

SUPPLEMENTARY MATERIAL

Blood pressure in bipolar disorder: evidence of elevated pulse pressure and associations between mean pressure and mood instability

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Supplementary Table 1: Correlation matrix of age, BMI, and blood pressure variables

	Age	BMI	HR	SBP	DBP	PP
BMI	0.077	—				
HR	-0.244 *	0.213 *	—			
SBP	0.471 ***	0.343 ***	0.041	—		
DBP	0.267 **	0.391 ***	0.325 ***	0.709 ***	—	
PP	0.384 ***	0.073	-0.285 **	0.668 ***	-0.052	—
MAP	0.376 ***	0.402 ***	0.227 *	0.890 ***	0.952 ***	0.256 **

Correlations are with Pearson product moment coefficient. * P<0.05; ** P<0.01; *** P<0.001

Supplementary Table 2: Group-wise comparison of alcohol use on blood pressure variables

Variable	Alcohol Drinkers (n = 73)	Alcohol Non-drinkers (n = 30)	Student's t-test	
			T	P
BP Metric				
HR, BPM ± SD	68.7 ± 8.8	72.6 ± 12.1	1.602†	0.117
SBP, mmHg ± SD	115.6 ± 10.2	112.2 ± 7.8	1.616	0.109
DBP, mmHg ± SD	76.6 ± 6.9	76.4 ± 8.2	0.134	0.894
PP, mmHg ± SD	38.9 ± 6.9	35.8 ± 5.5	2.219	0.029*
MAP, mmHg ± SD	89.6 ± 7.5	88.3 ± 7.7	0.788	0.433

†Inequality of variances; Welch's t-test used. *P<0.05

Supplementary Table 3: Group-wise comparison of smoking on blood pressure variables

Variable	Smokers (n = 16)	Non-smokers (n = 79)	Student's t-test	
			T	P
BP Metric				
HR, BPM ± SD	77.6 ± 11.5	68.2 ± 9.1	3.618	<0.001***
SBP, mmHg ± SD	116.3 ± 10.9	114.4 ± 9.5	0.689	0.487
DBP, mmHg ± SD	78.7 ± 9.7	76.3 ± 6.4	1.261	0.210
PP, mmHg ± SD	37.6 ± 5.5	38.1 ± 7.0	0.315	0.753
MAP, mmHg ± SD	91.3 ± 9.8	89.0 ± 6.8	1.120	0.266

***P<0.001

Supplementary Table 4: Sensitivity analysis ANCOVA for alcohol use

Variable	ANCOVA		
Covariates inserted: Age, BMI, Alcohol use (Yes/No)	<i>F</i>	<i>P</i>	η_p^2
BP Metric			
HR, BPM $\pm$ SD	2.218	0.114	0.044
SBP, mmHg $\pm$ SD	2.270	0.109	0.045
DBP, mmHg $\pm$ SD	0.205	0.815	0.004
PP, mmHg $\pm$ SD	3.389	0.038*	0.065
MAP, mmHg $\pm$ SD	0.596	0.553	0.012

*P<0.05

Supplementary Table 5: Sensitivity analysis ANCOVA for smoking

Variable	ANCOVA		
Covariates inserted: Age, BMI, Smoker (Yes/No)	<i>F</i>	<i>P</i>	η_p^2
BP Metric			
HR, BPM $\pm$ SD	2.116	0.126	0.042
SBP, mmHg $\pm$ SD	3.864	0.025*	0.080
DBP, mmHg $\pm$ SD	0.689	0.505	0.015
PP, mmHg $\pm$ SD	3.914	0.023*	0.081
MAP, mmHg $\pm$ SD	1.164	0.200	0.036

*P<0.05

Supplementary Table 6: Group-wise comparison of BD lithium users vs. non-users on blood pressure variables

Variable	Li	Non-Li	Student's t-test	
	(<i>n</i> = 16)	(<i>n</i> = 22)	<i>T</i>	<i>P</i>
BP Metric				
HR, BPM $\pm$ SD	67.7 $\pm$ 12.1	70.4 $\pm$ 12.1	0.748	0.459
SBP, mmHg $\pm$ SD	118.3 $\pm$ 12.8	117.3 $\pm$ 9.8	0.273	0.787
DBP, mmHg $\pm$ SD	76.8 $\pm$ 9.13	76.9 $\pm$ 7.5	0.045	0.964
PP, mmHg $\pm$ SD	41.4 $\pm$ 7.7	40.3 $\pm$ 7.4	0.453	0.653
MAP, mmHg $\pm$ SD	90.7 $\pm$ 9.8	90.4 $\pm$ 7.6	0.089	0.930

Supplementary Table 7: Group-wise comparison of BD anticonvulsant users vs. non-users on blood pressure variables

Variable	Anticon	non-Anticon	Student's t-test	
	(n = 15)	(n = 32)	T	P
BP Metric				
HR, BPM ± SD	70.6 ± 11.2	68.4 ± 10.9	0.587	0.561
SBP, mmHg ± SD	119.5 ± 12.3	116.6 ± 10.2	0.762	0.433
DBP, mmHg ± SD	78.2 ± 8.4	76.1 ± 8.0	0.783	0.439
PP, mmHg ± SD	41.3 ± 7.8	40.5 ± 7.4	0.314	0.755
MAP, mmHg ± SD	91.9 ± 9.2	89.6 ± 8.1	0.843	0.405

Supplementary Table 8: Group-wise comparison of antipsychotic users vs. non-users on blood pressure variables among clinical groups (BD and BPD)

Variable	Antipsyc	non-Antipsyc	Student's t-test	
	(n = 30)	(n = 33)	T	P
BP Metric				
HR, BPM ± SD	72.1 ± 11.9	71.1 ± 9.1	0.372	0.711
SBP, mmHg ± SD	118.4 ± 10.6	112.7 ± 8.7	2.328	0.023*
DBP, mmHg ± SD	78.1 ± 8.3	75.4 ± 6.7	1.386	0.171
PP, mmHg ± SD	40.4 ± 7.9	37.3 ± 5.9	1.718†	0.087
MAP, mmHg ± SD	91.5 ± 8.3	87.9 ± 6.9	1.896	0.063

†Inequality of variances; Welch's t-test used. *P<0.05

Supplementary Table 9: Group-wise comparison of antidepressant users vs. non-users on blood pressure variables among clinical groups (BD and BPD)

Variable	Antidepr	non-Antidepr	Student's t-test	
	(n = 32)	(n = 31)	T	P
BP Metric				
HR, BPM ± SD	73.9 ± 9.2	69.1 ± 11.2	1.905	0.061
SBP, mmHg ± SD	113.5 ± 7.4	117.5 ± 12.0	1.577†	0.121
DBP, mmHg ± SD	76.7 ± 6.5	76.7 ± 8.7	0.035	0.972
PP, mmHg ± SD	36.8 ± 6.1	40.8 ± 7.6	2.341	0.023*
MAP, mmHg ± SD	88.9 ± 6.2	90.3 ± 9.3	0.644†	0.520

†Inequality of variances; Welch's t-test used. *P<0.05

Supplementary Table 10: Sensitivity analysis ANCOVA for any psychotropic drug use

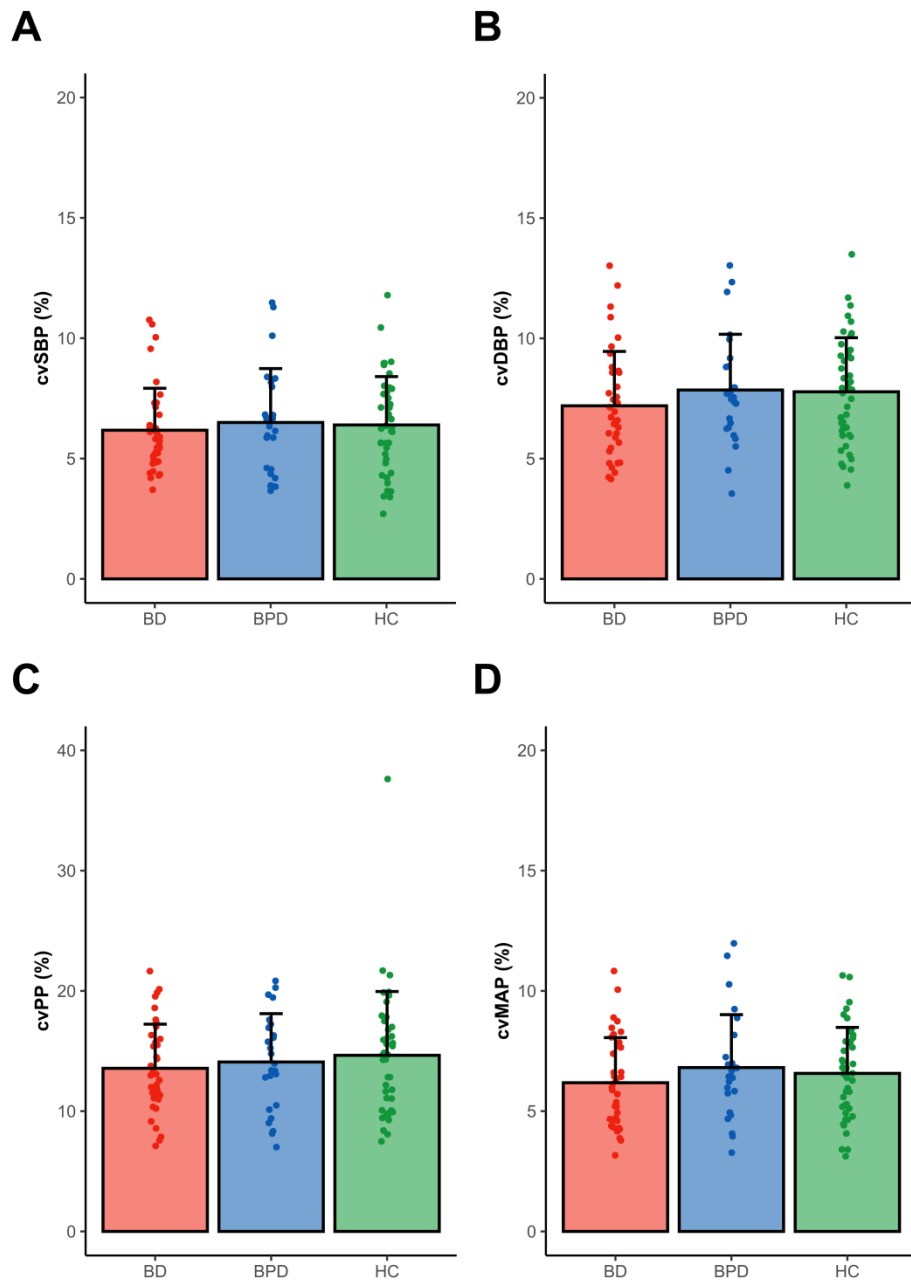
Variable	ANCOVA		
Covariates inserted: Age, BMI, Psychotropic drug use	<i>F</i>	<i>P</i>	η_p^2
BP Metric			
HR, BPM $\pm$ SD	2.170	0.120	0.042
SBP, mmHg $\pm$ SD	1.938	0.149	0.037
DBP, mmHg $\pm$ SD	0.371	0.691	0.007
PP, mmHg $\pm$ SD	3.237	0.043*	0.061
MAP, mmHg $\pm$ SD	0.569	0.568	0.011

*P<0.05

Supplementary Table 11: Sensitivity analysis ANCOVA for gender (BD vs. HC)

Variable	ANCOVA		
Covariates inserted: Age, BMI, Gender (M/F)	<i>F</i>	<i>P</i>	η_p^2
BP Metric			
HR, BPM $\pm$ SD	0.110	0.742	0.001
SBP, mmHg $\pm$ SD	2.112	0.150	0.027
DBP, mmHg $\pm$ SD	0.051	0.822	0.001
PP, mmHg $\pm$ SD	4.956	0.029*	0.061
MAP, mmHg $\pm$ SD	0.207	0.650	0.003

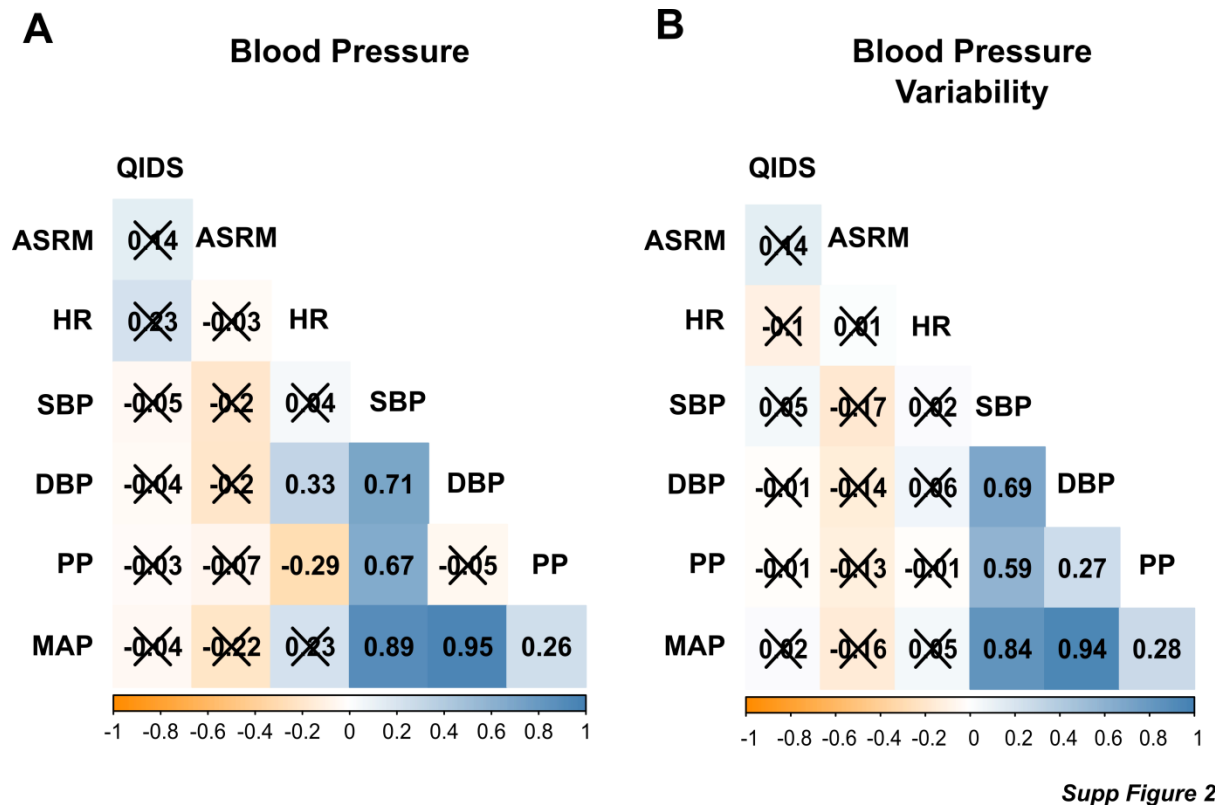
*P<0.05



Supp Figure 1

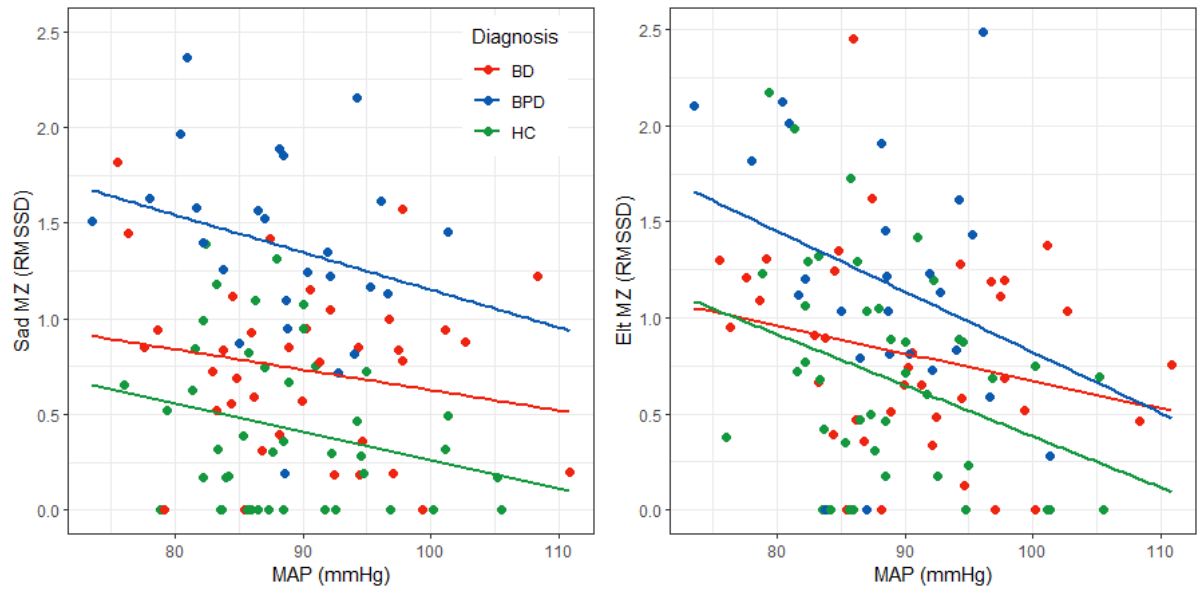
Supplementary Figure 1: Group-wise comparison of HBPM blood pressure variability

Bars represent group blood pressure variability estimated by the coefficient of variation of the week-long recording period with error bars indicating standard deviation. Variables plotted are as follows (A) systolic blood pressure (SBP); (B) diastolic blood pressure (DBP); (C) pulse pressure (PP); (D) mean arterial pressure (MAP). All comparisons control for age and BMI as covariates with no significant differences detected between BD, BPD and HC.



Supplementary Figure 2: Correlation between depressive and manic symptomatology with mean blood pressure and blood pressure variability

Correlation plot shows Spearman rank-order correlation matrix of depressive symptoms (QIDS score) and manic symptoms (ASRM score) and their association with (A) mean BP variables and (B) blood pressure variability measured via the coefficient of variation. QIDS = quick inventory of depressive symptomatology; ASRM = Altman self-rating mania scale. Strength and direction of correlation is indicated by colour legend. Crossed-out digits represent non-significant correlations ($P > 0.05$, FDR correction applied).



Supp Figure 3

Supplementary Figure 3: Association between mood instability and blood pressure segregated by group

Scatter plot indicating the inverse relation between mood instability and blood pressure for each group. Example plots show similar negative association with mean blood pressure for negative mood (example 'Sad') as for positive mood (example 'Elated') for BD, BPD and HC.