# Association between cardiorespiratory fitness and vascular function in type 2 diabetes

## Supporting information

**Supplementary Table 1. The construction of vascular health index.**

| Vascular health indicators | Criteria | Points assigned |
|---|---|---|
| ABI | ≥ 1.17 | 3 |
| | 1.08 - < 1.17 | 2 |
| | < 1.08 | 1 |
| $TcPO_2$ (mmHg) | ≥ 62 | 3 |
| | 51 - < 62 | 2 |
| | < 51 | 1 |
| PWV (m/s) | ≤ 8.12 | 3 |
| | 8.12 < - 9.24 | 2 |
| | > 9.24 | 1 |
| cIMT (mm) | < 1.0 | 3 |
| | 1.0 - < 1.5 | 2 |
| | ≥ 1.5 | 1 |

ABI, ankle-brachial index; $TcPO_2$, transcutaneous oxygen pressure; PWV, pulse wave velocity; cIMT, carotid intima-media thickness

The Vascular health index is calculated by summing the values assigned to the four vascular indicators. The score ranges from 4 to 12, with an index of less than 8 considered to be with impaired vascular function.

**Supplementary Table 2. Sensitivity analysis upon the exclusion of missing data.**

| Variable | No. of cases/total | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|---|
| | | OR (95%CI) | *P* | OR (95%CI) | *P* | OR (95%CI) | *P* |
| CRF tertiles (MET) | | | | | | | |
| Low (< 5.2) | 38/99 | 1 (Ref.) | | 1 (Ref.) | | 1 (Ref.) | |
| Middle (5.2 - 6.2) | 26/108 | 0.51 (0.28 - 0.93) | 0.03 | 0.68 (0.36 - 1.31) | 0.25 | 0.70 (0.35 - 1.43) | 0.33 |
| High (> 6.2) | 12/89 | 0.25 (0.12 - 0.52) | <0.001 | 0.38 (0.17 - 0.84) | 0.02 | 0.37 (0.16 - 0.86) | 0.02 |
| Per 1-MET increase | 76/296 | 0.61 (0.48 - 0.77) | <0.001 | 0.68 (0.53 - 0.87) | 0.002 | 0.64 (0.49 - 0.85) | 0.002 |

CRF, cardiorespiratory fitness; MET, metabolic equivalent; OR, odds ratio; CI, confidence interval

Model 1 was crude model.

Model 2 was adjusted for age and gender.

Model 3 was adjusted for age, gender, history of smoking, history of drinking, systolic blood pressure, body mass index, estimated glomerular filtration rate, high-density lipoprotein-cholesterol, triglycerides, and hemoglobin A1c.

Participants with missing data on high-density lipoprotein-cholesterol, triglycerides, and hemoglobin A1c was excluded for this analysis.

**Supplementary Table 3. Sensitivity analysis by employing quartiles of cardiorespiratory fitness.**

| Variable | No. of cases/total | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|---|
| | | OR (95%CI) | *P* | OR (95%CI) | *P* | OR (95%CI) | *P* |
| CRF quartiles (MET) | | | | | | | |
| Low (< 4.9) | 33/86 | 1 (Ref.) | | 1 (Ref.) | | 1 (Ref.) | |
| Middle (4.9 - 5.7) | 30/92 | 0.78 (0.42 - 1.44) | 0.42 | 1.18 (0.59 - 2.34) | 0.64 | 1.16 (0.55 - 2.44) | 0.70 |
| High (5.8 - 6.6) | 14/86 | 0.31 (0.15 - 0.64) | 0.002 | 0.42 (0.19 - 0.93) | 0.03 | 0.37 (0.16 - 0.86) | 0.02 |
| Very High (> 6.6) | 11/79 | 0.26 (0.12 - 0.56) | 0.001 | 0.37 (0.16 - 0.86) | 0.02 | 0.36 (0.14 - 0.91) | 0.03 |

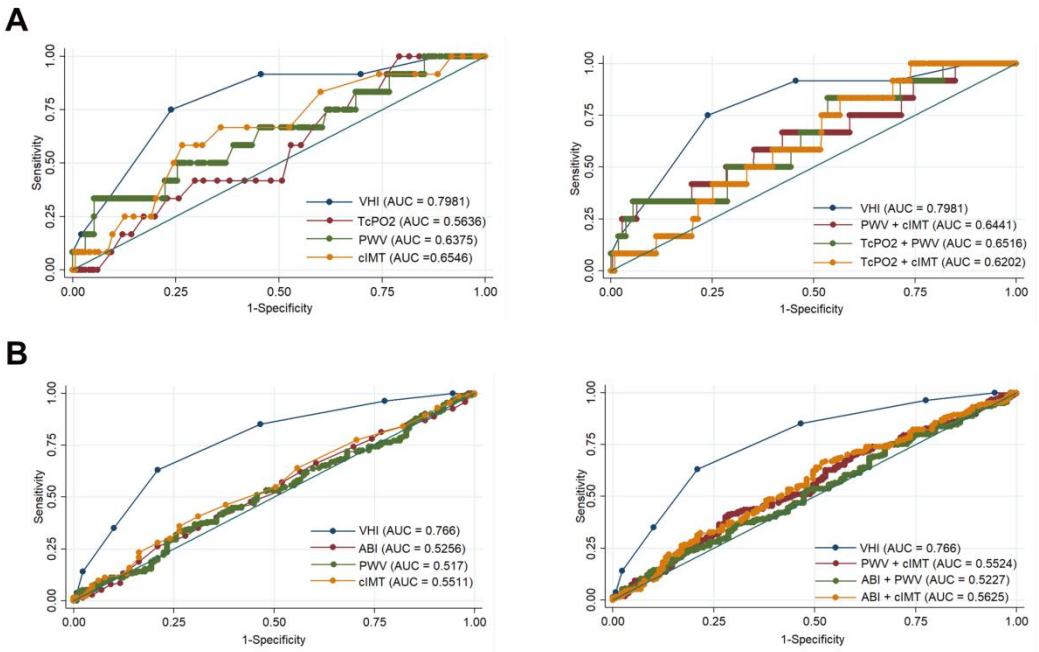
CRF, cardiorespiratory fitness; MET, metabolic equivalent; OR, odds ratio; CI, confidence interval.

Model 1 was crude model.

Model 2 was adjusted for age and gender.

Model 3 was adjusted for age, gender, history of smoking, history of drinking, systolic blood pressure, body mass index, estimated glomerular filtration rate, high-density lipoprotein-cholesterol, triglycerides, and hemoglobin A1c.

**Supplementary Figure 1. Receiver operating characteristic curve analysis.**



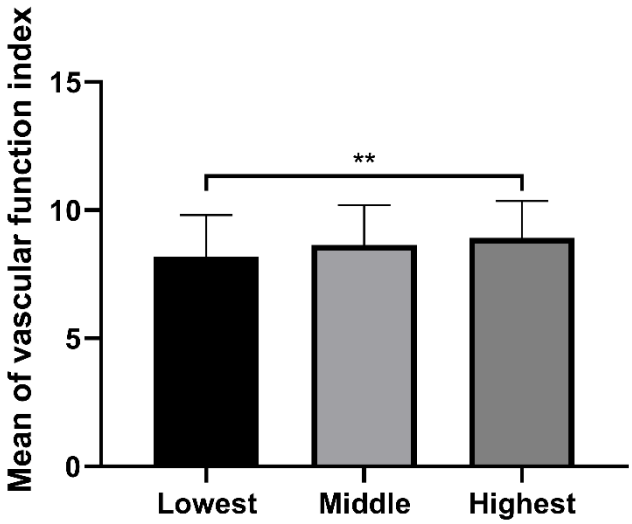

VHI, vascular health index; AUC, area under the receiver operating characteristic curve; TcPO2, transcutaneous oxygen pressure; PWV, pulse wave velocity; cIMT, carotid intima media thickness; ABI, ankle brachial index; ROC, receiver operating characteristic

Comparisons were conducted on the discriminability for macrovascular dysfunction (defined as ABI <1.0) and microvascular dysfunction (defined as TcPO2 <60mmHg) based on the ROC curves for VHI versus a single indicator or two combined indicators. The outcomes showed that VHI had the largest AUCs compared with all other indicators, with all the *P* values <0.001.

A. AUCs for macrovascular dysfunction: Left panel: ROC curves of VHI and the individual indicators. Right panel: ROC curve of VHI and the combination of two indicators.

B. AUCs for microvascular dysfunction: Left panel: ROC curve of VHI and the individual indicators. Right panel: ROC curve of VHI and the combination of two indicators.

**Supplementary Figure 2. Vascular function index across different categories of cardiorespiratory fitness**.




** *P* <0.05.