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An economic evaluation of manic-depressive illness–1991

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Abstract

In 1991, the costs for manic-depressive illness, which has a lifetime prevalence of 1.3% among adult Americans, totaled $45 billion. Costs were broken down into their direct and indirect components. Direct costs totaling $7 billion consist of expenditures for inpatient and outpatient care, which are treatment related, as well as nontreatment-related expenditures such as those for the criminal justice system used by individuals with manic-depressive illness. Indirect costs, which were $38 billion, include the lost productivity of both wage-earners ($17 billion) and home-makers ($3 billion), individuals who are in institutions ($3 billion) or who have committed suicide ($8 billion), and caregivers who take care of manic-depressive family members ($6 billion). The method for determining each expenditure is provided, and the implications of these staggering costs are discussed. These calculations rely heavily on methods and data bases that were developed for the accompanying paper on the costs of schizophrenia.

Introduction

The economic costs of manic-depressive illness have rarely been assessed [1]. Manic-depressive illness has a lifetime prevalence of 1.3% in the American noninstitutionalized, adult population; in 1991 almost two and a half million adults would be diagnosed as having manic-depressive illness at some point during their lives [2]. The cost of these individuals to the country includes not only their heavy use of psychiatric and other services, but the lost productivity of both the ill and those whom they affect directly. While bipolar disorder (I and II) is the DSM-III R [3] designation for this illness, we will use the term manic-depressive illness, which is both more traditional and descriptive [4]. The purpose of this study is to provide an estimate of the direct and indirect economic costs of manic-depressive illness to the United States for 1991 (Table 1).

Methods

Direct costs were initially determined for the year closest to 1991 for which data were available and adjusted to 1991 values by the Medical Care Consumer Price Index (CPI-U) [5]. Since indirect costs were more difficult to sort into their appropriate index components, the CPI-U for all indexed items was used in these computations. The notation $_{\text{ADJ–CPI}}$ indicates that a cost underwent the appropriate CPI-U adjustment.

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The estimated 1991 costs included the 50 states, the District of Columbia, and the five United States territories. Hospital costs were generally determined by using the mean daily censuses, rather than admission or discharge rates. The notation $_{ADJ–POP}$ indicates that an adjustment was made for population increases [6].

Direct costs

Public institutions and third-party health payers such as Medicaid, Medicare, Blue Cross/Blue Shield, and other public and private health care organizations have administrative costs associated with processing claims and with the collection and distribution of tax revenues and premiums. To account for these costs, we added 8.6% (the 1990 published administrative cost for Blue Cross/Blue Shield) [7] to all direct care expenditures except those provided directly by the federal government, which presumably include these administrative expenses in their cost estimates. The notation $_{ADS–INS}$ indicates that insurance overhead was added.

A recent study has estimated that the lost opportunity capital costs of the Veterans Administration hospitals are 6% of other operating expenses for inpatients, and 4% for outpatients [8]. We used these values to estimate the lost opportunity capital costs for other government institutions (no value was given to lost opportunity capital cost for private facilities, although it is arguable that there should be such an estimate for private, not-for-profit institutions). For institutions where inpatient and outpatient costs are aggregated, we used the 6% value since we expect most of the costs would be attributed to inpatient care. The notation $_{ADJ–CAP}$ indicates that the appropriate capital costs were added.

At times, data sources did not distinguish between individuals suffering from manic-depressive illness and those suffering from the more broadly defined and inclusive diagnosis of affective disorders. When data were provided only for affective disorders, a ratio was used to determine how many of those were manic-depressive. This ratio was based on the 1-year prevalence of each subgroup in psychiatric facilities [9]. Since the inpatient prevalence of manic-depressive illness was 2.2% and that of major depression was 4.4%, a ratio of 0.33 [2.2/6.6] was used.

A portion of the estimated direct expenditure attributable to manic-depressive illness would have occurred had the individuals not been manic-depressive. For example, a number of individuals would be in jails and prisons regardless of whether or not they were manic-depressive. To allow for this assumption, the lifetime prevalence of manic-depressive illness in the general population (1.3%) was subtracted from the lifetime prevalence of manic-depressive illness in jails, prisons, and shelters. The notation $_{ADJ–NOR}$ indicates the subtraction of this lifetime prevalence. A similar adjustment was not made for crime and the criminal justice system since these baseline expenditures were based solely on patients admitted to psychiatric hospitals; individuals who were not hospitalized in the last year were not considered to have contributed to the crime expenditure.

Total inpatient care

The average annual expenditure was calculated for private hospitals, state and county mental hospitals, Veterans Administration hospitals, nonfederal general hospitals, multiservice hospitals, the Indian Health Service, and the Department of Defense. The percentage of patients who were being treated for manic-depressive illness was assessed [10, 11]. Insurance and capital costs were added to the total wherever applicable. Since one-third of the professionals who see patients in private hospitals bill separately for their services, the costs per bed per year for these services were added to the private hospital total [12, 13].

The figures obtained from the Department of Defense reflect the total mental health care costs of direct health care. All active duty servicemen (including those from the public health service), retirees, the dependents of both, and a small percentage of others (designees of the Department of Defense) are given care in hospitals run by the Department of Defense. Exceptions to this occur only if specific services are not available in those hospitals (for example - there is no heart surgeon), and in such a situation, CHAMPUS (Civilian Health and Medical Program of the Uniformed Services) supplies the care (G. Willauer, personal communication, 1992). The figures obtained from the Indian Health Service reflect only direct inpatient costs, since it was assumed that contract costs had been included elsewhere. These figures do not include the cost of alcohol and drug abuse (B. Douglas, personal communication, 1993).

The total inpatient expenditure for manic-depressive illness in 1991 was approximately $\$2{,}350\ \text{million}_{\text{ADJ–CPI, INS, CAP}}$.

Total outpatient care

Most hospital-based outpatient expenditures are included under inpatient care expenditures since most hospital data do not separate the two. This does not affect the totals, but it does inflate the inpatient expenditures at the expense of the outpatient costs.

The average annual expenditure for freestanding outpatient clinics, Veterans Administration, the Department of Defense, the Indian Health Service, and private care were calculated, and the percentage spent on manic-depressive illness for each was assessed. When applicable, insurance and capital costs were added to the total. Figures for Veterans Administration outpatient clinics included the share of administrative, research, and training expenditures attributable to manic-depressive outpatients in 1991.

We were unable to separate case management from the other service costs provided by inpatient and outpatient facilities. Part of case management expenditures are therefore included in the estimate of inpatient and outpatient expenditures. For a number of years, however, many communities have provided case management services that are independent from traditional mental health services. Since readily obtainable data from manic-depressive illness were not available, we used a ratio of schizophrenic individuals in shelters to manic-depressive individuals in shelters. We assumed that roughly the same proportion of individuals who required assistance from shelters would require assistance from case managers. This ratio was multiplied by the annual case management expenditure for

schizophrenia to obtain a case management estimate of the expenditure for manic-depressive illness [16].

The total outpatient expenditure for manic-depressive illness in 1991 was approximately $300 million$_{ADJ–CPI, INS, CAP}$.

Nursing home, intermediate, domiciliary, and partial care

In addition to traditional inpatient and outpatient care, the Veterans Administration operates intermediate care beds and domiciliary care facilities. The cost for the psychiatric part of these services was calculated (excluding pharmacy expenditures, nursing, and other overhead costs), and the percentage of that total used to treat manic-depressive illness was assessed. Capital costs were not added to domiciliary care since these patients are treated in their homes.

In 1991, the total nursing home, intermediate and domiciliary care, and partial care center expenditure for manic-depressive illness was approximately $2,980 million $_{ADJ–CPI, INS, CAP}$.

Medication

The cost of medications used to treat manic-depressive illness in most inpatient, other institutional, and some outpatient settings are included as part of the aggregate expenses in the appropriate sections. We assumed, however, that the outpatient expenditure for medications was not included in previous estimates. A recent study of the adult, noninstitutionalized population has estimated that 237,153$_{ADJ–POP}$ individuals were taking antimanic medications in 1991 [17]. Because lithium is the drug of choice for the treatment of manic-depressive illness and because it is rarely prescribed for other conditions, we assumed that all the people taking lithium in that household sample were individuals with manic-depressive illness (any lithium used to treat other disorders would be more than counterbalanced by the additional medications used by manic depressive patients that are not included here). The average cost and quantity of lithium per patient was assessed and multiplied by the number of individuals using lithium [18]. We assumed a daily dose of 1200 mg lithium for each patient.

In addition to medication costs, there are expenses associated with maintenance therapy for individuals with manic-depressive illness. We estimated that manic-depressive individuals have blood drawn for lithium levels six times a year, and that they have a thyroid-stimulating hormone assay (TSH) biannually. The cost for this testing was added to the total cost of lithium medication.

The 1991 total expenditure for outpatient medication for individuals with manic-depressive illness was approximately $130 million$_{ADJ–POP, INS}$.

Substance abuse

Only those items that had not been counted elsewhere were included in the alcohol and drug abuse total. These were: alcohol and drug abuse specialty and federal institutions, short-stay

hospitals, office-based physicians, support costs, motor vehicle crashes, and social welfare administration [19].

In 1991, the total expenditures for treating substance abuse in individuals with manic-depressive illness was approximately $720 million$_{ADJ–CPI}$.

Supported living and shelters

Surveys differ greatly on the number of individuals who are mentally ill and homeless, and the expenditure for services received by these individuals has not been adequately calculated. Much of the cost for the services has been included elsewhere (for example, use of the criminal justice system) in our calculations. Other expenditures, such as provision for minimal living expenses, are transfer costs. The cost of shelters, however, which provide a number of services not found in ordinary housing, has not previously been estimated.

Surveys of shelter users are relatively consistent in their finding that a high percentage of individuals with psychiatric disorders use shelters. Our estimate of the percentage of manic-depressive individuals in the shelter population is the average from several studies, and is undoubtedly a conservative estimate [20]. Rates of manic-depressive illness among a homeless sample drawn from meal centers or day programs, in addition to shelters, tend to hover around 10%, compared to the 4.4%$_{ADJ–NOR}$ lifetime prevalence that we obtained. Our numbers, however, reflect only shelter use, and we have further subtracted the lifetime prevalence of manic-depressive illness from this number since it might be expected that these individuals would be using shelters in a manner consistent with their representation in the general population.

In 1991, the total expenditure for shelter care for individuals with manic-depressive illness was approximately $80 million$_{ADJ–CPI, NOR}$.

Crime (legal/trial, prison/jail, and property loss)

Unfortunately, our efforts revealed little on the rate of crimes committed by individuals with manic-depressive illness. This dearth of information is partially due to the fact that rates for individuals with manic-depressive illness are often included in the larger category of “affective disorders.” In general, individuals with affective disorders do not usually exhibit violent or illegal behavior. For example, individuals who are depressed are likely to be severely underdiagnosed in the jail and prison population. A quiet prisoner, who never causes trouble, and barely speaks, is unlikely to be noticed. Still, prevalence rates for manic-depressive prisoners are high. Because no jail prevalence rate was readily available, the prison prevalence rate was also used to calculate the cost of manic-depressive individuals in jails [9]. The costs for jails and prisons were determined by estimating the number of prisoners who suffer from manic-depressive illness and then calculating how much it cost to keep each one of those prisoners annually [12, 21–23].

Further crime costs included the cost of police and fire contact, pretrial investigations, property damage, and adjudication costs, Estimates of lost victim productivity are included in these calculations. Because so little reliable information existed about the involvement of individuals with manic-depressive illness in these activities, we calculated this cost from a

ratio derived for schizophrenia. The percentage of schizophrenic individuals to manic-depressive individuals in prison is very similar ($5.2\%_{ADJ–NOR}$ compared to $5.7\%_{ADJ–NOR}$). Based on that ratio (110%), we derived the costs of crime for individuals with manic-depressive illness [16].

In 1991, the total crime expenditure for manic-depressive illness was approximately $2,260 million$_{ADJ–NOR, CAP}$.

Suicide and suicide attempts

This calculation deals only with the direct costs of suicide. Lost productivity from the early death of manic-depressive individuals is considered under indirect costs.

For each attempted suicide, there exist medical costs. It was assumed that individuals with manic-depressive illness make only one such suicide attempt in their life (this is undoubtedly a gross underestimate), and that it is a serious attempt (to some degree, this assumption may overestimate the cost of suicide attempts and counterbalance our previous underestimate). To estimate the number of suicide attempts per year, we assumed that they take place entirely during the first year of illness and calculated the number of suicide attempts from the mean age of onset and the lifetime prevalence of manic-depressive illness at that age [9]. The emergency medical costs associated with these attempts were based on data obtained from CHAMPUS [13].

Each completed suicide is associated with investigational costs. We assumed that those individuals with manic-depressive illness who completed suicide had no medical costs associated with the suicide aside from those associated with any natural death, so that the only additional costs would be attributable to police and coroner's investigations. The lifetime prevalence of suicide in individuals with manic-depressive illness, the cost of these investigations, and the total number of individuals with manic-depressive illness was used in this calculation.

In 1991, the total direct suicide expenditure for manic-depressive illness was approximately $190 million$_{ADJ–POP, CPI}$.

Research and training costs

In 1991, National Institute of Mental Health (NIMH) grants supporting any study or training in manic-depressive illness totaled over $71 million$_{ADJ–CPI}$ (C. Willabee, personal communication, 1992). There exist, however, two sources for such funding. The first of these includes support for programs specifically targeted at manic-depressive illness. That is, 100% of the budget of these programs goes to the illness. The additional amount comes from other support where manic-depressive illness is not the only target of the effort. To calculate how much of the above total had manic-depressive illness as the sole focus, it was necessary to develop a ratio. This ratio was based on the two research values for schizophrenia, and, when multiplied by the total figure, totaled roughly $37 million$_{ADJ–CPI}$ [16]. In addition, states, private organizations, and pharmaceutical companies contribute about $10 million to this research, making the total 1991 expenditure for research and training costs for manic-depressive illness approximately $47 million$_{ADJ–CPI}$.

Transfer costs

A portion of the calculated direct costs attributable to manic-depressive illness, namely that for food, clothing, lodging, and basic medical expenses are basic costs of living and would be incurred whether or not the individual had manic-depressive illness. These costs should therefore not be attributed to manic-depressive illness and are subtracted from the total direct costs. To estimate these costs, we used the poverty level for a one-person household under the age of 65 years [25]. The number of individuals with manic-depressive illness occupying hospital, nursing home, shelter, jail, prison, and Veterans Administration intermediate and domiciliary beds was calculated and multiplied by the basic cost of living.

In 1991, transfer costs for manic depressives totaled approximately $1,300 million$_{ADJ–CPI}$.

Indirect costs

Indirect costs are lost productivity–the lost earnings or wages of those unable to work or partially disabled because of manic-depressive illness, those living in institutions as a result of the illness, those families that care for individuals with manic-depressive illness, and those who committed suicide as a result of that illness. Individuals aged 65 years and over were not included since had they been healthy, many would have been retired and no longer compensated for their work.

For those who would have been paid for their productivity, we used total compensation rather than wages, since compensation includes not only wages and salary payments to full-time workers, but also executive bonuses, tips, payments-in-kind, employer contributions for social security insurance, director fees, private pensions, welfare funds, etc., all of which provide a more complete picture of productivity. Lost wages were used for individuals who normally would not have been paid for their productivity (i.e. homemakers) [25].

Lost wages (including suicide)

Lost wages included those from family members of individuals with manic-depressive illness who either could not work at their full capacity or could not work at all because they needed to take care of their sick family member, the lost wages of either partially or totally disabled manic-depressive homemakers, the lost wages of individuals with manic-depressive illness who were in institutions, and the lost wages of those who committed suicide.

Family caregivers are largely, but not exclusively, parents who are taking care of their manic-depressive child. These parents may have wished to reenter the work force after their families had grown, or they may have returned to school to improve their position in the work force. Similarly, many who receive wages must take time away from work to care for their family member and therefore are less well compensated than they would have been otherwise. Since we only considered individuals 18 years or older in this cost-estimate, we assumed that the family who takes care of an ill family member is doing so instead of working for compensation. As a result, the lost wages of family members were calculated by estimating the number of hours spent annually with a sick family member and then finding out how much that time was economically worth [26]. It was estimated that non-NAMI (National Alliance for the Mentally Ill) families spent one-third the amount of time with

their family members as NAMI families. This was an arbitrary figure, but nonetheless provides an estimate of the lost wages for all families of individuals with manic-depressive illness.

The lost wages of homemakers were calculated by estimating the number of manic-depressive home-makers (based on the number of homemakers in the general population), the percentage of those who were totally disabled (the same percentage as those totally disabled in the manic-depressive work force), and the percentage of partial disability in the rest. These numbers were multiplied by the average estimated wage for a homemaker.

In 1991, individuals with manic-depressive illness between the ages of 18 and 65 years occupied 121,445 beds in psychiatric institutions, shelters, nursing homes, jails, and prisons. During their stay at the institution, the individuals occupying those beds could be considered to be nonproductive. The above estimates of lost productivity are based on household samples and therefore fail to take this population into account. To calculate the lost productivity of these individuals, we multiplied the number of beds they occupied by their weighted mean earnings (wages for homemakers and compensation for full-time workers).

A total of 13,255 manic-depressive individuals committed suicide in 1991. The conventional method for estimating their lost productivity is to project their earnings for the rest of their lives and discount them into 1991 dollars. There are at least two alternatives that consider the effects of past deaths on current productivity; the “cohort method” and the “steady-state method.” The cohort method examines what would have happened to productivity had the individual not died in the past. It adjusts for both changing populations and the increased earnings of individuals who were not old enough to have reached their maximal earning at the time of their death. The steady-state method, which we used because of its simplicity, assumes that the same number of people die each year from an illness. The lost productivity therefore depends on the number of years an individual would be expected to be productive, the average age of retirement, and the number of people who die during the base year (1991). This method, while simple, overestimates the loss by using the number of individuals dying in the present year, which, in a growing society, will be higher than the number who died in the past. At the same time, it underestimates the lost productivity by failing to consider that healthy individuals would be paid greater salaries later in life.

The lost wages from suicide were determined by first calculating the mean age of individuals with manic-depressive illness who kill themselves, a figure that was obtained by taking the average suicide age from a number of studies [27, 28]. The mean age of suicide was then subtracted from the average age of retirement (65 years) to estimate the number of lost productive years. This number was multiplied by the number of individuals with manic-depressive illness who killed themselves in 1991 to obtain the number of lost person years, which in turn was multiplied by the weighted mean earnings for 1991.

In 1991, the total lost wages for individuals with manic-depressive illness, including the productivity lost due to family caregiving, disability in homemakers, suicide, and those individuals with manic-depressive illness in institutions, was approximately $20,060 million$_{\text{ADJ–POP, CPI}}$.

Lost earnings

Lost earnings included the compensation received by adult workers who were not working (and who would have been working had they not been ill) and those who were working but partially disabled by their illness. In 1991, the total lost earnings for individuals with manic-depressive illness were approximately $17,574 milion$_{ADJ–CPI, POP}$.

Total

In 1991, the total cost of manic-depressive illness was approximately $45,210 million.

Discussion

In 1991, the direct and indirect costs of manic-depressive illness for the United States, the District of Columbia, and the territories totaled approximately $45 billion or about 70% of the costs for schizophrenia. The direct costs were $7 billion. While the direct expenditures were high, clearly the indirect or lost productivity costs were much higher. In a certain sense, these are “what if” costs. When considered as a percentage of the gross domestic product (GDP), they are counted in the numerator but not in the denominator (since they did not happen). Furthermore, lost productivity costs attributable to household work are not normally considered in estimating the GDP. It is apparent that if one added up the direct and indirect costs for all illnesses, as well as for other undesirable events such as crime and pollution, the number might equal or surpass the GDP itself.

It is important to emphasize that manic-depressive illness and other disorders take a terrible toll on the quality of life of these ill individuals and on those around them. Furthermore, if these individuals were healthy, they would be contributing to the total productivity of the nation and increasing the tax base. This is particularly true of manic-depressive illness, which usually does not emerge until much of one's formal education is finished. The high indirect costs, especially, can only crudely reflect the devastation that this illness causes for millions of individuals.

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Table 1

Costs of manic-depressive illness-rounded totals in millions[a]

Direct costs			
Treatment-related	Total inpatient costs	$2,350 million	
	Total outpatient costs	$300 million	
	Total nursing home, intermediate, domiciliary care costs	$2,980 million	
	Medication	$130 million	
	Substance abuse	$720 million	
	Shelters	$80 million	
Non-treatment-related	Total crime (includes jails/prisons)	$2,260 million	
	Suicide	$190 million	
	Research/Training	$50 million	
Subtracted from direct costs	Transfer costs	$1,300 million	
Total Direct Costs			$7,570 million
Indirect costs			
	Lost productivity homemakers	$3,150 million	
	Lost productivity institutions	$2,860 million	
	Lost productivity suicide	$7,840 million	
	Lost family productivity	$6,220 million	
	Lost compensation	$17,570 million	
Total indirect costs			$37,630 million
1991 Total (direct and indirect)			$45,210 million

[a] All figures, including totals, are rounded from the original figures