

# Does Depressed Persons With Non-Cardiovascular Morbidity Have A Higher Risk of CVD? A Population-Based Cohort Study in Sweden.

Aysha Almas MBBS, FCPS, PhD<sup>1,2</sup>, Jette Moller MPH, PhD<sup>2</sup>, Romaina Iqbal PhD<sup>1</sup>, Andreas Lundin<sup>2</sup> PhD and Yvonne Forsell MD, PhD<sup>2</sup> <sup>1</sup> Aga Khan University, Pakistan, <sup>2</sup> Karolinska Institutet, Sweden

**Background:** Depression often co-exists with non-cardiovascular morbid conditions. Whether this comorbidity increases the risk of cardiovascular disease has so far not been studied. **Thus, the aim of this study was to determine if non-cardiovascular morbidity modifies the effect of depression on future risk of CVD.**

**Methods:** Data was derived from the PART study (acronym in Swedish for: Psykisk hälsa, Arbete och Relationer: Mental Health, Work and Relationships), a longitudinal cohort study on mental health, work and relations, including 10 443 adults (aged 20-64 years). Depression was assessed using the Major Depression Inventory (MDI) and self-reported data on non-cardiovascular morbidity was assessed from 1998-2000. Outcomes of CVD were assessed using the National Patient Register during 2001-2014.

	Overall	Depressed	Nondepressed	P value <sup>1</sup>
	N=10341	n=1488	n=8832	
	n (%)	n (%)	n (%)	
<b>Age in years</b>				
<b>20-30</b>	2595 (25.1)	432 (29.0)	2160 (24.5)	<0.001
<b>31-40</b>	2476 (23.9)	364 (24.5)	2102 (23.8)	
<b>41-52</b>	2733 (26.4)	421 (28.3)	2308 (26.1)	
<b>&gt;52</b>	2534 (24.5)	271 (18.2)	2259 (25.6)	
<b>Male gender</b>	4620 (44.0)	463 (31.1)	4146 (46.9)	<0.001
<b>IHD</b>	193 (1.9)	47 (3.2)	143 (1.6)	<0.001
<b>Stroke</b>	86 (0.8)	23 (1.5)	63 (0.7)	0.003
<b>Hypertension</b>	716 (6.9)	126 (8.5)	590 (6.7)	0.01
<b>Diabetes mellitus</b>	221 (2.1)	38 (2.6)	181 (2.0)	0.20
<b>Smoking<sup>3</sup></b>				
<b>Regular</b>	1289 (12.4)	306 (24.5)	983 (13.6)	<0.001
<b>Occasional smoker</b>	889 (8.6)	148 (11.9)	741 (10.3)	
<b>Ex-smoker</b>	2502 (24.1)	331 (26.5)	2171 (30.0)	
<b>Never smoker</b>	3796 (36.6)	462 (37.0)	3333 (46.1)	
<b>Physical inactivity<sup>3</sup></b>	3936 (46.3)	697(55.9)	3237(44.6)	<0.001
<b>Mean BMI (SD) in kg/m<sup>2</sup></b>	24.97 (3.9)	25.13 (4.4)	24.93 (3.7)	0.1
<b>Non-cardiovascular morbidity</b>	1356(13.1)	323(21.7)	1026 (11.6)	<0.001
<b>Cardiovascular diseases</b>	676 (6.5)	109 (7.3)	564 (6.4)	0.09
<b>IHD</b>	435 (4.2)	71 (4.8)	361 (4.1)	0.12
<b>Stroke</b>	298 (2.9)	53 (3.6)	245 (2.8)	0.05

Results: Both depression (HR 1.5 (95 % CI, 1.1, 2.0)) and non-cardiovascular morbidity (HR 2.0 (95 % CI, 1.8, 2.6)) were associated with an increased future risk of CVD. The combined effect of depression and non-cardiovascular comorbidity on future CVD was shown in Table 2.

**Table 2. Effect of depression and non-cardiovascular morbidity on the risk of CVD, n=10074**

	Model 1 <sup>1</sup> n=9458 HR (95% CI)		Model 2 <sup>2</sup> n=7627 HR (95% CI)	
	Non-cardiovascular morbidity		Non-cardiovascular morbidity	
<b>Depression</b>	No	Yes	No	Yes
<b>No</b>	1 (Ref)	1.5 (1.1,2.0)	1 (Ref)	1.4 (1.0,2.0)
<b>Yes</b>	1.4 (1.0,2.0)	2.1 (1.4,3.4)	1.3 (1.0,2.0)	2.0 (1.1,3.3)
<b>Synergy index (95% CI)</b>	1.2 (0.8,1.7)		1.5 (1.0,2.2)	

<sup>1</sup> Model 1 adjusted for age, gender and socioeconomic position,

<sup>2</sup> Model 2 adjusted for age, gender, socioeconomic position, diabetes, hypertension, physical inactivity, BMI, smoking and hazardous alcohol consumption.

**Conclusion:** Persons affected by depression in combination with non-cardiovascular morbidity had a higher risk of CVD compared to those without non-cardiovascular morbidity or depression alone.