

Reductions in quality of life and increased economic burden associated with mental disorders in an Australian adult sample

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Abstract

Objective. The aim of this study was to determine the effect of a broad range of common mental disorders and their comorbidity on health-related quality of life and functional disability.

Methods. In all, 2734 Australians aged ≥ 18 years, recruited from the general community via Facebook during August–December 2014, completed an online survey assessing demographic characteristics, nine mental disorders, suicidal ideation and attempt. Outcome measures were health-related quality of life (assessed using the Assessment of Quality of Life (AQoL)-4D measure and functional disability (days out of role).

Results. Overall, 53.1% of the sample met criteria for at least one mental disorder. Participants with each of the 11 mental health problems had significantly lower mean AQoL-4D scores and significantly greater functional disability compared with not having the disorder ($P < 0.001$). A monotonic decrease in quality of life and an increase in functional disability were observed with an increased total number of comorbid disorders ($P < 0.001$). Accounting for disorder prevalence, annual economic burden for each mental disorder was estimated to be in the range of A\$870 million–A\$17 billion.

Conclusions. Mental disorders negatively affect health-related quality of life and functional disability, exacerbated by increased comorbidity. The economic burden to participants and employers estimated in this study is of concern, and highlights the importance of evidence-based treatment and prevention approaches.

What is known about the topic? Mental disorders are associated with poorer health-related quality of life, increased functional disability and increased economic costs.

What does this paper add? This paper furthers our understanding of the associations of nine mental disorders, suicidal ideation and suicide attempts with quality of life in an Australian setting, highlighting the considerable economic implications of these associations. Further, it reveals that comorbidity of mental disorders exacerbates reductions in quality of life and increased functional disability.

What are the implications for practitioners? The economic burden associated with lost productivity and quality of life for individuals with mental disorders is considerable. Therefore, prioritising funding to prevention and treatment using evidence-based approaches will have significant effect in terms of economic productivity and personal well-being for individuals.

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Introduction

Mental disorders are associated with poorer functioning identified through reductions in health-related quality of life (HRQoL),¹ increased disability² and increased economic costs.³ HRQoL is a multifactorial construct that assesses health quality and key aspects of functioning from the perspective of the individual. Reductions in HRQoL are associated with various mental disorders, including major depressive disorder (MDD),⁴ post-traumatic stress disorder (PTSD),⁵ obsessive-compulsive disorder,⁶ generalised anxiety disorder (GAD),⁷ social anxiety disorder (SAD),⁷ social phobia,⁸ panic disorder (PD),⁷ attention-deficit hyperactivity disorder (ADHD),⁹ cannabis use disorder¹⁰ and suicidal ideation.¹¹

Another means of assessing individual function involves measuring disability (i.e. number of days a person has been unable to perform their daily role due to poor physical or mental health in the past month). This measure focuses on role functioning by examining the individual's ability to perform normal activities, and has been shown previously to increase (i.e. greater disability) in the presence of common mental disorders.^{2,12–14} Across a range of countries, mental disorders account for a large proportion of days out of role.² In Australia, adults with mental disorders experience 4 days when they are unable to carry out their normal activities or need to cut down on what they did in a 30-day period.¹² Compared with physical problems, mental disorders result in a greater number of days out of role¹⁵ and a larger effect on HRQoL.¹⁶

Comorbidity of mental disorders is common, with almost half of people with a disorder experiencing more than one.¹⁷ The presence of comorbid mental disorders in treatment-seeking samples results in increased functional disability and reduced HRQoL compared with a single disorder.^{18,19} This reduction in HRQoL due to comorbidity is less than the sum of each disorder based on interactions of various mental disorders.¹⁶ The principal diagnosis dictates the magnitude of the effect of comorbidity.²⁰ Overall, there appears to be a strong relationship between comorbidity and days out of role and HRQoL, with an increased number of mental disorders associated with a decline in HRQoL and an increase in functional disability.^{1,13,21}

Against this background, the aim of the present study was to investigate the extent to which HRQoL and disability are affected by a range of mental health problems in a large sample of adults from the Australian general population. Although previous studies have been conducted in European populations,^{13,21} the present study is one of the first in Australia to report HRQoL and functional disability in parallel. The effects of nine disorders, suicidal ideation and suicide attempts were assessed, including some of the less studied disorders in adult populations, such as ADHD. Limited research on the economic effect of specific mental health problems in Australia is available,²² therefore the findings of this study were subsequently used to estimate economic effects in conjunction with existing prevalence estimates and earnings data. This information holds promise for generating estimates of the effects of mental disorders and comorbidity on the community, which is of special interest to policy makers and healthcare providers.

Methods

Participants and procedure

Recruitment of participants through an online social network, Facebook, was chosen because almost half (45%) the Australian population aged ≥ 18 years could be targeted. Between August and December 2014, participants were recruited through a Facebook page or a Facebook advertisement that read 'Assessing Mental Health Survey: Participate in a study examining your mental health by completing a 40 minute survey now'. Facebook advertisements provided a link to the survey or Facebook page and targeted Australians aged ≥ 18 years. The survey was implemented online using LimeSurvey, with data stored securely on a server at the Australian National University (ANU), Canberra. Ethics approval was obtained from the ANU Human Research Ethics Committee (Protocol: #2013/509). In total, approximately 3.3 million people were delivered the advertisement, with 39 945 people clicking on the advertisement and 12 240 'liking' the study's page.

A participant information sheet outlining survey involvement was provided, with consent subsequently obtained from 10 082 participants. Participants were invited to complete a comprehensive version of the survey assessing nine disorders, or a shorter version assessing a subset of disorders. In all, 5011 completed a survey; 1836 completed the short version and 3175 completed the comprehensive survey. In addition, participants were invited to participate in a randomised controlled trial testing the effect of feedback on service use.²³ Participants who agreed to participate in the trial completed additional measures, including HRQoL measures. There were 2734 participants who completed these measures and had complete data on all nine disorders, forming the sample used in the present analyses.

It was expected that participants with mental health concerns would be more likely to complete the survey, resulting in a sample with higher psychopathology. Although the resulting sample was not representative of the population, the high prevalence of a range of mental disorders provided the study with sufficient power to investigate the effects of multiple mental health outcomes on HRQoL. The effect at the population level was then estimated using nationally representative prevalence data from the Australian National Survey of Mental Health and Wellbeing.²⁴ Furthermore, there is little evidence that correlational analyses on the relative individual effect of each disorder would be biased by a lack of population representativeness²⁵

Measures

Demographics

Demographic variables were collected to describe the sample and are detailed in Table 1.

Psychological distress

The Distress Questionnaire-5 (DQ5) is a five-item self-rating scale used to screen for psychological distress in the past 30 days.²⁶ Items were rated on a scale of 1–5 ('Never' to 'Always'), with total scores ranging from 5 to 25. Higher scores indicated greater psychological distress (Cronbach's α for this study = 0.85). A screening cut-off point with high sensitivity

Table 1. Comparison of demographic characteristics between participants with no disorder and any disorder
Data are given as *n* (%). *P*-values are based on Fisher's exact test (two categories) or Pearson's Chi-squared test (more than two categories). K10, Kessler-10; DQ5, Distress Questionnaire-5

	No mental disorder (<i>n</i> = 1281)	Any mental disorder (<i>n</i> = 1453)	<i>P</i> -value
Age (years)			
18–25	82 (6)	191 (13)	
26–35	75 (6)	170 (12)	
36–45	164 (13)	279 (19)	<0.001
46–55	323 (25)	409 (28)	
56–65	409 (32)	314 (22)	
≥66	228 (18)	90 (6)	
Sex			
Male	271 (21)	284 (20)	0.317
Female	1010 (79)	1169 (81)	
Highest Level of Education			
Less than Year 12	349 (12)	179 (12)	
High school (Year 12 or equivalent)	129 (10)	227 (16)	
Certificate level I–IV, diploma, associate degree	364 (29)	480 (33)	<0.001
Bachelor degree	280 (22)	276 (19)	
Postgraduate (graduate certificate, graduate diploma, Masters, doctorate)	355 (28)	288 (20)	
Employment status			
Full-time	380 (30)	364 (25)	
Part-time/casual	320 (25)	383 (27)	<0.001
Unemployed	102 (8)	223 (16)	
Other	461 (37)	466 (33)	
Location of residence			
Metropolitan	555 (43)	643 (44)	
Regional	523 (41)	603 (42)	0.504
Rural/remote	203 (16)	207 (14)	
Language spoken at home			
English only	1177 (92)	1386 (95)	<0.001
Other language	104 (8)	67 (5)	
Suicidal ideation			
Never	1207 (94)	991 (68)	<0.001
Any thoughts	74 (6)	462 (32)	
Suicide attempts			
Never	1266 (99)	1346 (93)	<0.001
Any attempt	15 (1.2)	107 (7)	
Psychological distress: K10 scores			
10–15	668 (52)	163 (11)	
16–29	564 (44)	743 (51)	<0.001
30–50	49 (4)	547 (38)	
Psychological distress: DQ5 scores			
5–10	1090 (85)	385 (27)	<0.001
11–25	191 (15)	1068 (74)	

and specificity in identifying a range of mental disorders was established at a score of ≥ 11 .²⁶ The DQ5 is a comprehensive measure of psychological distress with better operating characteristics for screening a range of common mental disorders than the Kessler Psychological Distress Scales, K10 and the shorter form K6.²⁶

The K10 is a 10-item self-rating scale used to screen for psychological distress in the past 30 days.²⁷ In the K10, items were rated on a scale of 1–5 ('none of the time' to 'all of the

time'), with total scores ranging from 10 to 50. Higher scores indicated greater psychological distress (Cronbach's $\alpha = 0.93$). Scores of 16–29 and 30–50 indicate a medium and high risk of psychological distress respectively.²⁸

Mental health indicators

Diagnostic criteria for nine mental disorders were assessed using a symptom checklist developed by the authors based on the

Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) definition for each disorder²⁹ and described and published elsewhere.³⁰ Criteria were designed along similar principles to the Mini International Neuropsychiatric Interview (MINI),³¹ but it was developed independently, is non-proprietary and is based on DSM-5. The checklists queried respondents about the presence or absence of symptoms using binary and categorical self-report items with conditional skip logic to reduce response burden.

Suicide ideation and attempt

Suicide ideation was assessed with the statement: 'In the past 30 days, I seriously considered attempting suicide'. Responses were indicated on a five-point Likert scale (Never, Rarely, Sometimes, Often, Always) and recoded into dichotomous variables (Never vs Any thoughts) due to low prevalence. Suicide attempt was assessed with the question 'In the past 30 days, I attempted to kill myself', with response options as above that were collapsed to (Never vs Any attempt).

Health-related quality of life

The Assessment of Quality of Life (AQoL)-4D instrument is a multi-attribute utility measure to assess HRQoL.³² The AQoL-4D algorithm is calculated from four dimensions (Independent Living, Social Relationships, Physical Senses and Psychological Well-being), each containing three items queried using four-point scales, and computes a utility score ranging from -0.04 (worst possible HRQoL) to 1.00 (full HRQoL). Negative utility scores indicate a health state worse than death. The AQoL-4D for this study had high internal consistency (Cronbach's $\alpha = 0.77$).

Functional disability

The question 'How many days out of the past 30 were you totally unable to work or carry out your normal activities?' from the World Health Organization (WHO) Disability Assessment Schedule³³ was adapted for this study. Participants scoring ≥ 1 days, were asked a follow-up question, namely 'How many of these days were due to mental health problems?', enabling calculation of the number of days out of role due to mental health problems. A scaled variable was created with scores ranging from 0 to 30. We considered whole days only, excluding partial days from analysis. Previous studies have shown excellent recall of missed days in employed people,³⁴ validating this approach.

Data analysis

Analyses were conducted using SPSS version 23 (IBM Corp., Chicago, IL, USA). Mental disorders were measured by nine DSM-5 symptom checklists, which were summed to provide a binary variable (no disorder vs any disorder) and a continuous variable (no disorder, one disorder, two disorders, three disorders, four or more disorders). Comparisons of demographics, suicidal ideation and attempt and psychological distress for participants with or without a mental disorder were made using Fisher's exact test for binary variables and Pearson's Chi-squared tests for variables with three or more categories.

The two outcomes of interest were AQoL-4D and functional disability. Bivariate analysis of AQoL-4D with mental

disorders and suicidal ideation and attempt was conducted using *t*-tests with equivalent variance not assumed, or a one-way analysis of variance (ANOVA). Effect size was calculated using Cohen's *d*, based on the difference in means divided by pooled study sample standard deviation.^{1,35} Effect sizes of small (0.2), moderate (0.5) and large (0.8) effect were used.³⁶ Non-parametric Mann-Whitney *U*-tests and Kruskal-Wallis tests were performed on functional disability and are presented as median values with 25th and 75th percentiles based on Tukey's Hinges and the mean \pm s.d. Effect size estimates for the Mann-Whitney *U*-test used the *r* estimate and were interpreted as small (0.1), medium (0.3) and large (0.5) effect.³⁷

Estimation of economic loss due to mental health problems involved several assumptions about the value placed on a healthy year of life and employment figures. A value of A\$50 000 was placed on a healthy life year, based on the estimated gross domestic product (GDP) per capita.³⁸ Another estimate used was the value of a statistical life year (VSLY), which provides an estimate of the value society places on reducing the risk of premature death, estimated at A\$182 000 in 2014.³⁹ Calculation of lost productivity was made using average weekly earnings from the Australian Bureau of Statistics (ABS) of A\$1136.60 from May 2015 reference period.⁴⁰ All estimates were based on Australian dollars; Australia's population is currently estimated to be 24 million.

Results

In total, 1453 people (53.1%) had at least one of nine mental disorders. The most common disorders were GAD (21%), alcohol use disorder (AUD; 20%) and SAD (18%), whereas the least common were PD (6%), substance use disorder (SUD; 8%) and MDD (12%). The number of mental disorders experienced ranged from none to eight, with 32% of participants reporting more than one disorder. In addition, in the past month, 20% reported suicidal ideation, whereas 5% reported at least one suicide attempt.

Demographic characteristics are given in Table 1 according to disorder status. Participants with at least one mental disorder were less likely to have completed university education, more likely to be young, unemployed, speak English, report suicidal ideation or attempts and have higher psychological distress than participants without a mental disorder. No significant differences were observed for gender or location of residence.

The mean AQoL-4D utility score was 0.564 ± 0.264 . Participants with a mental disorder had lower utility scores than those without the disorder (Table 2). A large effect size (>0.8) for all mental disorders was observed, except for PD and SUD (moderate effect size observed) and AUD (below the small effect size). Similarly, participants with suicidal ideation and attempt were more likely to score lower on the AQoL-4D, with both having large effect sizes.

Functional disability scores ranged from 0 to 30 (maximum score possible). Almost two-thirds of participants (63%) stated that their mental health problems did not cause any days out of role in the past month; 64% of these participants had no disorder. Due to its highly skewed distribution,

Table 2. Bivariate associations of mental health problems with mean Assessment of Quality of Life (AQoL-4D) utility scores and functional disability (n = 2734)
P-values are based on *t*-tests assuming non-equal variance. MDD, major depressive disorder; SAD, social anxiety disorder; GAD, generalised anxiety disorder; OCD, obsessive-compulsive disorder; PTSD, post-traumatic stress disorder; ADHD, attention deficit hyperactivity disorder; AUD, alcohol use disorder; SUD, substance use disorder; DQ5, Distress Questionnaire-5; DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition

DSM-5 disorder	No disorder			AQoL-4D utility score			<i>P</i> -value	Cohen's <i>d</i>	No disorder			Days out of role			<i>P</i> -value	Effect size (<i>r</i>)
	<i>n</i>	Mean ± s.d.	<i>n</i>	Disorder	Mean ± s.d.	<i>n</i>			Disorder	Mean ± s.d.	Median (25th–75th)	Mean ± s.d.	Median (25th–75th)	Disorder		
MDD	2411	0.601 ± 0.248	323	0.287 ± 0.210	<0.001	1.37	0 (0–2)	2.50 ± 6.04	7 (1–20)	11.37 ± 10.99	<0.001	0.36				
SAD	2240	0.612 ± 0.244	494	0.345 ± 0.239	<0.001	1.11	0 (0–1)	2.21 ± 5.78	5 (1–15)	9.62 ± 10.35	<0.001	0.41				
PD	2564	0.574 ± 0.261	170	0.402 ± 0.253	<0.001	0.67	0 (0–2)	3.17 ± 7.03	5 (0–15)	9.30 ± 9.91	<0.001	0.23				
GAD	2158	0.614 ± 0.248	576	0.377 ± 0.237	<0.001	0.98	0 (0–1)	2.24 ± 5.84	4 (0–15)	8.46 ± 10.05	<0.001	0.39				
OCD	2351	0.595 ± 0.252	383	0.370 ± 0.253	<0.001	0.89	0 (0–2)	2.60 ± 6.20	5 (0–15)	9.37 ± 10.69	<0.001	0.32				
PTSD	2385	0.601 ± 0.248	349	0.311 ± 0.229	<0.001	1.22	0 (0–2)	2.53 ± 6.14	6 (1–20)	10.49 ± 10.71	<0.001	0.35				
ADHD	2281	0.601 ± 0.251	453	0.374 ± 0.242	<0.001	0.92	0 (0–1)	2.53 ± 6.23	5 (0–15)	8.68 ± 10.13	<0.001	0.34				
AUD	2182	0.571 ± 0.265	552	0.534 ± 0.258	0.003	0.14	0 (0–3)	3.34 ± 7.21	0 (0–4)	4.36 ± 8.02	<0.001	0.11				
SUD	2529	0.576 ± 0.260	205	0.415 ± 0.271	<0.001	0.61	0 (0–2)	3.24 ± 7.03	2 (0–10)	7.34 ± 10.18	<0.001	0.16				
Any disorder	1281	0.679 ± 0.221	1453	0.462 ± 0.256	<0.001	0.91	0 (0–0)	0.75 ± 3.05	1 (0–8)	6.01 ± 9.03	<0.001	0.46				
Suicidal ideation	2198	0.618 ± 0.240	536	0.341 ± 0.240	<0.001	1.15	0 (0–1)	2.23 ± 5.72	5 (0–15)	8.98 ± 10.38	<0.001	0.37				
Suicidal attempt	2612	0.577 ± 0.257	122	0.278 ± 0.239	<0.001	1.20	0 (0–2)	3.09 ± 6.81	10 (3–25)	13.40 ± 11.41	<0.001	0.25				
DQ5	1475	0.690 ± 0.212	1259	0.416 ± 0.240	<0.001	0.67	0 (0–0)	0.67 ± 2.83	2 (0–10)	6.92 ± 9.39	<0.001	0.54				

non-parametric tests were performed. The median functional disability score for participants without the disorder was 0, whereas for those with a disorder median scores ranged from 0 (AUD) to 10 (suicide attempt; Table 2). There was a significant difference (*P* < 0.001) in the rank for each disorder as opposed to not having the disorder. A small effect size was observed for AUD, SUD, PD and suicide attempt. All other disorders exhibited a medium effect size.

For every increase in the number of mental disorders experienced by participants, a monotonic decline was observed in mean AQoL-4D scores (Fig. 1a; *P* < 0.001). The mean AQoL-4D utility score for no disorders was 0.679 ± 0.221, decreasing to 0.282 ± 0.212 for four or more disorders. Similarly, Kruskal–Wallis analyses showed that the number of days out of role due to mental health problems increased in line with a greater number of disorders experienced (Fig. 1b; *P* < 0.001). Large variation was observed, with participants reporting 0–30 poor mental health days for each category.

To determine the economic burden of mental disorders due to reduced HRQoL and loss in potential earnings, both outcome measures were used with two similar methodologies to estimate costs (Table 3). Reduced HRQoL (as determined by the difference in mean AQoL-4D scores) was combined with estimated GDP of A\$50 000 per capita. Under this assumption, value lost per person due to poor HRQoL was in the range from A\$1850 for AUD up to A\$15 700 for MDD annually. When the national prevalence of each disorder from the ABS²⁴ was taken into consideration, estimates ranged from A\$870 million for AUD to A\$15 billion for PTSD. A more liberal estimate, based on the value society places on reducing the risk of premature death (VSLY = A\$182 000),³⁹ increased annual Australia-wide costs by a factor of 3.64, from A\$3 billion to A\$54 billion.

The second approach considered the reduced capacity of an individual to earn an income due to days out of role, using a median weekly income estimate of A\$1136.60.⁴⁰ Based on this approach, yearly estimates of economic loss for an individual ranged from A\$5000 for SUD up to A\$19 000 for MDD, reflecting the increased number of days out of role for each condition across a 12-month period (Table 3). Nationally, when prevalence was taken into consideration, these estimates indicated that approximately A\$1 billion in average earnings were lost due to SUD, up to A\$17 billion for PTSD. The estimates derived using this method were similar to those using the application of GDP to AQoL-4D utility scores.

Discussion

The results from this study indicate that comorbid mental disorders are associated with a dose–response pattern on HRQoL and functional disability, with a monotonic decrease in HRQoL and increase in functional disability as the count of comorbid mental disorders increased. This replicates findings from European studies.^{13,21} The results of the present study provide further evidence that the relationship is likely to be causative, although longitudinal research is required to better determine evidence for the bidirectionality of this relationship. In addition, the results indicate the vast economic

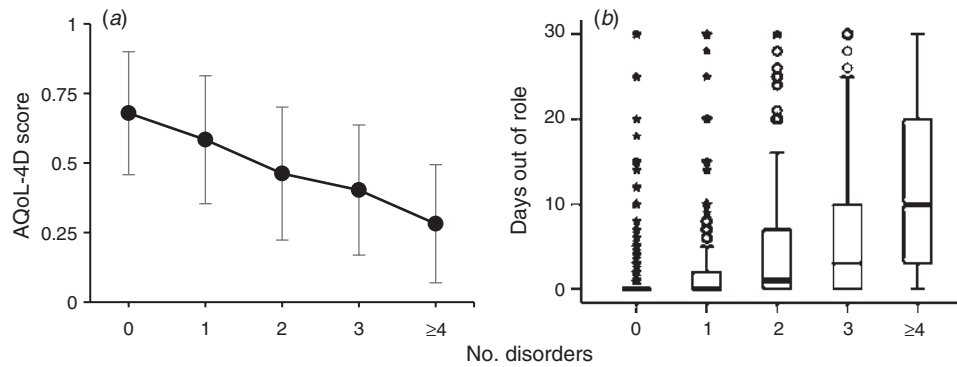


Fig. 1. Dose–response relationships for (a) Assessment of Quality of Life (AQoL)-4D mean utility score and (b) functional disability with the number of mental disorders. (a) The mean \pm s.d. AQoL-4D score plotted against the total number of mental disorders experienced by participants. (b) Box plots of the number of days out of role plotted against total number of mental disorders experienced by participants. The boxes show the interquartile range (IQR), with the median value indicated by the horizontal line; whiskers show the range. Open symbols indicate data >1.5-fold the IQR and asterisks indicate data >3-fold times the IQR.

Table 3. Estimated value of annual economic losses due to mental health problems

AQoL-4D, Assessment of Quality of Life-4D; MDD, major depressive disorder; SAD, social anxiety disorder; PD, panic disorder; GAD, generalised anxiety disorder; OCD, obsessive–compulsive disorder; PTSD, post-traumatic stress disorder; ADHD, attention deficit hyperactivity disorder; AUD, alcohol use disorder; SUD, substance use disorder; DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition

DSM-5 disorder	Prevalence ($\times 10^3$) ^A	AQoL-4D			Median ^E	Days out of role	
		Difference mean AQoL-4D ^B	Annual value lost per case ^C (A\$)	Estimated annual value lost ^D (A\$ million)		Annual per case lost productivity ^F (A\$)	Estimated annual lost income ^G (A\$ million)
MDD	652.4	0.314	15 700	10 243	7	19 095	12 457
SAD	759.9	0.267	13 350	10 145	5	13 639	10 364
PD	410.3	0.172	8600	3529	5	13 639	5596
GAD	436.1	0.237	11 850	5168	4	10 911	4758
OCD	305.6	0.225	11 250	3438	5	13 639	4168
PTSD	1031.9	0.290	14 500	14 963	6	16 367	16 889
ADHD		0.227	11 350		5	13 639	
AUD	470.1	0.037	1850	870	0	0	0
SUD	231.4	0.161	8050	1863	2	5456	1262
Any disorder	3197.8	0.217	10 850	34 696	1	2728	8723
2 or more disorders	1400	0.268	13 390	18 746	4	10 911	15 276
Suicidal Ideation	368.1	0.277	13 850	5098	5	13 639	5020
Suicide Attempt	65.3	0.299	14 950	976	10	27 278	1781

^APrevalence data from the Australian Bureau of Statistics.²⁴

^BUtility loss calculated by subtracting mean AQoL-4D without the disorder from the mean AQoL-4D with the disorder.

^CCalculated by multiplying the difference mean AQoL-4D by \$50 000, which is the estimated value of life.

^DCalculated by multiplying prevalence by the estimated annual value lost per case.

^EMedian number of days out of role due to mental health problems in the past 30 days.

^FCalculated by multiplying the median number of days out of role by the average daily income (from an average weekly income of \$1136.60 divided by 5, as per Ustun *et al.*³³) and then by 12 (to convert to annual costs).

^GCalculated by multiplying prevalence by the annual per case lost productivity.

effect of mental health problems in the community, with each mental disorder under investigation exerting a substantial economic cost in terms of lost productivity.

The present study is one of the first Australian studies to investigate HRQoL and functional disability in parallel, and shows that the effects of mental disorders were largely consistent with both outcomes. This is interesting because AQoL-4D focused on function and performance, whereas days out of role was more concerned with lost productivity. Effect sizes were

large for most disorders, making it difficult to identify disorders with greater effect, although PTSD, MDD, suicidal ideation and SAD stand out in terms of both reduced HRQoL and elevated days out of role. The minimal effect of AUD confirms previous findings,^{1,13,16,21} and could reflect that AUD and SUD impair function in a different manner to other mental disorders and therefore this was not captured with the measures used herein. Suicide attempt had a large effect on AQoL-4D, but a small effect on days out of role, which may reflect higher

variability in estimates for participants reporting a suicide attempt than other conditions.

Few studies have estimated the economic burden of mental disorders, especially adult ADHD.²² By making assumptions about the costs of reduced HRQoL and increased days out of role, we estimated the economic burden individual mental disorders made to the Australian economy. Largely due to its high estimated prevalence, PTSD had the largest effect, with approximately A\$16 billion lost per year, whereas the economic burden of MDD was estimated at A\$12 billion and that of SAD was estimated at more than A\$10 billion. Costs for MDD were similar to those in a 2004 South Australian study, after accounting for inflation.⁴¹ These estimates exclude mental health-related services costs, which were estimated to be over A\$8 billion in 2013–14.⁴² They also exclude estimates of ‘presenteeism’; that is, reduced capacity to work rather than lost capacity to work. Figures are consistent with an earlier Australian study which estimated an A\$5.9 billion loss of annual productivity due to psychological distress.⁴³ In addition, these estimates do not account for the considerable costs associated with elevated mortality attributable to mental disorders, which were not addressed in the present study.

Limitations of this study include recruitment of participants through an online social network and the introduced selection bias that occurred. This is observed in the female-dominant sample, higher prevalence rates of disorders compared with other community-based studies¹² and lower HRQoL compared with Australian population norms.¹ The mean HRQoL found in this study was substantially lower than in general population samples,^{1,4} which may be attributable to the high prevalence of mental health problems in the sample. Therefore, for the estimates of economic impact, we used prevalence estimates from an existing population-based study to account for this overrepresentation. The AQoL-4D is a measure of HRQoL that was chosen for its brevity and consistency with other studies. The AQoL-4D may be less sensitive to psychological and social distress than lengthier measures, such as the AQoL-8D, such that the reported effects may represent conservative estimates. The disability measure (days out of role) only focused on days totally unable to work, because it is most concordant with objective indices of work loss and circumvents the difficulty of appropriately combining total and partial days out of role. Its exclusion resulted in a more conservative estimate of disability. In the present analyses, we were unable to account for the severity of each disorder. More severe symptoms of mental health have been associated with poorer HRQoL,¹⁶ as have an increased number of social fears,⁸ therefore examination of the effect of disorder severity may further elucidate the role of mental disorders on quality of life.

Strengths of the study include a large community-based sample, examination of a wide range of mental disorders separately and together, the use of two HRQoL measures with convergent findings and the high prevalence of a range of disorders, which provided the study with sufficient power to investigate multiple mental health outcomes. Further, the correlational nature of the study did not necessitate an entirely representative sample. The use of a checklist approach to assess DSM-5 criteria is consistent with other population-based studies that use self-report instruments such as the MINI.

Further validation of the findings using clinician-administered diagnosis would be highly resource intensive, although beneficial.

Conclusion

Adults experiencing mental disorders report significantly poorer HRQoL and reduced capacity to carry out normal duties. This reduction in quality of life is exacerbated as comorbidity increases. Understanding the reduced quality of life and functional disability associated with mental disorders will help guide the development of interventions to support people with mental disorders and practitioners in developing appropriate care plans for patients. Further, the estimates of economic burden highlight the significant cost of mental disorders, which is important for policy makers to understand in order to ensure appropriate investment in mental health. Quantifying the role of mental disorders on quality of life is also important for researchers to establish the potential effects of population and clinical interventions in reducing this burden. Reducing this burden of mental disorders through prevention and treatment using evidence-based approaches will have significant effects in terms of reduced economic expenditure and personal well-being for individuals.

Competing interests

The authors declare that they have no competing interests.

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