

Title

Mood instability is a common feature of mental health disorders and is associated with poor clinical outcomes

Authors

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Supplementary material

Supplementary Table 1

Modifier words entered into natural language processing applications

Mood	Affect	Emotion
change	change	changes
changeable	changes	difficulties regulating
changable (misspelling of changeable)	labile	displays of
changes	lability	dysregulation
chaotic	range	extremes
extremes	variable	lability
fluctuate		levels
fluctuated		outbursts of
fluctuates		range
fluctuating		regulation difficulties
fluctuation		unstable
fluctuations		waves of
instability		
labile		
lability		
liability (misspelling of lability)		
liable (misspelling of labile)		
rapid cycling		
swings		
unpredictable		
unsettled		
unstable		
variable		
variation		
variations		
volatile		

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Supplementary Table 2

Inter-annotator reliability for gold standard annotations for natural language processing applications						
NLP application	Reference annotations (n)	Training data annotations (n)	Active learning annotations (n)	Total sentences in BRC Case Register (n)	Inter-annotator agreement (%)	Cohen's kappa value
Mood	313	300	395	386,386	92.0	0.84
Affect	317	501	300	32,132	92.7	0.82
Emotion	320	300	605	103,894	90.6	0.80

Supplementary Table 3

Performance of natural language processing applications				
NLP application	Baseline		Confidence Filter Applied	
	Precision	Recall	Precision	Recall
Mood Instability	84.2%	84.2%	90.5%	72.5%
Affective Instability	82.0%	55.6%	91.1%	45.6%
Emotional Instability	84.8%	86.6%	90.8%	60.8%

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Supplementary Table 4

Binary logistic regression analysis of factors associated with mood instability with missing data not included (n = 23,584)							
Factor	Group	Number in sample	Prevalence of documented mood instability within 1 month (%)	Association with mood instability			
				Unadjusted		Adjusted model*	
				Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value
Age (years)	16-25	7133	16.3	1.28 (1.17-1.40)	<0.001	1.27 (1.15-1.41)	<0.001
	26-35	7842	13.2	Reference		Reference	
	36-45	6611	9.8	0.71 (0.64-0.79)	<0.001	0.73 (0.65-0.81)	<0.001
	46-55	4066	9.1	0.65 (0.58-0.74)	<0.001	0.65 (0.56-0.74)	<0.001
	56-65	2052	7.1	0.50 (0.42-0.60)	<0.001	0.49 (0.40-0.59)	<0.001
Gender	Male	12532	10.9	0.81 (0.75-0.87)	<0.001	0.74 (0.68-0.81)	<0.001
	Female	15172	13.2	Reference		Reference	
Ethnicity	White	15691	12.5	Reference		Reference	
	Asian	1511	12.6	1.01 (0.86-1.18)	0.94	0.92 (0.78-1.09)	0.34
	Black	5203	13.3	1.07 (0.98-1.18)	0.15	0.99 (0.89-1.09)	0.80
	Other	5299	9.8	0.76 (0.69-0.84)	<0.001	0.82 (0.73-0.93)	<0.001
Marital status (first recorded)	Married/cohabiting	5115	11.7	0.88 (0.80-0.97)	0.010	1.16 (1.04-1.28)	0.009
	Divorced/separated	2391	11.1	0.82 (0.72-0.94)	0.005	1.17 (1.01-1.35)	0.04
	Single	16078	13.1	Reference		Reference	
Diagnosis	Schizophrenia and related	5860	15.5	2.11 (1.92-2.32)	<0.001	2.27 (2.04-2.52)	<0.001
	Bipolar affective disorder	2691	22.6	3.37 (3.03-3.76)	<0.001	3.35 (2.98-3.77)	<0.001
	Psychotic Depression	767	14.0	1.87 (1.51-2.31)	<0.001	2.03 (1.62-2.55)	<0.001
	Personality Disorder	2311	17.8	2.50 (2.21-2.82)	<0.001	2.43 (2.13-2.78)	<0.001
	Unipolar Depression (without psychosis)	14192	8.0	Reference		Reference	
	Other Affective Disorder	1883	10.6	1.36 (1.16-1.60)	<0.001	1.39 (1.17-1.65)	<0.001

*Results adjusted for all the factors reported in this table; 4,120 cases with no recorded data on marital status were dropped.

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Supplementary Table 5

Multivariable zero-inflated negative binomial regression analysis of association between documented mood instability and number of hospital admissions during follow-up period

Follow-up period	Number of hospital admissions Incidence rate ratio (95% CI, p value)	Vuong test p value
0-12 months, n=27704	Did not converge	
0-24 months, n=24848	1.87 (1.71-2.05), p<0.001	0.001
0-36 months, n=21188	1.77 (1.61-1.96), p<0.001	0.003
0-48 months, n=17130	1.80 (1.61-2.02), p<0.001	0.04
0-60 months, n=13032	1.78 (1.56-2.03), p<0.001	0.14
Results adjusted for age, gender, ethnicity, marital status and psychotic diagnosis		

Supplementary Figure 1

Definition of precision and recall statistics for assessing performance of NLP applications

