**Supplementary data**

**Supplementary figure I.** Diagnostic algorithm to classify anaemia into aetiological subtypes.

**Supplementary file I. Chronic disease groups (CDGs) and diseases included with the corresponding ICD-10 codes (International Classification of Diseases,** 10threvision**).**

**Supplementary table I.** Percentage of patients with anaemia who received subsequent laboratory tests stratified by morphological subtypes of anaemia.

**Tables and figures**

**Table I. Demographic and clinical characteristics of individuals aged 40-90 years with new-onset anaemia detected in general practice (n=62,731)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Patient characteristics** | **Men, n (%)** | **Women, n (%)** | **Total, n (%)** |
| Total a | 35,075 (55.9) | 27,656 (44.1) | 62,731 (100.0) |
| **Age groups, years** |  |  |  |
| 40-49 | 2,567 (7.3) | 7,256 (26.2) | 9,823 (15.7) |
| 50-59 | 4,990 (14.2) | 3,882 (14.0) | 8,872 (14.1) |
| 60-69 | 8,848 (25.2) | 3,714 (13.4) | 12,562 (20.0) |
| 70-79 | 11,265 (32.1) | 6,012 (21.7) | 17,277 (27.5) |
| 80-89 | 7,405 (21.1) | 6,792 (24.6) | 14,197 (22.6) |
| **Educational level** |  |  |  |
| Low | 13,618 (38.8) | 13,312 (48.1) | 26,930 (42.9) |
| Medium | 15,193 (43.3) | 8,798 (31.8) | 23,991 (38.2) |
| High | 6,264 (17.9) | 5,546 (20.1) | 11,810 (18.8) |
| **Income** |  |  |  |
| Low | 11,853 (33.8) | 9,045 (32.7) | 20,898 (33.3) |
| Medium | 10,709 (30.5) | 10,159 (36.7) | 20,868 (33.3) |
| High | 12,513 (35.7) | 8,452 (30.6) | 20,965 (33.4) |
| **Civil status** |  |  |  |
| Living with a partner | 21,834 (62.2) | 13,464 (48.7) | 35,298 (56.3) |
| Living alone | 13,241 (37.8) | 14,192 (51.3) | 27,433 (43.7) |
| **Anaemia severity b** |  |  |  |
| Mild | 32,736 (93.3) | 16,693 (60.4) | 49,429 (78.8) |
| Moderate | 1,999 (5.7) | 10,047 (36.3) | 12,046 (19.2) |
| Severe | 340 (1.0) | 916 (3.3) | 1,256 (2.0) |
| **Number of comorbidities** |  |  |  |
| 0 | 16,457 (46.9) | 14,654 (53.0) | 31,111 (49.6) |
| 1 | 9,180 (26.2) | 6,421 (23.2) | 15,601 (24.9) |
| 2 | 5,876 (16.8) | 3,943 (14.3) | 9,819 (15.7) |
| ≥3 | 3,562 (10.2) | 2,638 (9.5) | 6,200 (9.9) |
| **Type of comorbidity c** |  |  |  |
| Cardiovascular disease | 10,577 (30.2) | 5,672 (20.5) | 16,249 (25.9) |
| Hypertension | 7,890 (22.5) | 6,179 (22.3) | 14,069 (22.4) |
| Mental illness | 2,395 (6.8) | 3,012 (10.9) | 5,407 (8.6) |
| Diabetes | 3,835 (10.9) | 2,591 (9.4) | 6,426 (10.2) |
| Chronic obstructive pulmonary disease | 2,158 (6.2) | 1,657 (6.0) | 3,815 (6.1) |
| Neurological disorder | 1,141 (3.3) | 743 (2.7) | 1,884 (3.0) |
| Arthritis | 226 (0.6) | 401 (1.4) | 627 (1.0) |
| Inflammatory bowel disease | 317 (0.9) | 302 (1.1) | 619 (1.0) |
| Liver disease | 480 (1.4) | 333 (1.2) | 813 (1.3) |
| Kidney disease | 622 (1.8) | 422 (1.5) | 1,044 (1.7) |
| Cancer | 3,041 (8.7) | 1,801 (6.5) | 4,842 (7.7) |

a Total numbers are shown in row percentages; all other variables are shown in column percentages.

b Anaemia severity was defined according to WHO´s guidelines: mild anaemia (110 g/L-normal value), moderate anaemia (80-110 g/L) and severe anaemia (<80 g/L). Units converted from g/L to mmol/L (110 g/L = 6.8 mmol/L, 80 g/L = 5 mmol/L).

c A person was categorised as having a comorbidity within the specified chronic disease group (e.g. cardiovascular disease)

if the person had any of the included diseases (e.g. ischaemic heart disease) listed under the chronic disease group (Supplementary file I).

**Figure I.** Percentage a of patients with anaemia classified into subtypes of anaemia (n=62,731)

U:\Study 2\Graphpad prism\Aetiological subtypes of anaemia.tifU:\Study 2\Graphpad prism\Morphological subtypes of anaemia.tif

Abbreviations: AI: anaemia of inflammation, CIIDA: combined inflammatory iron deficiency anaemia, IDA: iron deficiency anaemia, MCV: mean cell volume

a Adjusted percentages were calculated by setting age at 70-79 years. Error bars = 95% confidence intervals.

**Figure II.** Percentage a of patients with anaemia who received subsequent laboratory tests in the following 3 months (n=62,731)

U:\Study 1\Graphpad prism\Laboratory tests among men.tifU:\Study 1\Graphpad prism\Laboratory tests among women.tif

Abbreviations: CRP: C-reactive protein, RDW: **red cell distribution width.**

a Adjusted percentages were calculated by setting age at 70-79 years. Error bars = 95% confidence intervals.

**Table II.** The likelihood and percentage of patients having unclassified anaemia according to the aetiological algorithm and the association with patient characteristics (n=62,731)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Patient characteristics** | **Men** | | **Women** | |
| OR (CI) a | Percentage (CI) b | OR (CI) a | Percentage (CI) b |
| **Age groups, years** |  |  |  |  |
| 40-49 | 1 | 69.3% (66.9-71.7) | 1 | 43.2% (41.1-45.4) |
| 50-59 | 1.25 (1.13-1.40) | 73.9% (71.8-76.0) | 1.48 (1.36-1.61) | 53.0% (50.9-55.2) |
| 60-69 | 1.45 (1.31-1.61) | 76.6% (74.9-78.4) | 1.96 (1.78-2.15) | 59.8% (57.7-62.0) |
| 70-79 | 1.68 (1.52-1.86) | 79.1% (77.5-80-8) | 2.40 (2.20-2.62) | 64.7% (62.7-66.6) |
| 80-89 | 1.86 (1.68-2.07) | 80.8% (79.1-82.4) | 3.00 (2.73-3.29) | 69.5% (67.6-71.5) |
| **Educational level** |  |  |  |  |
| Low | 1 | 79.4% (77.7-81.2) | 1 | 65.3% (63.4-67.2) |
| Medium | 1.01 (0.95-1.08) | 79.6% (78.0-81.3) | 0.89 (0.84-0.95) | 62.7% (60.7-64.6) |
| High | 0.99 (0.91-1.09) | 79.3% (77.4-81.2) | 0.81 (0.76-0.87) | 60.5% (58.3-62.6) |
| **Income** |  |  |  |  |
| Low | 1 | 78.7% (77.0-80.4) | 1 | 64.2% (62.2-66.2) |
| Medium | 1.07 (1.01-1.15) | 79.9% (78.3-81.5) | 1.05 (0.99-1.12) | 65.4% (63.5-67.2) |
| High | 1.08 (1.01-1.16) | 79.9% (78.2-81.6) | 0.84 (0.78-0.90) | 60.2% (58.1-62.3) |
| **Civil status** |  |  |  |  |
| Living alone | 1 | 79.7% (78.1-81.4) | 1 | 64.8% (62.9-66.6) |
| Living with a partner | 0.99 (0.94-1.05) | 79.6% (77.9-81.2) | 0.91 (0.87-0.96) | 62.7% (60.8-64.6) |
| **Anaemia severity b** |  |  |  |  |
| Mild | 1 | 81.4% (79.8-82.9) | 1 | 71.8% (70.0-73.5) |
| Moderate | 0.25 (0.23-0.28) | 52.5% (49.8-55.2) | 0.40 (0.38-0.43) | 50.6% (48.6-52.7) |
| Severe | 0.21 (0.17-0.27) | 48.1% (42.2-53.9) | 0.24 (0.20-0.28) | 37.6% (33.8-44.4) |
| **No. of comorbidities** |  |  |  |  |
| 0 | 1 | 78.2% (76.5-80.0) | 1 | 59.2% (57.2-61.1) |
| 1 | 1.08 (1.02-1.15) | 79.6% (77.8-81.3) | 1.38 (1.30-1.47) | 66.7% (64.7-68.7) |
| 2 | 1.14 (1.05-1.23) | 80.4% (78.6-82.2) | 1.44 (1.33-1.55) | 67.6% (65.4-69.7) |
| ≥3 | 1.25 (1.14-1.37) | 81.8% (80.0-83.6) | 1.44 (1.31-1.58) | 67.6% (65.3-69.9) |
| **Type of comorbidity c** |  |  |  |  |
| Cardiovascular disease | 1.08 (1.02-1.14) | 80.4% (78.7-82.0) | 1.13 (1.06-1.21) | 65.8% (63.8-67.9) |
| Hypertension | 1.12 (1.05-1.19) | 80.9% (79.3-82.5) | 1.23 (1.15-1.31) | 67.0% (65.0-69.1) |
| Mental illness | 1.08 (0.98-1.20) | 80.8% (78.7-82.9) | 1.28 (1.18-1.39) | 68.8% (66.6-71.0) |
| Diabetes | 1.34 (1.21-1.47) | 83.5% (81.8-85.1) | 1.27 (1.16-1.39) | 68.4% (66.1-70.7) |
| COPD | 0.92 (0.82-1.03) | 78.4% (76.0-80.7) | 1.09 (0.98-1.21) | 65.5% (62.8-68.2) |
| Neurological disorder | 1.12 (0.96-1.29) | 81.3% (78.8-83.8) | 1.30 (1.11-1.52) | 69.3% (65.8-72.9) |
| Arthritis | 1.02 (0.75-1.40) | 80.0% (74.6-85.4) | 1.38 (1.10-1.74) | 70.7% (65.6-75.8) |
| IBD | 1.02 (0.79-1.31) | 79.9% (75.6-84.2) | 1.22 (0.97-1.52) | 68.1% (62.9-73.2) |
| Liver disease | 0.92 (0.75-1.13) | 78.3% (74.4-82.2) | 1.13 (0.90-1.42) | 66.4% (61.2-71.7) |
| Kidney disease | 1.22 (0.99-1.50) | 82.6% (79.4-85.8) | 1.50 (1.21-1.86) | 72.3% (67.7-76.9) |
| Cancer | 1.04 (0.95-1.15) | 80.2% (78.2-82.2) | 1.39 (1.25-1.54) | 70.3% (67.7-72.9) |

Abbreviations: CI: 95% confidence intervals, COPD: chronic obstructive pulmonary disease, IBD: inflammatory bowel disease, OR: odds ratio.

a Odds ratios (of having unclassified anaemia vs. classified anaemia according to patient characteristics) were adjusted for age.

b Adjusted percentages were calculated by setting age at 70-79 years.

c Anaemia severity was defined according to WHO´s guidelines: mild anaemia (110 g/L-normal value), moderate anaemia (80-110 g/L) and severe anaemia (<80 g/L). Units converted from g/L to mmol/L (110 g/L = 6.8 mmol/L, 80 g/L = mmol/L).

d A person was categorised as having a comorbidity within the specified chronic disease group (e.g. cardiovascular

disease) if the person had any of the included diseases (e.g. ischaemic heart disease) listed under the chronic disease

group (Supplementary file I).

e The reference group for each of the comorbidities is patients without the specified comorbidity (e.g. the reference

group for cardiovascular disease is patients without cardiovascular disease).