

Life-years lost associated with mental illness in a South African medical insurance scheme

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Background

- Mental disorders rank among the top ten leading causes of disease burden in South Africa.¹
- A meta-analysis found that people with mental illnesses have more than double the mortality rates of the general population.²
- Most studies of mental illness and mortality focus on high-income countries – studies based in low- and middle -income countries are scarce.
- Aim: quantify excess mortality associated with various types of mental illnesses in a South African medical insurance scheme.

¹ Global Burden of Disease Study 2019, *Lancet* HIV 2022

² Walker et al., *JAMA Psychiatry* 2014

Methods: Design, data & participants

- Study design:
 - Retrospective cohort study using data from a large private South African medical insurance scheme.
- Data:
 - Reimbursement claims from a cohort of beneficiaries of the insurance scheme.
 - Supplemented with mortality data, including cause of death (natural and unnatural) from the National Population Register linked by the MRC.
- Participants:
 - Aged 15-84 years and covered by medical insurance between Jan 1, 2011 and Jun 30, 2020.

Methods: Exposure

Mental illness	ICD10 codes
Any	F00-F99
Organic disorder	F00-F09
Substance use disorder	F10-F16, F18 –F19
Alcohol use disorder	F10
Drug use disorder	F11-F16, F18 –F19
Psychotic disorder	F20-F29
Mood disorder	F30-F39
Anxiety disorder	F40-F49
Eating disorder	F50

We also analysed the following disorder subtypes: alcohol use (F10), drug use (F11-F16,F18-F19), bipolar (F31), depressive (F22, F33, F34.1), generalized anxiety (F41.1), PTSD (F43.1)

Methods: Outcome

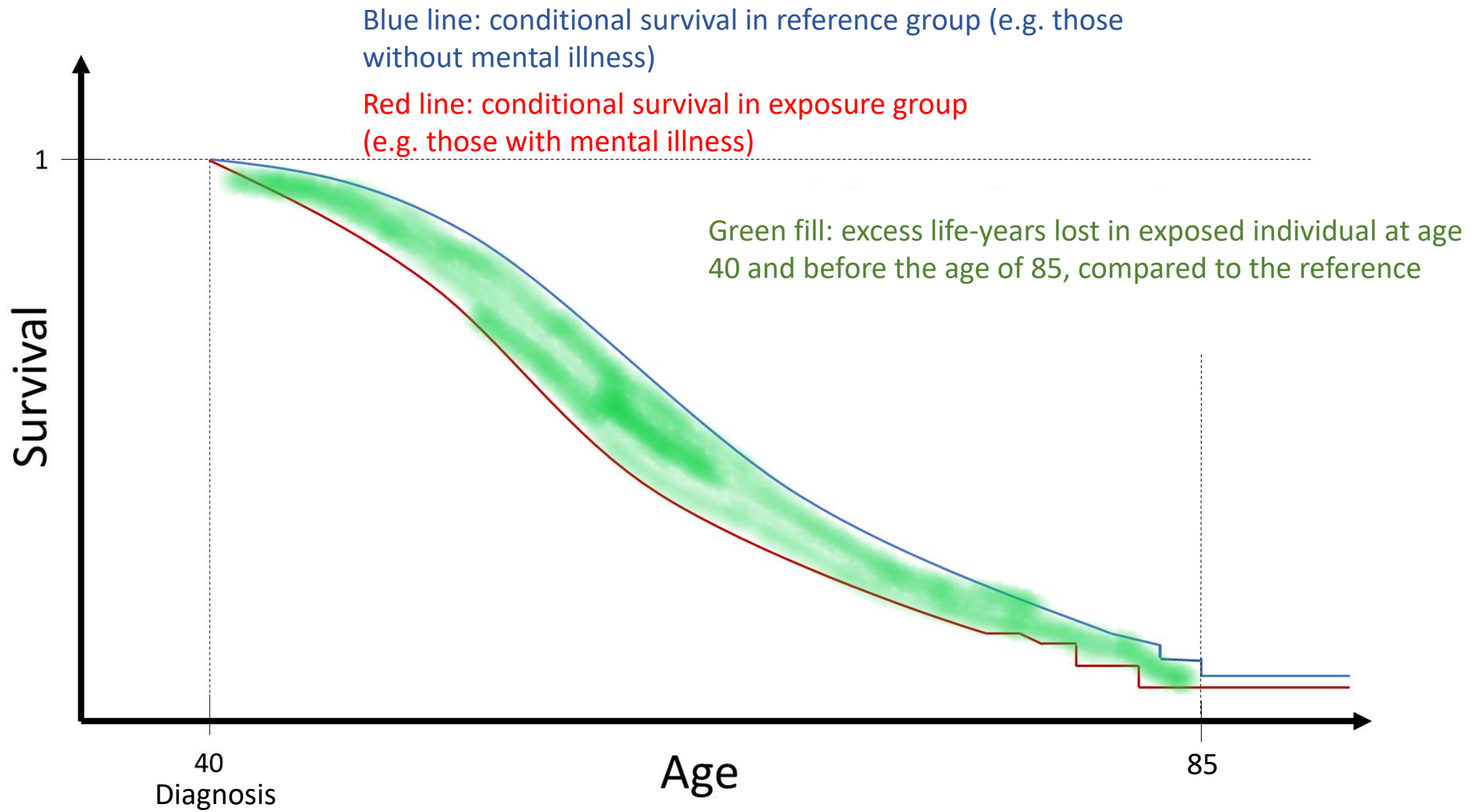
- Death from all causes ascertained by NPR or medical scheme data
 - Death from natural causes
 - Death from unnatural causes
 - Death from unknown causes

Methods: Statistical analysis

Excess life-years lost associated with a mental illness

- Formulated by a Denmark-based team of researchers and applied to data from the Danish Civil Registration System.³
- Measures the average difference in excess mortality between people diagnosed with a mental illness to people of the same age and sex without a diagnosis.
- The excess LYL is mainly intended as a descriptive measure of disease burden. This differs from the years of life lost (YLL) measure reported by the Global Burden of Disease study which is a causal measure of disease burden

³Plana-Ripoll et al., *The Lancet* 2019



Methods: Statistical analysis

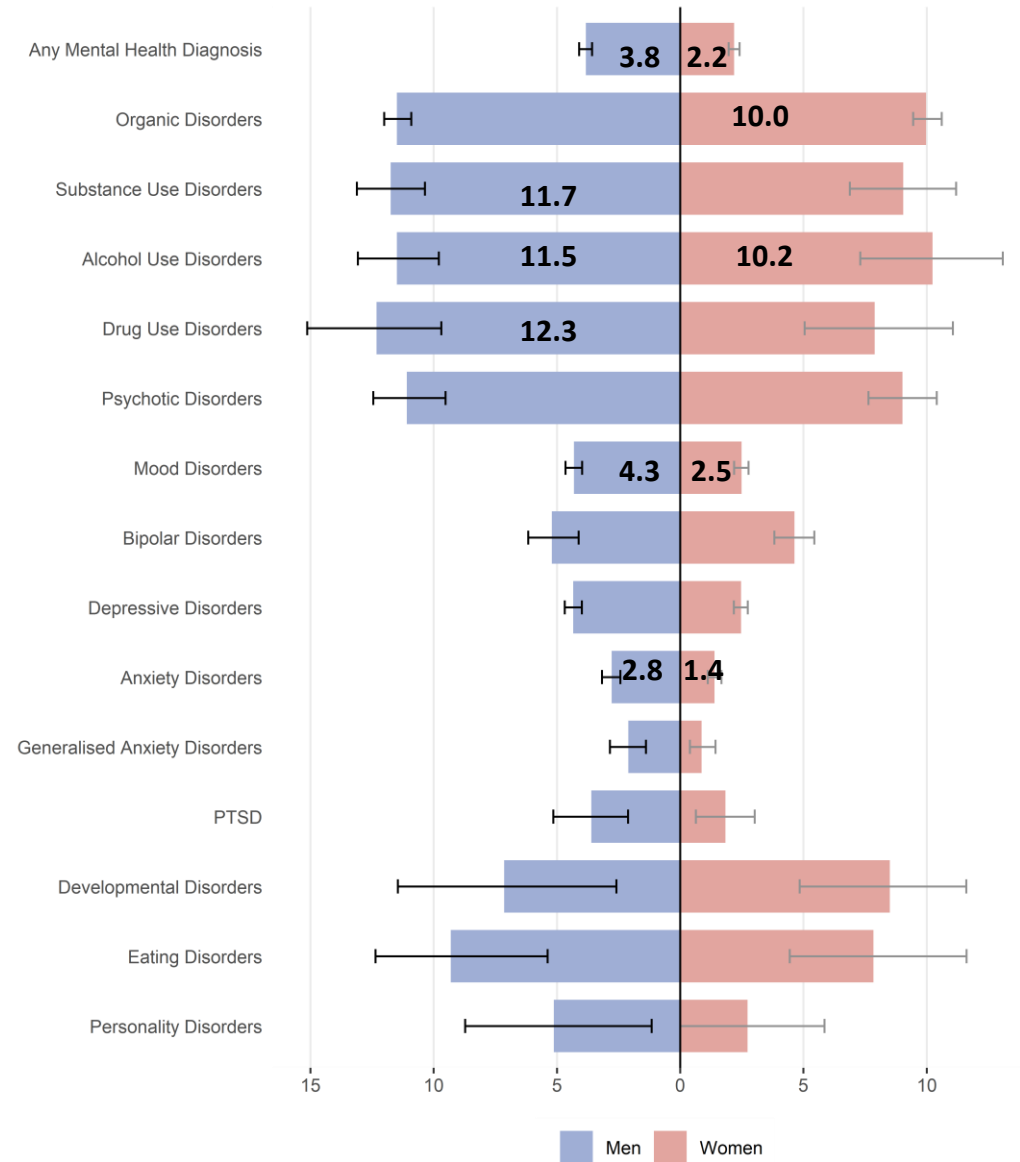
- Excess LYL can be disaggregated into mutually exclusive causes of death.
- Confidence intervals can be produced via bootstrap.
- The R package *lillies* produces excess LYL.

Results

- A total of 1,070,183 participants from the insurance scheme were eligible for our study:
 - 52% women
 - median age at enrolment: 36 years (IQR 26-49)
- 282,926 (26%) of participants received a mental illness diagnosis (22% of men, 31% of women).

Mental illness	Men (N=517,305)	Women (N=522,878)	Total (N=1,070,0183)
Any	114 377 (22.1%)	168 549 (30.5%)	282 926 (26.4%)
Organic disorder	3 863 (0.7%)	4 655 (0.8%)	8 518 (0.8%)
Substance use disorder	5 275 (1.0%)	2 042 (0.4%)	7 317 (0.7%)
Alcohol use disorder	2 757 (0.5%)	938 (0.2%)	3 695 (0.3%)
Drug use disorder	2 947 (0.6%)	1 226 (0.2%)	4 173 (0.4%)
Psychotic disorder	2 228 (0.4%)	2 324 (0.4%)	4 552 (0.4%)
Mood disorder	57 038 (11.0%)	98 835 (17.9%)	155 873 (14.6%)
Anxiety disorder	67 599 (13.1%)	110 405 (20.0%)	178 004 (16.6%)
Eating disorder	459 (0.1%)	897 (0.2%)	1 356 (0.1%)

Results: excess life-years lost



Excess life-years lost associated with mental illness: men

Mental illness	All-cause	Natural	Unnatural
Any	3.8 [3.6; 4.1]	3.4 [3.2; 3.7]	0.4 [0.3; 0.6]
Organic disorder	11.5 [10.9; 12.0]	10.9 [10.3; 11.6]	0.6 [0.2; 1.1]
Substance use disorder	11.7 [10.4; 13.1]	8.2 [6.7; 9.7]	2.4 [1.5; 3.5]
Alcohol use disorder	11.5 [9.8; 13.1]	8.2 [6.3; 9.7]	2.5 [1.4; 3.6]
Drug use disorder	12.3 [9.7; 15.1]	8.8 [6.1; 11.7]	2.0 [0.6; 3.8]
Psychotic disorder	11.1 [9.5; 12.4]	9.7 [7.9; 11.3]	1.4 [0.4; 2.6]
Mood disorder	4.3 [4.0; 4.7]	3.6 [3.3; 4.0]	0.7 [0.5; 0.9]
Bipolar disorder	5.2 [4.1; 6.2]	3.6 [2.6; 4.6]	1.5 [0.9; 2.2]
Depressive disorder	4.3 [4.0; 4.7]	3.7 [3.3; 4.0]	0.7 [0.5; 0.9]
Anxiety disorder	2.8 [2.4; 3.2]	2.5 [2.1; 2.8]	0.4 [0.2; 0.6]
Gen. anxiety disorder	2.1 [1.4; 2.9]	1.8 [1.1; 2.4]	0.4 [0.0; 0.8]
PTSD	3.6 [2.1; 5.1]	3.1 [1.6; 4.6]	0.5 [0.0; 1.1]
Developmental disorder	7.1 [2.6; 11.5]	5.7 [1.5; 9.8]	1.6 [-1.5; 5.7]
Eating disorder	9.3 [5.4; 12.4]	10.9 [7.0; 14.0]	-1.1 [-1.2; -1.0]
Personality disorder	3.8 [3.6; 4.1]	3.4 [3.2; 3.7]	0.4 [0.3; 0.6]

Excess life-years lost associated with mental illness: women

Mental illness	All-cause	Natural	Unnatural
Any	2.2 [2.0; 2.4]	1.9 [1.7; 2.1]	0.2 [0.2; 0.3]
Organic disorder	10.0 [9.5; 10.6]	9.3 [8.7; 10.0]	0.5 [0.2; 0.8]
Substance use disorder	9.0 [6.9; 11.2]	7.1 [5.0; 9.3]	1.3 [0.3; 2.3]
Alcohol use disorder	10.2 [7.3; 13.1]	9.0 [6.4; 11.9]	1.3 [0.1; 2.8]
Drug use disorder	7.9 [5.1; 11.1]	4.9 [2.1; 8.2]	1.9 [0.3; 3.7]
Psychotic disorder	9.0 [7.6; 10.4]	8.0 [6.6; 9.5]	0.8 [0.3; 1.4]
Mood disorder	2.5 [2.2; 2.8]	2.1 [1.8; 2.4]	0.3 [0.2; 0.4]
Bipolar disorder	4.6 [3.8; 5.4]	3.3 [2.5; 4.1]	0.8 [0.5; 1.1]
Depressive disorder	2.5 [2.2; 2.7]	2.1 [1.8; 2.3]	0.3 [0.2; 0.4]
Anxiety disorder	1.4 [1.1; 1.7]	1.2 [0.9; 1.4]	0.2 [0.2; 0.3]
Gen. anxiety disorder	0.9 [0.4; 1.4]	0.6 [0.1; 1.2]	0.2 [0.0; 0.4]
PTSD	1.8 [0.6; 3.0]	1.5 [0.5; 2.7]	0.4 [0.0; 0.7]
Developmental disorder	8.5 [4.8; 11.6]	8.8 [5.0; 12.1]	-0.5 [-0.5; -0.4]
Eating disorder	7.8 [4.4; 11.6]	6.2 [3.1; 9.6]	1.8 [-0.3; 4.0]
Personality disorder	2.7 [-0.3; 5.9]	1.8 [-1.1; 4.9]	1.2 [-0.3; 2.9]

Summary

- On average, life expectancy after a mental health diagnosis was 3.8 years shorter for men and 2.2 years shorter for women compared to people without a mental health diagnosis.
- Developmental, psychotic, substance use, and organic disorders were strongly associated with excess LYL, especially among men.
- Most excess mortality among people with mental illness were attributable to natural causes.

Limitations

- Mental health status assessed on ICD-10 diagnoses from reimbursement claims
 - Potential missed beneficiaries with undiagnosed mental disorders and substance use disorder
 - Possibility of diagnostic or administrative errors
- Remissions not considered, possibly misclassifying person-time
 - Could lead to underestimation of excess mortality in people with a mental health diagnosis
- Private-sector data, not applicable to public health care sector
 - People using public health services may have higher risk of poor mental health outcomes
 - Limited access to mental health care in South Africa's public sector
- Low proportion of unnatural deaths, is there under-ascertainment of unnatural deaths in the data?

Conclusions

- Our study demonstrates a considerable burden of premature death among people with mental illness in members of a South African insurance scheme.
- Supports implementing interventions for prevention, early detection, and treatment of physical comorbidities among people with mental illness.
- Paper currently under review.
- Preprints are available on medRxiv

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NPR Linkage



Thank you