

**Supplementary Table 1: Comparison of baseline ECHO characteristics among healthy individuals and individuals with pre-existing co-morbidities (Diabetes, Hypertension, Cardiac disease)**

Variables (units)	Pre-existing comorbidities present				P value
	YES		NO		
	N	Mean (SD) / Median (IQR)	N	Mean (SD) / Median (IQR)	
Age (years)	1105	<b>46.06</b> (1.12)	1217	<b>45.93</b> (1.12)	0.005
Height (cm)	1099	<b>163.35</b> (9.11)	1216	<b>160.98</b> (9.01)	<0.001
Weight (kg)	1099	<b>73.31</b> (14.69)	1216	<b>65.25</b> (14.09)	<0.001
BMI (kg/m <sup>2</sup> )	1098	<b>27.43</b> (4.82)	1216	<b>25.16</b> (4.95)	<0.001
Body surface area (m <sup>2</sup> )	1098	<b>1.79</b> (0.20)	1216	<b>1.68</b> (0.19)	<0.001
SBP (mmHg)	1099	<b>137.70</b> (19.53)	1215	<b>117.97</b> (11.28)	<0.001
DBP (mmHg)	1099	<b>87.78</b> (12.45)	1215	<b>73.59</b> (9.09)	<0.001
Pulse	1099	<b>85.43</b> (11.86)	1215	<b>81.20</b> (10.64)	<0.001
<b>CARDIAC SIZE</b>					
LVIDD (mm)	1074	<b>46.08</b> (5.75)	1201	<b>44.69</b> (4.97)	<0.001
LVISD (mm)	1074	<b>29.84</b> (4.11)	1201	<b>28.85</b> (3.49)	<0.001
Fractional shortening	1074	<b>0.35</b> (0.05)	1201	<b>0.35</b> (0.04)	0.468
PWT (mm)	1074	<b>9</b> (8.33, 9.67)	1201	<b>8.67</b> (8, 9)	<0.001
Septal thickness (mm)	1074	<b>10</b> (9, 10.33)	1201	<b>9.33</b> (9, 10)	<0.001
Relative wall thickness (no units)	1074	<b>0.40</b> (0.06)	1201	<b>0.39</b> (0.07)	<0.001
LVEDV (4c) (ml)	1021	<b>63.60</b> (18.05)	1162	<b>62.04</b> (16.32)	0.132
LVESV (4c)(ml)	1021	<b>22.56</b> (6.99)	1162	<b>21.52</b> (5.96)	0.003
LV mass (2D) (g)	989	<b>117</b> (100, 140)	1140	<b>105</b> (89.9, 122.5)	<0.001
LV mass <sup>i</sup> (indexed for BSA, 2D) (g/m <sup>2</sup> )	983	<b>66.26</b> (58.09, 77.35)	1139	<b>63.03</b> (55.05, 72.25)	<0.001
<b>Categories of LV re-modelling/hypertrophy</b>					
None N (%) <sup>#</sup>		<b>620</b> (63.98)		<b>807</b> (71.42)	
Concentric remodelling N (%) <sup>#</sup>		<b>299</b> (30.86)		<b>287</b> (25.40)	0.001
Concentric hypertrophy N (%) <sup>#</sup>		<b>18</b> (1.86)		<b>9</b> (0.80)	
Eccentric hypertrophy N (%) <sup>#</sup>		<b>32</b> (3.30)		<b>27</b> (2.39)	
<b>SYSTOLIC FUNCTION</b>					
LV ejection fraction (%) <sup>†</sup>					
	1021	<b>64.98</b> (62.59, 67.13)	1162	<b>65.65</b> (63.27, 67.64)	<0.001
Low LV ejection fraction N (%)		<b>14</b> (1.37)		<b>6</b> (0.52)	
<b>Global longitudinal strain (GLS)</b>					
Average GLS	1096	<b>-18.55</b> (2.33)	1213	<b>-19.43</b> (2.82)	<0.001
GLS 2c	1084	<b>-18.53</b> (2.63)	1202	<b>-19.47</b> (3.25)	<0.001
GLS 4c	1092	<b>-19.60</b> (2.45)	1213	<b>-20.28</b> (2.99)	<0.001
GLS long axis	969	<b>-17.51</b> (3.35)	1115	<b>-18.62</b> (3.50)	<0.001
<b>Categories of GLS</b>					
Normal N (%) <sup>β</sup>		<b>885</b> (80.75)		<b>1090</b> (89.86)	
Borderline N (%) <sup>β</sup>		<b>161</b> (14.69)		<b>97</b> (08.00)	<0.001

Abnormal N (%) <sup>β</sup>	50 (04.56)		26 (02.14)		
<b>DIASTOLIC FUNCTION (additionally excluded people in atrial fibrillation)</b>					
E (cm/sec)					
A (cm/sec)	1102	<b>75.80</b> (66.40, 85.80)	1215	<b>75.40</b> (66.60, 85)	0.810
E/A (no units)	1102	<b>66.63</b> (59.20, 75.40)	1215	<b>60.80</b> (54, 68.57)	<0.001
Deceleration time (ms)	1102	<b>1.15</b> (0.96, 1.29)	1215	<b>1.25</b> (1.10, 01.4)	<0.001
Medial e' (cm/sec)	1102	<b>144</b> (121, 162)	1215	<b>148</b> (126, 169)	<0.001
Lateral e' (cm/sec)	1102	<b>10.70</b> (2.36)	1213	<b>11.56</b> (2.27)	<0.001
Average e' (cm/sec)	1101	<b>7.98</b> (1.67)	1212	<b>8.70</b> (1.65)	<0.001
Medial E/e' (no units)	1103	<b>9.34</b> (1.82)	1213	<b>10.13</b> (1.74)	<0.001
Lateral E/e' (no units)	1100	<b>9.71</b> (8.23, 11.19)	1212	<b>8.73</b> (7.57, 10.14)	<0.001
Average E/e'	1101	<b>7.08</b> (6.05, 8.42)	1213	<b>6.58</b> (5.64, 7.79)	<0.001
LA volume <sup>i</sup> (ml/m <sup>2</sup> ) - 4c	1102	<b>8.35</b> (7.26, 9.75)	1213	<b>7.71</b> (6.67, 8.86)	<0.001
LA volume <sup>i</sup> (ml/m <sup>2</sup> ) - 2C	1014	<b>11.08</b> (9.25, 12.9)	1161	<b>11.45</b> (9.35, 13.64)	0.029
Average LA volume ml/m <sup>2</sup>	990	<b>11.09</b> (9.44, 13.17)	1145	<b>11.28</b> (9.38, 13.40)	0.003
TR max (m/sec)	983	<b>11.25</b> (9.54, 12.75)	1143	<b>11.34</b> (9.64, 13.32)	0.035
TR max (m/sec)	943	<b>165.71</b> (39.72)	1100	<b>176.79</b> (37.73)	<0.001
<b>Categories of LV diastolic dysfunction (participants with normal LV ejection fraction only)*</b>					
None N (%) <sup>γ</sup>		<b>922</b> (91.56)		<b>1101</b> (95.24)	
Indeterminate N (%) <sup>γ</sup>		<b>85</b> (08.44)		<b>55</b> (04.76)	0.001
Dysfunction N (%) <sup>γ</sup>		<b>0</b> (0.0)		<b>0</b> (0.0)	

LV: left ventricle; LVIDD: LV internal diameter in diastole; LVISD: LV internal diameter in systole; PWT: Posterior wall thickness; GLS: Global longitudinal strain; E: passive ejection of left atrium; A: active atrial contraction; e': diastolic annular velocity. Participants with cardiac abnormalities excluded from the analysis.

**Supplementary Table 2: Descriptive data for VBC participants stratified by urban or rural residence**

Variable units	N	RURAL				URBAN			
		MALE Mean SD/ Median IQR <sup>†</sup> / N %	N	FEMALE Mean SD/ Median IQR <sup>†</sup> / N %	N	MALE Mean SD/ Median IQR <sup>†</sup> / N %	N	FEMALE Mean SD/ Median IQR <sup>†</sup> / N %	
<b>Clinical characteristics</b>									
Age (years)	460	<b>45.6</b> (1.06)	451	<b>45.9</b> (1.14)	364	<b>46.2</b> (1.06)	294	<b>46.3</b> (1.08)	
Height (cm)	460	<b>166.8</b> (6.0)	451	<b>154.5</b> (5.8)	364	<b>167.6</b> (6.8)	294	<b>154.6</b> (5.7)	
Weight (kg)	460	<b>66.0</b> (12.4)	451	<b>60.1</b> (12.9)	364	<b>71.7</b> (14.0)	294	<b>66.1</b> (12.6)	
BMI (kg/m <sup>2</sup> )	460	<b>23.6</b> (3.9)	451	<b>25.1</b> (5.1)	364	<b>25.4</b> (4.3)	294	<b>27.6</b> (4.8)	
Body surface area (m <sup>2</sup> )	460	<b>1.73</b> (0.17)	451	<b>1.57</b> (0.16)	364	<b>1.80</b> (0.18)	294	<b>1.64</b> (0.15)	
Systolic blood pressure (mmHg)	460	<b>128.9</b> (18.8)	451	<b>123.0</b> (18.6)	364	<b>132.4</b> (19.6)	294	<b>128.0</b> (17.9)	
Diastolic blood pressure	460	<b>79.7</b> (14.0)	451	<b>74.8</b> (11.4)	364	<b>79.6</b> (13.7)	294	<b>77.0</b> (10.9)	
Pulse (bpm)	460	<b>79.1</b> (11.7)	451	<b>84.3</b> (11.1)	364	<b>82.8</b> (12.0)	294	<b>87.1</b> (11.2)	
SLI score	364	<b>31.2</b> (5.6)	294	<b>30.7</b> (6.2)	460	<b>28.2</b> (6.9)	451	<b>27.5</b> (6.8)	
Tobacco use									
Never		<b>277</b> (60.2)		<b>415</b> (92.0)		<b>222</b> (61.0)		<b>283</b> (96.3)	
Ex-user		<b>36</b> (7.8)		<b>3</b> (0.7)		<b>33</b> (9.1)		<b>2</b> (0.7)	
Current user		<b>147</b> (32.0)		<b>33</b> (7.3)		<b>109</b> (30.0)		<b>9</b> (3.1)	
Alcohol consumption									
none		<b>173</b> (37.6)		<b>451</b> (100.0)		<b>148</b> (40.7)		<b>294</b> (100.0)	
mild		<b>179</b> (38.9)		<b>0</b> (0.0)		<b>148</b> (40.7)		<b>0</b> (0.0)	
moderate		<b>66</b> (14.4)		<b>0</b> (0.0)		<b>38</b> (10.4)		<b>0</b> (0.0)	
heavy		<b>42</b> (9.1)		<b>0</b> (0.0)		<b>30</b> (8.2)		<b>0</b> (0.0)	
<b>Cardiac size</b>									
LVIDd (mm)	460	<b>45.6</b> (4.57)	451	<b>42.9</b> (4.44)	364	<b>45.6</b> (4.55)	294	<b>43.2</b> (4.47)	
LVIDs (mm)	460	<b>29.27</b> (3.12)	451	<b>27.39</b> (2.81)	364	<b>29.28</b> (3.19)	294	<b>27.53</b> (3.06)	
Fractional shortening	460	<b>0.36</b> (0.04)	451	<b>0.36</b> (0.04)	364	<b>0.36</b> (0.03)	294	<b>0.36</b> (0.05)	
PWT (mm) <sup>†</sup>	460	<b>9.0</b> (8.3, 9.3)	451	<b>8.7</b> (8.0, 9.0)	364	<b>9.0</b> (8.7, 9.7)	294	<b>9.0</b> (8.3, 9.0)	
Septal thickness (mm)	460	<b>9.9</b> (1.1)	451	<b>9.3</b> (1.0)	364	<b>10.0</b> (1.2)	294	<b>9.4</b> (1.0)	
Relative wall thickness <sup>†</sup>	460	<b>0.39</b> (0.36, 0.42)	451	<b>0.39</b> (0.36, 0.43)	364	<b>0.40</b> (0.37, 0.43)	294	<b>0.40</b> (0.37, 0.44)	
LVEDV 4c (ml) <sup>†</sup>	460	<b>69.1</b> (59.8, 83.3)	451	<b>58.9</b> (49.2, 70.9)	364	<b>66.5</b> (55.6, 82.5)	294	<b>56.7</b> (49.6, 68.2)	
LVESV 4c (ml) <sup>†</sup>	460	<b>23.7</b> (19.9, 28.4)	451	<b>20.2</b> (16.9, 23.9)	364	<b>23.0</b> (18.9, 28.3)	294	<b>19.7</b> (17.0, 23.3)	
LV mass absolute (g) <sup>†</sup>	460	<b>117.0</b> (98.8, 134.0)	451	<b>97.3</b> (83.8, 112.0)	364	<b>116.0</b> (99.3, 136.0)	294	<b>102.0</b> (85.4, 118.0)	
LV mass <sup>i</sup> indexed for BSA, (g/m <sup>2</sup> )	460	<b>67.4</b> (58.9, 77.2)	451	<b>62.3</b> (54.9, 70.7)	364	<b>64.8</b> (57.3, 75.6)	294	<b>61.7</b> (54.9, 70.3)	
<b>Categories of LV re-modelling/hypertrophy</b>									
None (n, %)		<b>330</b> (70.8)		<b>253</b> (68.4)		<b>296</b> (64.5)		<b>182</b> (60.9)	
Concentric remodelling (n, %)		<b>124</b> (26.6)		<b>107</b> (28.9)		<b>141</b> (30.7)		<b>107</b> (35.8)	
Concentric hypertrophy (n, %)		<b>3</b> (0.6)		<b>5</b> (1.4)		<b>8</b> (1.7)		<b>4</b> (1.3)	
Eccentric hypertrophy (n, %)		<b>9</b> (1.9)		<b>5</b> (1.4)		<b>14</b> (3.1)		<b>6</b> (2.0)	
<b>SYSTOLIC FUNCTION</b>									
LV ejection fraction (%) <sup>†</sup>	460	<b>65.4</b> (63.1, 67.4)	364	<b>65.4</b> (63.3, 67.2)	451	<b>65.8</b> (63.6, 67.6)	294	<b>65.5</b> (63.7, 67.2)	
Low LV ejection fraction (n, %)		<b>3</b> (0.6)		<b>3</b> (0.8)		<b>1</b> (0.2)		<b>2</b> (0.7)	
Average GLS	460	<b>-19.7</b> (2.0)	364	<b>-18.4</b> (2.2)	450	<b>-20.1</b> (2.1)	294	<b>-19.2</b> (2.3)	

**Categories of GLS**

Normal (n, %)	<b>431</b> (92.5)	<b>286</b> (77.3)	<b>423</b> (92.4)	<b>260</b> (87.0)
Borderline (n, %)	<b>27</b> (5.8)	<b>56</b> (15.1)	<b>26</b> (5.7)	<b>28</b> (9.4)
Abnormal (n, %)	<b>8</b> (1.7)	<b>28</b> (7.6)	<b>9</b> (2.0)	<b>11</b> (3.7)

**DIASTOLIC FUNCTION additionally excluded people in atrial fibrillation**

Mitral - E (cm/sec) <sup>†</sup>	460	<b>74.8</b> (65.0, 85.4)	364	<b>73.9</b> (64.8, 82.8)	448	<b>77.6</b> (69.4, 89.3)	293	<b>80.4</b> (71.1, 89.6)
Mitral - A (cm/sec) <sup>†</sup>	460	<b>60.4</b> (53.0, 68.3)	364	<b>60.6</b> (53.2, 67.1)	448	<b>64.2</b> (56.1, 73.1)	293	<b>65.4</b> (58.6, 74.4)
Mitral E/A <sup>†</sup>	460	<b>1.2</b> (1.09, 1.43)	364	<b>1.24</b> (1.07, 1.39)	448	<b>1.24</b> (1.10, 1.39)	293	<b>1.22</b> (1.11, 1.35)
Deceleration time (ms)	460	<b>152.4</b> (31.0)	364	<b>142.0</b> (30.5)	448	<b>145.9</b> (31.6)	293	<b>138.8</b> (29.7)
Mitral E/average e' <sup>†</sup>	460	<b>7.8</b> (6.8, 9.1)	364	<b>8.1</b> (7.1, 9.4)	448	<b>8.5</b> (7.2, 9.5)	293	<b>8.8</b> (7.8, 10.0)
LA volume <sup>i</sup> (ml/m <sup>2</sup> ) - 4c <sup>†</sup>	460	<b>11.8</b> (10.1, 13.9)	364	<b>11.3</b> (9.6, 13.3)	450	<b>12.1</b> (10.4, 14.4)	294	<b>11.7</b> (9.8, 13.7)
Average LA volume <sup>i</sup> (ml/m <sup>2</sup> ) <sup>†</sup>	460	<b>11.6</b> (10.2, 13.3)	364	<b>11.3</b> (9.8, 13.0)	450	<b>12.2</b> (10.6, 14.2)	294	<b>11.7</b> (10.0, 13.3)
TR max m/sec	458	<b>174.7</b> (40.1)	364	<b>173.1</b> (37.6)	450	<b>180.1</b> (37.3)	294	<b>178.9</b> (38.7)

**Categories of LV diastolic dysfunction participants with normal LV ejection fraction only\***

None (n, %)	<b>449</b> (98.68)	<b>359</b> (99.45)	<b>447</b> (99.33)	<b>290</b> (98.98)
Indeterminate (n, %)	<b>6</b> (1.32)	<b>2</b> (0.55)	<b>3</b> (0.67)	<b>3</b> (1.02)
Dysfunction (n, %)	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Co-morbidities**

Diabetes (n, %)	<b>113</b> (24.57)	<b>99</b> (27.20)	<b>79</b> (17.52)	<b>79</b> (26.87)
Hypertension (n, %)	<b>138</b> (30.00)	<b>130</b> (35.71)	<b>93</b> (20.62)	<b>80</b> (27.21)
Myocardial infarction (n, %)	<b>4</b> (0.87)	<b>4</b> (1.10)	<b>0</b> (0.00)	<b>0</b> (0.00)
Atrial fibrillation (n, %)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>1</b> (0.22)	<b>0</b> (0.00)

Overweight (BMI ≥25 kg/m<sup>2</sup>), n (Obesity (BMI ≥30 kg/m<sup>2</sup>), n (%)

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LV: left ventricle; LVIDD:LV internal diameter in diastole; LVISD: LV internal diameter in systole; PWT: Posterior wall thickness; GLS: Global longitudinal strain; E: passive ejection of left atrium; A: active atrial contraction; e': diastolic annular velocity. Participants with known cardiac disease excluded from the analysis.



**Supplementary table 3. Comparison of Cardiac structure and function between IndEcho and other published studies form different ethnicities**

Ethnicity	SABRE <sup>1</sup>			LOLIPOP <sup>2</sup>		NORRE study <sup>3</sup>	Sullere et al <sup>4</sup>	INDEA study <sup>5</sup>	IndEcho (Current study)		WASE <sup>6</sup>	2015 ASE/EACVI guidelines
	European (n=427)	African Caribbean (n=143)	Migrant South Asians in UK (n=325)	European white (n=199)	Indian Asian migrants in the UK (n=259)	Caucasians (n=734)	Indians (n=707)	Indians (n=880)	NDBC (n=753)	VBC (n=1564)	Indians range	N=839
Age	70.1 (6.2)	70.9 (5.8)	69.2 (6.0)	51.8 (8.5)	50.6 (8.5)	45.8 (13.3)	40.7 (11.4)	39.7 (12.3)	46.13 (1.10)	45.93 (1.13)	-	45 (32 – 65)
Height, m	1.73 (0.07)	1.72 (0.06)	1.69 (0.06)	-	-	1.70 (0.96)	1.66 (1.01)	-	1.64 (0.09)	1.61 (0.09)	-	167 (160–174)
Weight, kg	80.4 (11.7)	71.7 (9.5)	79.3 (11.3)	-	-	69.5 (12.0)	74.6 (14.7)	-	76.4 (15.0)	65.6 (13.6)	-	67 (58–77)
BMI	-	-	-	24.4 (2.7)	25.0 (2.6)	24.0 (3.0)	27.2 (4.9)	23.7 (2.1)	28.4 (5.0)	25.2 (4.7)	-	-
BSA	-	-	-	1.90 (0.2)	1.80 (0.2)	1.80 (0.2)	-	1.69 (0.15)	1.83 (0.20)	1.69 (0.19)	-	-
LVIDd, cm	4.52 (0.02)	4.46 (0.03)	4.39 (0.02)	-	-	4.43 (0.48)	4.62 (0.44)	4.22 (0.39)	4.82 (0.61)	4.40 (0.52)	3.4 to 5.2 (M) 3.2 to 4.9 (M)	4.2 to 5.8 (M) 3.8 to 5.2 (F)
LVEDV, ml	84.6 (0.9)	79.0 (1.6)	77.3 (1.02)	-	-	92.8 (24.8)	88.1 (20.7)	71.5 (17.5)	55.3 (14.7)	63.1 (15.2)	47 to 113 (M) 40 to 91 (F)	62 to 150 (M) 46 to 106 (F)
IVS, cm	1.15 (0.1)	1.25 (0.02)	1.10 (0.1)	-	-	0.86 (0.2)	1.07 (0.11)	0.89 (0.1)	0.96 (0.2)	0.97 (0.1)	-	-
PWT, cm	1.02 (0.01)	1.09 (0.01)	1.00 (0.01)	-	-	0.88 (0.2)	1.06 (0.1)	-	0.87 (0.2)	0.88 (0.1)	-	-
RWT	0.46 (0.004)	0.49 (0.007)	0.46 (0.004)	0.35 (0.07)	0.37 (0.07)	-	0.47 (0.05)	-	0.38 (0.08)	0.40 (0.06)	-	-
LV mass, g	176.3 (2.1)	190.8 (3.7)	159.8 (2.4)	159.3 (45.3)	132.5 (33.4)	126.8 (37.4)	176.8 (37.7)	-	126.2 (33.5)	110.5 (27.6)	-	-
LV mass/BSA, g/m <sup>2</sup>	92.9 (1.04)	101.0 (1.8)	90.2 (1.2)	92.1 (2.5)	80.2 (1.9)	69.9 (17.5)	96.9 (22.2)	-	69.6 (18.3)	65.4 (13.8)	40 to 88 (M) 37 to 78 (M)	43 – 102 (M) 36 – 89 (F)
E/A ratio	-	-	-	1.2 (0.3)	1.2 (0.4)	-	1.4 (0.4)	1.5 (0.5)	1.1 (0.23)	1.2 (0.27)	-	-
EF (%)	-	-	-	62 (5)	62 (6)	63.9 (4.9)	61.2 (5.1)	61.7 (5.9)	64.0 (4.4)	65.3 (3.0)	58 to 69 (M) 59 to 69 (F)	52 – 72 (M) 54 – 74 (F)
GLS%	-	-	-	-	-	-	-	- 21.0 (2.9)	-18.14 (3.14)	-19.4 (2.2)	-17 to -25 (M) -18 to -26 (F)	-

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