in the population as depression and, like depression and severe psychological distress, they can result in high levels of impairment. The pathophysiologic characteristics of anxiety disorders are similar to those of depression and often are associated with the same chronic medical conditions.^{22,23}

It was of interest that Southeastern states reported higher rates of depression in most categories. Future national and state-level mental illness surveillance should measure a wider range of psychiatric conditions and include anxiety disorders. Many mental illnesses can be managed successfully and increasing access to and use of mental health treatment services could reduce substantially the associated morbidity to the individual and society.

MENTAL ILLNESS AND THE MILLENNIUM DEVELOPMENT GOALS

There is compelling evidence that in developing countries mental illness is among the most important causes of sickness, disability, and in certain age groups, premature mortality.¹⁵ It has been suggested that addressing mental health may be an integral part of health system interventions aimed at achieving some of the Millennium Development Goals (MDGs).²⁴ Population-based studies of the risk factors for depression and anxiety show that poor and marginalized people were at greater risk for preventing attainment of MDG 1, the eradication of extreme poverty and hunger.²⁵ A major reason why children may not be able to enroll or complete primary education, preventing attainment of MDG 2—the achievement of universal primary education, may be related to developmental and mental disorder, and learning disability.²⁶ MDG 4, the reduction in child mortality, may be associated with mental illness in pregnancy. Early childhood failure to thrive in babies less than 1 year was independently associated with depression in pregnancy among South Asian mothers.²⁷ A cohort study of depressed Pakistani mothers were at 5-fold greater risk to give birth to an underweight baby compared with nondepressed mothers, even after adjustment for confounders including socioeconomic status.²⁸ The association of low birth weight with depression during pregnancy was replicated in an India-based study.²⁹ Up to 30% of mothers suffer from postpartum depression in rural India,³⁰ urban South Africa,³¹ and Vietnam,³² impacting on MDG 5, and improving maternal health. Moreover, suicide is a leading cause of maternal death in developed countries.³³

GLOBAL BURDEN OF MENTAL ILLNESS

In a given year, about 30% of the population worldwide is affected by a mental disorder and more than two-thirds of those affected do not receive the care they need. With 14% of the global disease burden attributed to neuropsychiatric disorders, 1 in 17 people have a serious mental health condition.⁴ The projected burden of mental health disorders is expected to reach 15% by 2020, when common mental disorders will disable more people than complications arising from AIDS, heart disease, traffic accidents, and wars combined. Almost 28% of disability-adjusted life-years were globally attributed to neuropsychiatric disorders in 2005.³⁴

Roughly 10% to 20% of children are affected by 1 or more mental or behavioral problems,³⁵ with estimates from the Western Cape region of South Africa of 17% that have a mental disorder.³⁶ In conflict areas such as Mosul, Iraq, the prevalence of mental illness can be 35%.³⁷ Only 15% to 30% of children worldwide receive the treatment they need.³⁸

GLOBAL INEQUALITIES IN MENTAL HEALTH

According to the WHO, health inequalities are defined as ‘differences in health status or in the distribution of health determinants between different population groups’.³⁸ They deter access to care, use, and outcomes of care, affecting all geographic regions whether rural or suburban, as well as both genders, racial and ethnic background, and sexual orientation. In almost all nations the poor are at a higher risk of developing mental disorders compared with the nonpoor. Poverty is both a determinant and consequence of poor mental health in that mental illness may increase the likelihood of living in poverty, because of its influence on functionality and ability to get or sustain employment.^{39,40} In many developing nations, resources and infrastructure are scarce, and the advocacy and political is deficient limiting effective mental health legislations and interventions.³⁸ Families of people with mental health problems are often marginalized and are limited in their ability to champion for mental health issues owing to the stigma associated with these disorders. Although some progress is being made⁴¹ to address the challenges posed by mental health problems, the burden of mental disorders in developing countries is compounded by high rates of stigma and discrimination.^{42,43}

Stigma, myths, and misconceptions surrounding mental illness contribute to the discrimination and human rights violations experienced by people with mental illness in many developing countries,⁴⁴ with the result that they may be judged inaccurately by community and family members, and unnecessarily restricted in the rights to work, go to school, marry, and participate in community and family functions. The stigma of mental illness may pervade the medical establishment and trainees, many of whom in Spain,⁴⁵ Saudi Arabia,⁴⁶ and Romania⁴⁷ voiced negative attitudes and a reluctance to specialize in psychiatry. In developing nations and communities with limited availability of modern mental health services and providers, there may be a reliance on nontraditional health and healing practices.^{48,49}

There may be unmet medical needs in patients with mental illness in developing nations. Patients may leave the hospital without knowing their diagnosis or what medications they are taking, wait too long for referrals, appointments, and treatment, or may not be respected or given adequate emotional support.⁵⁰ In many communities, the burden of caring for the sick may be placed on women and children because of the high adult morbidity and mortality owing to human immunodeficiency virus/AIDS and other infectious diseases. This has resulted in age and gender inequities in primary caregiver’s responsibilities for people living with mental illness. The increased international migration of health workers from developing to the developed nations and internal migration from rural poorer communities to wealthier urban communities in the developing nations has led to shortages of mental health care workers^{51–53} a majority of people with mental illness in developing nations go untreated despite the availability of effective treatment. These large treatment gaps are not surprising, given that in many developing countries there is no budget for mental health services.

INTEGRATING MENTAL HEALTH INTO PRIMARY CARE

With a mismatch of mental health resources to those in need varying from 1 psychiatrist for every 100,000 people in much of Southeast Asia, to less than 1 for every 1 million people in sub-Saharan Africa,³⁸ there is a scarcity of psychiatric hospitals that are typically located in urban settings and away from family members. A key strategy for addressing inequalities in mental health care has been to integrate mental health within other primary care services.^{54,55} The reasons for integrating mental health into primary care would generally make it affordable and cost effective,

promoting access and respect. Community mental health services can help to reduce social stigma and discrimination by reducing the social isolation, neglect, and institutionalization of people living with mental health problems.

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