Association of Mental Health With Health Care Use and Cost: A Population Study

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Objective: To compare the health costs of groups with and without psychiatric diagnoses (PDs) using 9 years of physician billing data.

Methods: A dataset containing registration data for all patients receiving public mental health service was constructed and subsequently matched, on age and sex, in a final patient to comparison patient ratio of 1:8, with health care users who did not receive treatment in the mental health system. Three groups emerged: a patient PD group—patients with psychiatric disorders treated in public mental health care (n = 76 677); a comparison patient PD group—comparison patients with PDs treated in physicians only (n = 277 627); and a patient–comparison patient non-PD group—patients (treated in specialized publicly funded care or by their physician) without PDs (n = 329 177). Examining over 42 million billing records for all of these patients, we compared the average number of visits and the average health only (nonpsychiatric) billing cost per each patient during the 9-year study period across the groups.

Results: Among all health care users in the data, the health costs (Total Costs – Mental Health Costs) were greater on average for the patients with PD group ($3437) and the comparison patient PD group ($3265), compared with patient–comparison patient non-PD group ($1345). Forty-six percent of the comparison sample had a PD.

Conclusions: Having a mental health problem is related to greater health-related expenditures. This has important policy implications on how mental health resources are constructed and rationed within the health care system.

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Clinical Implications

- The health costs associated with mental health disorders were disproportionately high in 46% of the randomly selected comparison patient population, hence comorbid PDs always need to be considered in standard assessment and screening.
- Only a fraction of the patients with PDs received specialized treatment, hence mental health investment policy needs to focus on expanding access.
- The cumulative 16-year population rate of PDs for patients was of epidemic proportion.

Limitations

- The sample consists of only 9 years of billing data.
- The billing format underestimates all direct and indirect PD costs.
- The caseness or validity of each PD was unknown, although each psychiatric diagnosis had the same potential bias.

Key Words: *health cost, psychiatric diagnosis, population study*

Worldwide, mental disorders are among the most prevalent and disabling illnesses, consuming a large share of health care resources.[1] In the United States, spending on mental health treatment reached $104 billion in 2001 and 7.6% of all health care spending.[2] In the 2003/04 fiscal year, Canada spent $6.6 billion and about 4.8% of the total health budget on mental health.[3,4] According to one recent study, the mental health proportions of the total health budget of some other developed countries are 12.1% for Britain, 10.0% for Germany, 8.0% for the Netherlands, 8.0% for Denmark, 6.8% for Ireland, and 6.7% for Australia.[4]

With rising health care costs, priority setting becomes a top concern of policy-makers. Evidence regarding direct and indirect costs of mental health is therefore essential to understand how best to optimize resources allocation.

Previous studies[5–20] have associated mental illness with higher overall health care use and costs. However, these studies either focused only on mental health use and cost,[5] or examined the link between mental health and overall health care use and cost in specific settings, such as primary care[7–8,11–14] or emergency care.[20] Many of the previous studies lack comparable health care cost measures. Most importantly, the samples used in these studies were not population-based and were limited in size.

Our paper presents results from a large population-based health care use study in the Calgary Alberta catchment (total estimated population, 1.2 million). We examined 9 years of physician billing data, comparing the physical or somatic care (nonmental) health costs for 3 main groups: a patient group, comprised of those who were public mental health care users; a comparison patient group, comprised of those given any mental disorder diagnosis by their physician during the study period; and a combined patient–comparison patient group, comprised of those who did not have any PDs in the dataset resulting from physician billing.

Methods

Canada has a universal, publicly funded, health care system. In each province, health services that are categorized as medically necessary, such as physician visits (for example, the diagnosis-based billings analyzed in our paper) and access to specialized ambulatory, emergency, and inpatient health treatment are funded under the public provincial health plan. In addition, physicians serve as a gatekeeper for specialist care. Most people voluntarily seek help for mental disorders. Among other entry points to specialized mental health services, people requiring mental health care are treated or referred by their physician (who submits a bill based on a diagnosis for each visit). In addition to physical diagnoses, mental disorders in the dataset under study include ICD-9 codes 290–319. On receiving a referral, patients will then be assessed for treatment in the public (specialized ambulatory, emergency, or inpatient) mental health system. If admitted, they will receive specialized mental health treatment for more intractable or complex mental disorders.

For each patient visit, physicians bill the provincial health plan directly to receive payment for the physical and mental health services they deliver. Each billing has, at minimum, 1 and, at most, 3 ICD diagnoses. The data examined in our study consisted only of physician billings to Alberta Health and Wellness from the Calgary Zone in Alberta, based on the provincial billing schedule. Ambulatory and emergency–inpatient databases will be considered in separate papers. Physician billing data represents the records of all health services rendered by physicians to people in the population seeking health care on a specified date for a specified problem and assigned an ICD (International Statistical Classification of Diseases and Related Health Problems) diagnosis. More details on the data source, population, and provincial mental disorder prevalence rates are available.[21] The patient group consisted of all health records from 1994 to 2003 of people who received care within the publicly funded emergency, inpatient, and (or) ambulatory mental health services. The comparison patient group consisted of those not receiving any publicly funded mental health services. A patient–comparison patient data file of physician billing data consisting of 683 481 people was created in a 1:9 patient to comparison patient ratio, matched on age and sex. About 1 in 9 of the comparison patient group did not have physician billing data, possibly because these people did not have or need to access to health care, or because they had migrated or died. The resulting patient to comparison patient ratio provided in the physician billing data, matched on age and sex, was 1:8. In summary, patients in the patient group received specialized mental health services, comparison patients did not. Nevertheless, patients and comparison patients could have received an ICD-9 diagnosis, code 290–319, associated with a physician billing to Alberta Health and Wellness.

The final analysis was based on a total of 42 102 130 billing records submitted by physicians to Alberta Health and Wellness both for patient and for comparison patient groups. These records included billing data related both to physical and to mental ICD-9 diagnoses. PDs during the billing period were based on ICD mental health diagnostic codes in the billing records. The data formed 3 natural groups of patients with multiple visits to the billing physicians: 1) those from the patient and comparison patient sample without any physician assigned PDs (patient–comparison patient non-PD group); 2) patients with physician-assigned PDs who came to mental health services (patient PD group); and 3) comparison patients with physician-assigned PDs who did not come to mental health services (comparison patient PD group).

Abbreviations

ICD	International Classification of Diseases
PD	psychiatric diagnosis

Table 1 Summary of visits for physical (nonmental health) contacts

Study group	*n*	Total visits	Mean	Minimum	Maximum
Patient–comparison patient non-PD	329 177	11 479 119	34.9	1	1634
Patient PD	76 677	7 841 514	78.7	1	155
Comparison patient PD	277 627	22 693 497	75.9	1	2350

Table 2 Average cost for physical (nonpsychiatric) contacts

Study group	*n*	Mean cost per patient 1994–2003 based on physician billings, $
Patient–patient comparison non-PD	329 177	1344.9
Patient PD	76 677	3437.3
Comparison patient PD	277 627	3264.6

Health care cost was recorded in the dataset as the total amount paid by the provincial health plan to the physician for each visit—this is the cost under study totalled and averaged in each of the 3 groupings. Inpatient, emergency, and ambulatory costs are in independent databases and will be considered in a separate study. In calculating health costs, health costs were summed across each group, except that mental disorder billings were subtracted. Up to 3 ICD diagnoses could be assigned for each visit. If any one of these diagnoses was a PD, then the total cost for the visit was coded as a PD cost. About 81.4% of the visits had a single ICD-9 diagnosis associated with a billing. As a result, the total health costs based on classification of visit data are marginally underestimated. Descriptive statistics (people per group, total visits, mean, and range) were calculated for the number of visits and the cost per patient for health care costs.

Results

Among the total number of visits, about 8.9% involved 1 PD, 0.14% involved 2, and 0.04% involved 3 PDs for any given visit. For all other visits, ICD-9 physical diagnoses were assigned by physicians for the purpose of billing. Table 1 shows the average number of visits accumulated for visits related to physical (nonpsychiatric) diagnoses during the 9-year period: 78.7 for the patient PD group, 75.9 for the comparison patient PD group, and 34.9 for patient–comparison patient non-PD group.

Average cost per person for physical (nonpsychiatric) contacts is presented in Table 2. For the patient PD group, the average cost per patient accumulated during the period from 1994 to 2003 was $3437; $3265 for the comparison patient PD group; and $1345 for the patient–comparison patient non-PD group. Of note is the total number billings.

Discussion

Our study results show a positive association between mental health and overall health care use and cost. Both physician visits and health care costs (exclusive of psychiatric visit costs) were substantially higher on average for patients with PDs, compared with those without PDs. This finding is consistent with the existing literature on the indirect cost of psychiatric illness. In addition, our results are consistent with those of Felitti,[22] who found higher levels of physical disorder and morbidity to be related to report of adverse childhood experiences. According to developmental psychopathology, early adversity is a harbinger of adult mental disorder.[23]

In addition, 46% of the comparison sample had a PD during the 9-year period. This is consistent with an earlier 3-year PD prevalence study using Alberta billing data that yielded 18% prevalence in Year 1, 28% prevalence in Year 2, and 35% prevalence in Year 3.[21] The 46% prevalence for 9 years represents a natural cumulative rate growth. These prevalence results are also in line with a recent study which found the 12-month prevalence of any Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, disorder in the United States to be 26.2%.[24] Of note, the total number of PDs in the comparison group represented only 4.5% of the total number of diagnoses made by community physicians. In keeping with other findings,[25] among those with a PD in our total sample, only 11.2% had access to specialized care (for example, were treated in the ambulatory, inpatient, or emergency mental health system). This finding indicates that the psychiatric need within the population is largely underserved, and their physical problems were comparable to those with PDs who were served.

About 5% of total health budget in Canada is spent on mental health.[3,4] Our study points out that a substantially higher proportion of the health budget is attributable to PDs, given that the presence of PD, on average, leads to the greater proportion of physical health costs and 46% of the population not treated by specialized mental health services.

There are several limitations of our study. First, psychiatric disorder diagnoses may be less accurate in the comparison patient PD group (those with a psychiatric disorder who did not receive any tertiary care), as these diagnoses were made by physicians who have less specialized psychiatric

training. Second, we did not adjust for severity of medical illness when comparing the health care use and cost among the 3 groups—an issue we intend to address in a future study, in which we will examine the associations between comorbidity and cost. Third, observational data used in our study do not allow us to establish a causal relation between psychiatric disorder and health care use and cost. Fourth, our data only include people with billing data and it did not include those apparently who did not seek any psychiatric or physical health care (one-ninth of the comparison sample). Hence the association between psychiatric health and health care use could be slightly overestimated. Similarly, it was noted in the end of the methods section that health costs within the groups with a PD assigned in the community could be underestimated.

Our next steps will take advantage of the longitudinal feature of our data to examine the dynamic of patient mix and clinical pathways over time. Examining clinical pathways, comorbidity, and costs at the population-based or catchment level may be used to identify groups with high physical health costs associated with PDs. Unlike our study, few studies have had sufficiently large population-based samples associated with this objective.[26] Our current sample permits examination of trajectories for specified clinical cohorts in terms of their start and endpoints within the billing period. Analysis of clinical psychiatric pathways in time, with associated physical problems taken into account, or the corollary, will better permit understanding of how clients move between primary care and more tertiary ambulatory or inpatient settings. Using the age-dependent trajectory details of physical health-related and psychiatric-related diagnoses, procedures, and costs will help to unravel pathways of care and may identify groups in which further integration of physical and mental health services may be indicated.

Systematic review indicates that, while economic analysis has progressed during the last 2 decades,[27] development of standardized and comparable approaches is still required.[28,29] The dataset related to our study is large enough to provide highly standardized comparison patients within a population.

The results of the current phase of our study point to the indirect impact of PDs on diagnoses related specifically to general health and mental health costs. While the results observed in our study establish an association between psychiatric conditions and higher health costs, we have much to learn about this relation in terms of sequence, path, and patient mix. Nevertheless, on first impression, these findings appear to have substantial implications for policy related to psychosomatic medicine and the need: to deliberately and actively optimize the rationing of limited mental health knowledge, education, and resources within health service systems; and for an increased focus on promotion, prevention, and early intervention—a call coming from multiple health and social domains over a long period of time. For example, in addition to health costs, epidemiologic evidence currently suggests an excess mortality in people with mental illness.[30]

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Résumé : Association de la santé mentale avec l'utilisation et le coût des soins de santé : une étude dans la population

Objectif : Comparer les coûts de santé de groupes avec et sans diagnostics psychiatriques (DP) à l'aide de données de facturation des médecins sur 9 ans.

Méthodes : Un ensemble de données contenant les données d'inscription de tous les patients recevant des services publics de santé mentale a été créé et subséquemment apparié, selon l'âge et le sexe, dans un rapport patient sur patient de comparaison final de 1:8, avec des utilisateurs de soins de santé qui ne recevaient pas de traitement dans le système de la santé mentale. Trois groupes sont ressortis : un groupe de patients DP — des patients souffrant de troubles psychiatriques traités par des soins publics de santé mentale (n = 76 677); un groupe de patients de comparaison DP — des patients de comparaison ayant des DP traités par des médecins seulement (n = 277 627); et un groupe de patients-patients de comparaison n'ayant pas de DP — des patients (traités dans des soins spécialisés financés par les deniers publics ou par leur médecin) sans DP (n = 329 177). Après avoir examiné plus de 42 millions dossiers de facturation pour tous ces patients, nous avons comparé le nombre moyen de visites et le coût moyen de facturation de santé seulement (non psychiatrique) pour chaque patient durant la période de 9 ans de l'étude, dans tous les groupes.

Résultats : Parmi tous les utilisateurs de soins de santé des données, les coûts de santé (coûts totaux – coûts de santé mentale) étaient plus élevés pour le groupe des patients ayant un DP (3 437 $) et le groupe des patients de comparaison ayant un DP (3 265 $), par rapport au groupe des patients-patients de comparaison n'ayant pas de DP (1 345 $). Quarante-six pour cent de l'échantillon de comparaison avait un DP.

Conclusions : Avoir un problème de santé mentale est lié à des dépenses de santé plus élevées. Cela comporte d'importantes implications sur la manière dont les ressources de santé mentale sont construites et distribuées dans le système de santé.