Begrambekova Yu. L.[1], Mareev Yu. V.[12], Mareev V. Yu.[1], Orlova Ya. A.[1], Kobalava Zh. D. [3,4], Karapetyan L. V. [3, 4], Galochkin S. A.[3, 4], Kazakhmedov E. R.[3, 4], Lapshin A. A.[3, 4], Garganeeva A. A.[5], Kuzheleva E. A.[5], Efremushkina A. A.[6, 7], Kiseleva E. V.[7], Barbarash O. L.[8], Pecherina T. B.[8], Galyavich A. A.[9], Galeeva Z. M.[9], Baleeva L. V.[9], Koziolova N. A.[10], Veklich A. S.[10], Duplyakov D. V.[11, 12], Maksimova M. N.[12], Yakushin S. S.[13, 14], Smirnova E. A.[14], Sedykh E. V.[13, 14], Shaposhnik I. I.[15], Makarova N. A.[15], Zemlyanukhina A. A.[16], Skibitsky V. V.[17], Fendrikova A. V.[17], Skibitsky A. V.[17], Spiropoulos N. A.[18], Seredenina E. M.[1], Errolanova K. A.[19], Kotovskaya Yu. V.[19], Tkacheva O. N.[19], Fedin M. A.[19, 20]

[1] Lomonosov Medical Research and Educational Center, Moscow, Russia
[2] National Medical Research Center for Therapy and Preventive Medicine, Moscow, Russia
[3] Peoples' Friendship University of Russia, Moscow, Russia
[4] Vinogradov Municipal Clinical Hospital, Moscow, Russia
[5] Research Institute of Cardiology, Tomsk National Research Medical Center of the Russian Academy of Sciences, Tomsk, Russia
[6] Altai State Medical University, Barnaul, Russia
[7] Altai Territorial Cardiological Dispensary, Barnaul, Russia
[8] Research Institute for Complex Issues of Cardiovascular Diseases, Kemerovo, Russia
[9] Kazan State Medical University, Kazan, Russia
[10] Vagner Perm State Medical University, Perm, Russia
[11] Research Institute of Cardiology, Samara State Medical University, Samara, Russia
[12] Polyakov Samara Regional Clinical Cardiological Dispensary, Samara, Russia
[13] Pavlov Ryazan State Medical University, Ryazan, Russia
[14] Ryazan Regional Clinical Cardiological Dispensary, Ryazan, Russia
[15] South Ural State Medical University, Chelyabinsk, Russia
[16] Chelyabinsk Municipal Clinical Hospital #1, Chelyabinsk, Russia
[17] Kuban State Medical University, Krasnodar, Russia
[18] Clinical Hospital for Emergency Care, Krasnodar, Russia
[19] Russian Gerontological Research and Clinical Center, Moscow, Russia
[20] Pirogov Russian National Research Medical University, Moscow, Russia

# Female and Male Phenotypes of Iron Deficiency in CHF. Additional analysis of the «The Prevalence of Iron Deficiency in Patients With Chronic Heart Failure in the Russian Federation (J-CHF-RF)» study

## ADDITIONAL MATERIALS

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**Table 1.** Comparison of clinical characteristics of patients with and without ID depending on sex according to the ESC criteria

| Parameter | Female patients N = 198 | | | Male patients N = 299 | | |
|---|---|---|---|---|---|---|
| | With ID, N=174 | Without ID, N=24 | p | With ID, N=239 | Without ID, N=60 | p |
| Age, years, Me [Q1; Q3] | 74.0 [66.2; 82.8] | 71.5 [66.0; 81.0] | 0.557 | 67.0 [60.0; 74.0] | 64.0 [54.8; 71.5] | 0.027 |
| BMI, median [Q1; Q3] | 32.2 [27.6; 37.0] | 31.2 [24.9; 34.2] | 0.260 | 29.4 [25.6; 33.9] | 27.9 [25.6; 32.4] | 0.328 |
| Anemia, N (%) | 73 (42.0%) | 4 (16.7%) | 0.031 | 107 (44.8%) | 17 (28.3%) | 0.030 |
| Atrial fibrillation, N (%) | 110 (63.2%) | 9 (37.5%) | 0.029 | 138 (57.7%) | 29 (48.3%) | 0.243 |
| **Alcohol misuse, N (%):** | | | 0.037 | | | 0.092 |
| • Present | 4 (2.30%) | 1 (4.17%) | | 23 (9.62%) | 8 (13.3%) | |
| • Past | 3 (1.72%) | 3 (12.5%) | | 23 (9.62%) | 11 (18.3%) | |
| • Never | 167 (96.0%) | 20 (83.3%) | | 193 (80.8%) | 41 (68.3%) | |
| Surgeries, N (%): | 5 (2.87%) | 2 (8.33%) | 0.205 | 20 (8.37%) | 8 (13.3%) | 0.351 |
| Diabetes mellitus, N (%) | 76 (43.7%) | 10 (41.7%) | 1.000 | 58 (24.3%) | 13 (21.7%) | 0.800 |
| Hypothyroidism, N (%) | 12 (6.90%) | 2 (8.33%) | 1.000 | 5 (2.09%) | 0 (0.00%) | 0.378 |
| Hyperthyroidism, N (%) | 2 (1.15%) | 1 (4.17%) | 0.327 | 239 (100%) | 60 (100%) | |
| **Type of CHF, N (%):** | | | 0.947 | | | 0.459 |
| • HFpEF | 93 (53.4%) | 14 (58.3%) | | 72 (30.1%) | 23 (38.3%) | |
| • HFrEF | 58 (33.3%) | 7 (29.2%) | | 121 (50.6%) | 26 (43.3%) | |
| • HFmrEF | 23 (13.2%) | 3 (12.5%) | | 46 (19.2%) | 11 (18.3%) | |
| **HF NYHA class, N (%):** | | | 1.000 | | | 0.002 |
| I | 2 (1.15%) | 0 (0.00%) | | 10 (4.18%) | 7 (11.7%) | |
| II | 35 (20.1%) | 5 (20.8%) | | 74 (31.0%) | 27 (45.0%) | |
| III | 106 (60.9%) | 15 (62.5%) | | 116 (48.5%) | 24 (40.0%) | |
| IV | 31 (17.8%) | 4 (16.7%) | | 39 (16.3%) | 2 (3.33%) | |
| LVEF, %, Me [Q1; Q3] | 50.5 [37.0; 57.8] | 54.0 [37.5; 62.0] | 0.472 | 40.0 [30.0; 52.0] | 44.5 [30.8; 58.0] | 0.102 |
| Hemoglobin, g/dL, Me [Q1; Q3] | 12.3 [11.1; 13.4] | 13.3 [12.3; 14.3] | 0.016 | 13.3 [11.6; 14.6] | 14.2 [12.9; 16.2] | <0.001 |
| TSAT, %, Me [Q1; Q3] | 12.3 [7.04; 17.8] | 27.8 [21.1; 32.3] | <0.001 | 11.8 [7.10; 17.1] | 28.0 [21.8; 36.7] | <0.001 |
| Ferritin, ng/dL, Me [Q1; Q3] | 44.0 [26.0; 84.4] | 176 [145; 265] | <0.001 | 62.3 [33.9; 92.8] | 186 [137; 353] | <0.001 |
| Iron, μmol/L, Me [Q1; Q3] | 8.27 [4.93; 11.8] | 15.5 [11.0; 19.2] | <0.001 | 8.30 [5.22; 12.3] | 16.7 [11.0; 21.7] | <0.001 |
| Transferrin, g/L, Me [Q1; Q3] | 2.91 [2.47; 3.29] | 2.13 [1.85; 2.51] | <0.001 | 2.76 [2.38; 3.22] | 2.26 [1.96; 2.62] | <0.001 |
| RBC, ×1012/L, Me [Q1; Q3] | 4.38 [3.90; 4.78] | 4.45 [4.08; 4.68] | 0.962 | 4.52 [4.00; 4.92] | 4.56 [4.10; 5.21] | 0.265 |
| WBC, ×109/L, Me [Q1; Q3] | 7.20 [6.01; 8.50] | 8.14 [6.50; 9.93] | 0.269 | 7.70 [6.30; 9.18] | 7.41 [6.55; 8.81] | 0.727 |
| MCH, pg, Me [Q1; Q3] | 28.5 [26.7; 30.0] | 30.0 [28.8; 30.6] | 0.006 | 29.4 [26.6; 31.0] | 31.0 [29.9; 32.1] | <0.001 |
| MCV, fl, Me [Q1; Q3] | 87.5 [82.5; 91.7] | 91.3 [89.1; 94.8] | 0.001 | 89.5 [83.6; 94.3] | 92.5 [89.0; 97.8] | 0.001 |
| RDW CV, %, Me [Q1; Q3] | 15.1 [14.0; 17.2] | 14.2 [13.6; 15.0] | 0.022 | 15.4 [13.8; 17.6] | 14.1 [13.1; 15.9] | 0.006 |
| RDW SD, fl, Me [Q1; Q3] | 49.0 [44.7; 56.5] | 50.2 [47.2; 53.3] | 0.887 | 50.1 [44.7; 54.8] | 52.6 [40.9; 56.5] | 0.714 |
| NT-proBNP, pg/mL, Me [Q1; Q3] | 3551 [1118; 8039] | 2442 [1210; 6119] | 0.348 | 3827 [1376; 8922] | 1020 [343; 2689] | <0.001 |
| ACE inhibitors, N (%) | 101 (58.0%) | 11 (45.8%) | 0.362 | 146 (61.1%) | 34 (56.7%) | 0.633 |
| ARBs, N (%) | 54 (31.0%) | 11 (45.8%) | 0.224 | 45 (18.8%) | 10 (16.7%) | 0.841 |
| ARNIs, N (%) | 8 (4.60%) | 0 (0.00%) | 0.586 | 30 (12.6%) | 12 (20.0%) | 0.202 |
| ACE inhibitors/ARBs/ARNIs, N (%) | 163 (93.7%) | 22 (91.7%) | 1.000 | 221 (92.5%) | 56 (93.3%) | 1.000 |
| Beta-blockers, N (%) | 161 (92.5%) | 21 (87.5%) | 0.408 | 215 (90.0%) | 54 (90.0%) | 1.000 |
| MCRAs, N (%) | 123 (70.7%) | 15 (62.5%) | 0.561 | 187 (78.2%) | 38 (63.3%) | 0.026 |
| Ivabradine, N (%) | 1 (0.57%) | 1 (4.17%) | 0.229 | 2 (0.84%) | 1 (1.67%) | 1.000 |
| Diuretics, N (%) | 162 (93.1%) | 22 (91.7%) | 1.000 | 213 (89.1%) | 48 (80.0%) | 0.093 |
| Loop diuretics, N (%) | 153 (87.9%) | 17 (70.8%) | 0.033 | 209 (87.4%) | 47 (78.3%) | 0.111 |
| Cardiac glycosides, N (%) | 26 (14.9%) | 3 (12.5%) | 0.772 | 31 (13.0%) | 5 (8.33%) | 0.444 |
| 6MWD, m, mean (SD) | 222 (100) | 241 (80.0) | 0.313 | 264 (115) | 318 (98.1) | <0.001 |

Data are presented as the absolute numbers of patients and their percentage of the total number of patients in the group, or the medians with 25$^{th}$ and 75$^{th}$ quartiles, or the means and standard deviations, AF, atrial fibrillation; DM, diabetes mellitus; CHF, chronic heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; HFmrEF, heart failure with mid-range ejection fraction; LVEF, left ventricular ejection fraction; TSAT, transferrin saturation; MCH, mean corpuscular hemoglobin; MCV, mean corpuscular volume; NT-proBNP, N-terminal pro-brain natriuretic peptide; NYHA class, functional class of heart failure according to the New York Heart Association classification; ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blocker; ARNI, angiotensin receptor-neprilysin inhibitor; MCRA, mineralocorticoid receptor antagonist; 6MWD, 6 minute walk distance; RDW SD, RDW CV, red blood cell distribution width.


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**Table 2.** Comparison of clinical characteristics of patients with and without ID depending on sex according to the ESC criteria

| Parameters | Female | | | Male | | |
|---|---|---|---|---|---|---|
| | Without ID, N=44 | With ID, N=154 | p, overall | Without ID, N=83 | With ID, N=217 | p, overall |
| Age, years, Me [Q1; Q3] | 71.0 [62.8;81.0] | 74.0 [67.0;83.0] | 0.273 | 65.0 [57.5;73.0] | 67.0 [59.0;74.0] | 0.103 |
| BMI, Me [Q1; Q3] | 29.3 [25.0;37.8] | 32.4 [28.3;37.0] | 0.048 | 27.4 [25.4;32.8] | 30.0 [25.9;34.1] | 0.073 |
| Anemia, N (%) | 9 (20.5%) | 68 (44.2%) | 0.008 | 16 (19.3%) | 108 (49.8%) | <0.001 |
| Atrial fibrillation, N (%) | 20 (45.5%) | 99 (64.3%) | 0.038 | 40 (48.2%) | 128 (59.0%) | 0.120 |
| **Alcohol misuse, N (%):** | | | 0.254 | | | 0.569 |
| • Present | 1 (2.27%) | 4 (2.60%) | | 8 (9.64%) | 23 (10.6%) | |
| • Past | 3 (6.82%) | 3 (1.95%) | | 12 (14.5%) | 22 (10.1%) | |
| • Never | 40 (90.9%) | 147 (95.5%) | | 63 (75.9%) | 172 (79.3%) | |
| **Alcohol 01, N (%):** | | | 1.000 | | | 0.974 |
| • Yes | 1 (2.27%) | 4 (2.60%) | | 8 (9.64%) | 23 (10.6%) | |
| • No | 43 (97.7%) | 150 (97.4%) | | 75 (90.4%) | 194 (89.4%) | |
| **Surgeries, N (%):** | | | 0.043 | | | 1.000 |
| • Yes | 4 (9.09%) | 3 (1.95%) | | 8 (9.64%) | 20 (9.22%) | |
| • No | 40 (90.9%) | 151 (98.1%) | | 75 (90.4%) | 197 (90.8%) | |
| Diabetes mellitus, N (%) | 11 (25.0%) | 75 (48.7%) | 0.009 | 19 (22.9%) | 52 (24.0%) | 0.965 |
| Hypothyroidism, N (%) | 4 (9.09%) | 10 (6.49%) | 0.730 | 1 (1.20%) | 4 (1.84%) | 1.000 |
| Hyperthyroidism, N (%) | 0 (0.00%) | 3 (1.95%) | 0.578 | 83 (100%) | 217 (100%) | . |
| **Type of CHF, N (%):** | | | 0.541 | | | 0.431 |
| • HFmrEF | 5 (11.4%) | 21 (13.6%) | | 17 (20.5%) | 40 (18.4%) | |
| • HFpEF | 27 (61.4%) | 80 (51.9%) | | 30 (36.1%) | 65 (30.0%) | |
| • HFrEF | 12 (27.3%) | 53 (34.4%) | | 36 (43.4%) | 112 (51.6%) | |
| LVEF, %, Me [Q1; Q3] | 53.5 [38.8;60.5] | 50.0 [37.0;57.0] | 0.277 | 45.0 [34.5;55.0] | 40.0 [28.0;52.0] | 0.047 |
| Hemoglobin, g/dL, Me [Q1; Q3] | 13.5 [12.6;14.4] | 12.2 [11.0;13.2] | <0.001 | 14.8 [13.4;16.2] | 13.1 [11.4;14.3] | <0.001 |
| TSAT, %, Me [Q1; Q3] | 29.7 [25.7;36.1] | 10.4 [6.14;15.2] | <0.001 | 30.5 [24.6;38.0] | 11.0 [6.80;15.0] | <0.001 |
| Ferritin, ng/dL, Me [Q1; Q3] | 70.0 [37.9;135] | 47.3 [26.0;104] | 0.067 | 95.5 [55.5;160] | 67.7 [35.5;127] | 0.004 |
| Iron, μmol/L, Me [Q1; Q3] | 19.4 [16.6;23.7] | 7.62 [4.71;10.3] | <0.001 | 19.4 [16.7;23.7] | 7.37 [5.12;10.0] | <0.001 |
| Transferrin, g/L, Me [Q1; Q3] | 2.58 [2.39;2.98] | 2.88 [2.33;3.27] | 0.116 | 2.57 [2.31;2.89] | 2.74 [2.29;3.23] | 0.047 |
| RBC, ×1012/L, Me [Q1; Q3] | 4.48 [4.11;4.92] | 4.36 [3.84;4.71] | 0.132 | 4.72 [4.22;5.19] | 4.46 [4.00;4.89] | 0.004 |
| WBC, ×109/L, Me [Q1; Q3] | 7.19 [5.47;8.33] | 7.28 [6.20;9.20] | 0.204 | 7.70 [6.27;8.41] | 7.60 [6.40;9.30] | 0.656 |
| MCH, pg, Me [Q1; Q3] | 30.1 [28.9;31.1] | 28.3 [26.7;29.6] | <0.001 | 31.0 [29.4;32.1] | 29.3 [26.6;30.7] | <0.001 |
| MCV, fl, Me [Q1; Q3] | 91.1 [86.2;94.3] | 87.4 [82.5;91.4] | 0.006 | 92.1 [88.3;97.8] | 89.3 [83.0;93.9] | <0.001 |
| RDW CV, %, Me [Q1; Q3] | 13.9 [12.2;14.9] | 14.7 [13.2;17.0] | 0.008 | 13.7 [12.6;15.2] | 14.9 [13.3;17.3] | 0.001 |
| RDW SD, fl, Me [Q1; Q3] | 11.0 [11.0;47.6] | 11.0 [11.0;44.7] | 0.811 | 11.0 [11.0;48.8] | 11.0 [11.0;47.2] | 0.298 |
| NT-proBNP, pg/mL, Me [Q1; Q3] | 2056 [652;3967] | 3949 [1476;8535] | 0.008 | 1047 [354;2946] | 4111 [1838;9675] | <0.001 |
| **NYHA class, N (%):** | | | 0.450 | | | <0.001 |
| I | 0 (0.00%) | 2 (1.30%) | | 9 (10.8%) | 8 (3.69%) | |
| II | 12 (27.3%) | 28 (18.2%) | | 39 (47.0%) | 63 (29.0%) | |
| III | 26 (59.1%) | 95 (61.7%) | | 32 (38.6%) | 108 (49.8%) | |
| IV | 6 (13.6%) | 29 (18.8%) | | 3 (3.61%) | 38 (17.5%) | |
| 6MWD, Me [Q1; Q3] | 250 [193;304] | 210 [159;290] | 0.035 | 330 [242;376] | 264 [180;330] | <0.001 |
| Quality of life, visual analogue scale, median [Q1; Q3] | 47.5 [33.0;55.0] | 45.0 [30.0;53.8] | 0.403 | 23 (28.0%) | 51 (23.5%) | |

Data are presented as the absolute numbers of patients and their percentage of the total number of patients in the group, or the medians with 25th and 75th quartiles, or the means and standard deviations, AF, atrial fibrillation; DM, diabetes mellitus; CHF, chronic heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; HFmrEF, heart failure with mid-range ejection fraction; LVEF, left ventricular ejection fraction; TSAT, transferrin saturation; MCH, mean corpuscular hemoglobin; MCV, mean corpuscular volume; NT-proBNP, N-terminal pro-brain natriuretic peptide; NYHA class, functional class of heart failure according to the New York Heart Association classification; 6MWD, 6 minute walk distance; RDW SD, RDW CV, red blood cell distribution width.