Brief Original Report

The economic burden of eating disorders and related mental health comorbidities: An exploratory analysis using the U.S. Medical Expenditures Panel Survey

Mihail Samnaliev [a], H. LeAnn Noh [b], Kendrin R. Sonneville [c], S. Bryn Austin [c]

[a] Clinical Research Center, Boston Children's Hospital, United States
[b] Analysis Group, United States
[c] Boston Children's Hospital, Division of Adolescent Medicine, Boston, MA, United States

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ABSTRACT

Background. Very little is known about the economic burden of eating disorders (ED) and related mental health comorbidities.

Methods. Using 5 years of data from the U.S. Medical Expenditures Panel Survey, we estimated the difference in annual health care costs, employment status, and earned income (2011 US$) between individuals with current ED compared to those without ED. We further estimated the contribution of mental health comorbidities to these disparities in health care costs, employment and earnings.

Results. Individuals with ED had greater annual health care costs ($1869, p = 0.012), lower but borderline significant employment rates (OR = 0.67, 95% CIs [0.41, 1.09]), and lower but not statistically significant earnings among those who were employed ($2093, p = 0.48), compared to individuals without ED. Among individuals with ED, the presence of mental health comorbidities was associated with higher but not statistically significant health care costs ($1993, p = 0.17), lower borderline significant odds of employment (OR = 0.41, 95% CIs [0.14, 1.20]), and significantly lower earnings ($19,374, p < 0.01).

Conclusions. Treatment and prevention of ED may have broader economic benefits in terms of heath care savings and gains in work productivity than previously recognized. This exploratory study justifies large scale evaluations of the societal economic impact of eating disorders and comorbidities.

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Eating disorders (ED) are relatively rare in the general population, but those affected often require long-term expensive treatment. Nearly half of all individuals with ED suffer from mental health comorbidities at some point during their lives, including anxiety, major depressive or other mood disorders, and behavioral disorders (Hudson et al., 2007; Swanson et al., 2011). While several economic evaluations have assessed the cost of ED treatment (Stuhldreher, 2012), the costs of treating mental health comorbidities have received little attention. Recent studies have also begun to measure the non-health care impacts of ED, including work productivity and impairment (Lynch et al., 2010; Mond & Hay, 2007); however, specific estimates of lost productivity associated with ED are still lacking. In a recent review of 18 economic evaluations of ED (Stuhldreher, 2012), none evaluated lost productivity in the US. Researchers are beginning to recognize that additional evidence of the full economic costs of ED is needed to more accurately evaluate the overall burden of disease and the cost-effectiveness of emerging ED treatment and prevention interventions (Crow, 2014). In this exploratory study, we measure the impact of ED on health care costs, employment status, and earnings in the US. We further explore the contribution of mental health comorbidities to these disparities in health care costs and lost productivity.

Methods

We used 5 years of data from the representative Medical Expenditures Panel Survey (MEPS) of the civilian non-institutionalized US population, which collects demographic, diagnostic, health care utilization, and associated cost data annually. We included all age groups (0 to 85), in order to estimate excess health care costs, adjusting for inflation (Bureau of Labor Statistics, 2012), representative of the entire US population with ED. We included a broad range of eating and related disorders, including anorexia nervosa (International Classification of Diseases, Ninth Revision (ICD-9) (Classification of Diseases and Injuries, 2014) 3071), bulimia nervosa or binge eating (ICD-9 30751), pica (ICD-9 30752), other eating disorders (ICD-9 30750, 30759), rumination disorder (ICD-9 30753) and psychogenic vomiting (ICD-9 30754). We identified mental health comorbidities, including schizophrenia, bipolar disorder, or major depression and a broad range of non-severe mental health disorders (ICD-9 codes 295.x to 302.x and 306.x to 315.x, excluding ED). We extracted total health care costs for all care provided during each calendar year. MEPS also collects data on

E-mail address: Mihail.Samnaliev@childrens.harvard.edu (M. Samnaliev).

Table 1
Characteristics of respondents to the Medical Expenditure Panel Survey, 2007–2011.

	MEPS respondents		MEPS respondents with ED	
	No ED N = 168,865	ED N = 86	No MH comorbidity N = 52	Had MH comorbidity N = 34
Age, mean (sd)	34.6 (22.4)	43.1 (21.5)*	45.8 (21.8)	39.0 (20.6)
Female, %	52.1	36.1*	21.2	58.8**
Education years, mean (sd)	10.8 (4.6)	13.1 (3.6)*	13.7 (3.1)	12.3 (4.2)
Household size, mean (sd)	3.6 (1.8)	2.7 (1.5)*	2.8 (1.6)	2.6 (1.3)
White, %	70.2	84.9*	82.7	88.2

MEPS = Medical Expenditures Panel Survey.
ED = eating disorders.
 * p < .05 compared to MEPS respondents without ED.
 ** p < .05 compared to MEPS respondents with ED who did not have behavioral health comorbidity. Statistical tests were conducted using non-parametric Mann–Whitney U tests for continuous and exact Fisher's test for categorical variables.

Table 2
Annual health care costs[a], odds of employment and earnings (2011 US$) associated with ED and mental health comorbidities.

	MEPS respondents			MEPS respondents with ED		
	No ED	ED	Difference[b] 95% CI (p-value)	No MH comorbidity	MH comorbidity	Difference[b] 95% CI (p-value)
Annual health care costs	$3910	$5779	$1869 $96 to $3641 (0.012)	$5033	$7026	$1993 −$1445 to $5433 (0.17)
Odds ratio of being employed over past 12 months[c]			0.67 0.41 to 1.09 (0.10)			0.41 (0.14 to 1.20) (0.10)
Annual wage income[d]	$29,872	$27,779	$2093 −$3517 to $7703 (0.48)	$39,938	$20,564	$19,374 $4155 to $34,592 (<0.001)

MEPS = Medical Expenditures Panel Survey; ED = eating disorders.
 [a] All costs were inflation adjusted to 2011 US $ using the Price Index of the Bureau of Labor Statistics and the general inflation rate from the BLS.
 [b] Controlling for age, gender, race/ethnicity, household size and years of education.
 [c] Among MEPS respondents of age 18 years or above (48 respondents had ED).
 [d] Among MEPS respondents of age 18 years or above who were employed.

all earned annual income among adults (18 years and above). We assumed that the person was employed if he or she reported earned income through either gainful employment or self-employment in the respective year.

We first compared the characteristics of all MEPS respondents with ED and those without ED using non-parametric Mann–Whitney U tests for age, years of education and household size and exact Fisher's test for gender and race/ethnicity. We then estimated the additional health care costs among all MEPS respondents (ages 0–85) and odds of employment (among those of age 18 years or above). Finally, we estimated differences in annual earnings (among individuals of age 18 years or above who were employed within the past 12 months) between individuals with ED and those without ED. The estimations above relied on generalized linear regression models with a log link – to address non-normality of the data and mitigate the effect of the skewed distribution that characterize cost data – and gamma distribution for costs and earnings and binary distribution with a logit link (Manning & Mullahy, 2001) to estimate the odds of being employed. These models adjusted for several potential confounders which in theory are linked with health care utilization and earnings: age, gender, race/ethnicity, household size, and number of years of education. We applied the same models among a subset of individuals with ED to contrast those with and without mental health comorbidities and to estimate their additional health care costs, odds of being employed and earnings. As this was a small exploratory study, we adopted a low threshold of p < 0.10 to evaluate statistical significance.

Results

Of 168,951 women and men ages 0 to 85 in MEPS 2007 to 2011, 86 (0.05%) were identified to currently have ED[1]. Of these individuals 34

(39.5%) had at least one mental health comorbidity. Individuals with ED compared to those without ED, were older and less likely to be female. The latter might be related to the average age of our sample of individuals with ED (43.1 years, which exceeds the typical age of ED onset) and suggests that point prevalence of ED in that age group might be higher among men than women. Individuals with ED were also slightly more educated and more likely to be white as opposed to other race or ethnicity (Table 1). These differences were not significant when MEPS respondents with ED and mental health comorbidities were contrasted to those with ED only, with the exception of gender; females with ED were much more likely to have mental health comorbidity than males with ED (p < 0.01).

Annual health care costs were $1869 greater (p = 0.012) among individuals with ED compared to the general population (Table 2). In addition, individuals with ED (of ages 18 years or above) were less likely to report any earnings in the past 12 months, compared to individuals without ED, although this effect was borderline significant (OR = 0.67, 95% CIs [0.41, 1.09]). Among the subgroup of MEPS respondents with ED who were employed at least for some time in the past 12 months, annual earnings were $2093 lower but not statistically significant (p = 0.48) compared to MEPS respondents without ED.

Having mental health comorbidities was associated with $1993 increased annual costs when contrasted to individuals with ED and no comorbidities. Although large, that difference was not significant (p = 0.17), perhaps due to the small sample size and power to detect such differences in costs. Similarly, the presence of mental health comorbidities was associated with 59% lower probability of being employed (OR = 0.41, 95% CIs [0.14, 1.20]). These large differences however were on the borderline of statistical significance (assuming a 0.10 cutoff for an exploratory study) again possibly because of the small sample size. On the other hand, among those with ED, the presence of mental health comorbidity was associated with almost two times lower annual earnings (difference of $19,374, p < 0.01, Table 2).

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 [1] Other studies have also reported relatively low point prevalence of ED (Smink et al., 2012); ours may be even lower as it was assessed at the average age of 43.1 years which is substantially above the average age of onset of ED.

Comment

Decision makers increasingly rely on economic evaluations to set public health priorities and to determine the relative value and cost-effectiveness of new screening, treatment, and prevention modalities. Direct costs of ED treatment have been previously documented (Mitchell et al., 2009; Striegel-Moore et al., 2000) but are only a fraction of the overall economic impact associated with the disease. Accordingly, our analysis suggests that employment rates may be lower among individuals with ED than those without ED. The overall loss in earnings associated with ED was greater in magnitude to the excess health care costs associated with the disease (34% lower odds of working compounded with an annual wage decrement of $2903 if working, compared to $1869 in excess health care costs), which further points to the need to incorporate these non-health impacts into evaluations and decision making processes.

Mental health comorbidities in our sample (point prevalence of 39.5%) substantially exceeded the background prevalence of mental health disorders reported in the general US population (Kessler et al., 1994) and seemed to contribute considerably to the differences in health care costs, employment status, and earnings between individuals with ED and other MEPS respondents. Therefore evaluations of the economic burden of ED need to also consider the wider impacts on overall mental health, such as anxiety and depression. Similarly, evaluations of the cost-effectiveness of ED treatment and prevention need to incorporate the health benefits and savings associated with improved mental health more broadly.

Our findings should be viewed primarily as a rationale for conducting large scale evaluations of the economic burden of ED and associated comorbidities that include measures of employment and earnings. Such evaluations will likely demonstrate that investment in ED treatment and prevention has broader economic benefits and is more cost-effective from a societal perspective than previously recognized.

Conflict of interest

The authors declare that there is no conflict of interest.

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