Supplementary Material

Associations of Changes in Cardiorespiratory Fitness and Symptoms of Anxiety and Depression with Brain Volumes: The HUNT Study

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Supplementary Table 1. Standardized beta coefficients (β) and 95% confidence intervals (CI) for the independent associations of changes in eCRF and HADS from HUNT2 to HUNT3 with BPF, hippocampal volume, and cortical volume (n=751).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Brain region | | | | | |
|  |  | BPF (Mean = 69.7%)\* | | Hippocampal volume (Mean = 7599μl)\*\* | | Cortical volume (Mean = 426764μl)\*\* | |
|  | *n* | β(95% CI) | Adjusted R2 | β(95% CI) | Adjusted R2 | β (95% CI) | Adjusted R2 |
| eCRF change‡ |  |  |  |  |  |  |  |
| Remained low | 265 | Ref. | 0.23 | Ref. | 0.40 | Ref. | 0.78 |
| Decreased | 112 | 0.01 (-0.07, 0.08) | 0.04 (-0.02, 0.11) | -0.004 (-0.04, 0.04) |
| Increased | 110 | **0.09 (0.02, 0.16)** | **0.09 (0.03, 0.15)** | 0.02 (-0.02, 0.06) |
| Remained high | 264 | **0.15 (0.07, 0.22)** | 0.06 (-0.01, 0.12) | **0.05 (0.12, 0.09)** |
|  |  |  |  |  |  |  |  |
| HADS-A change‡‡ |  |  |  |  |  |  |  |
| Remained favorable | 608 | Ref. | 0.23 | Ref. | 0.40 | Ref. | 0.78 |
| Improved | 58 | 0.01 (-0.06, 0.07) | -0.01 (-0.07, 0.05) | 0.002 (-0.03, 0.04) |
| Worsened | 45 | **-0.08 (-0.15, -0.01)** | -0.05 (-0.11, 0.01) | **-0.04 (-0.08, -0.01)** |
| Remained unfavorable | 40 | -0.003 (-0.07, 0.07) | 0.03 (-0.03, 0.09) | -0.01 (-0.04, 0.03) |
|  |  |  |  |  |  |  |  |
| HADS-D change‡‡‡ |  |  |  |  |  |  |  |
| Remained favorable | 645 | Ref. | 0.23 | Ref. | 0.40 | Ref. | 0.78 |
| Improved | 32 | 0.01 (-0.06, 0.08) | -0.02 (-0.07, 0.05) | -0.01 (-0.05, 0.03) |
| Worsened | 50 | -0.003 (-0.07, 0.07) | -0.001 (-0.06, 0.06) | -0.01 (-0.05, 0.03) |
| Remained unfavorable | 24 | -0.02 (-0.08, 0.05) | 0.01 (-0.05, 0.07) | 0.01 (-0.03, 0.05) |
|  |  |  |  |  |  |  |  |
| ΔeCRF§ | 751 | **0.16 (0.10, 0.23)** | 0.24 | **0.09 (0.03, 0.15)** | 0.40 | **0.06 (0.02, 0.09)** | 0.78 |
| ΔHADS-A§§ | 751 | -0.06 (-0.14, 0.02) | 0.24 | -0.07 (-0.14, 0.01) | 0.40 | -0.05 (-0.09, 0.001) | 0.78 |
| ΔHADS-D§§§ | 751 | -0.03 (-0.12, 0.06) | 0.24 | 0.03 (-0.05, 0.11) | 0.40 | 0.004 (-0.04, 0.05) | 0.78 |

BPF: brain parenchymal fraction; eCRF: estimated cardiorespiratory fitness; HADS-A: Hospital Anxiety and Depression Scale anxiety subscale; HADS-D: Hospital Anxiety and Depression Scale depression subscale. Bold text indicates statistically significant associations at p<0.05.   
\*Adjusted for age, sex, education, and smoking.   
\*\*Adjusted for age, sex, education, smoking, and intracranial volume.  
§Additionally adjusted for eCRF, HADS-A, and HADS-D at HUNT2, ΔHADS-A, and ΔHADS-D.

§§Additionally adjusted for eCRF, HADS-A, and HADS-D at HUNT2, ΔeCRF, and ΔHADS-D.

§§§Additionally adjusted for eCRF, HADS-A, and HADS-D at HUNT2, ΔeCRF, and ΔHADS-A.

‡ Additionally adjusted for categorical HADS-A and HADS-D change.

‡‡ Additionally adjusted for categorical eCRF and HADS-D change.

‡‡‡ Additionally adjusted for categorical eCRF and HADS-A change.