**Table S1.** Sensitivity analysis: Seasonal allergies

|  |  |
| --- | --- |
|  | Seasonal allergies only |
|  | Model 1a | Model 2b | Model 3c |
| Sex |  |  |  |
| Male | 1.0 |
| Female | 0.9 (0.6, 1.4) | 1.0 (0.7, 1.4) | 1.0 (0.7, 1.4) |
| Age groups |  |  |  |
| 39-50 | 1.0 |
| 51-60 | 0.7 (0.4, 1.2) | 0.6 (0.4, 1.0) | 0.6 (0.4, 1.0) |
| 61-70 | 0.5 (0.3, 1.0)\* | 0.4 (0.3, 0.7)\*\* | 0.4 (0.2, 0.6)\*\* |
| ≥ 71 | 0.2 (0.1, 0.8)\* | 0.2 (0.1, 0.4)\*\*\* | 2.6 (1.5, 4.8)\*\*\* |
| Family predisposition |  |  |  |
| No | 1.0 |
| Yes | 2.4 (1.2, 4.5)\*\* | 2.5 (1.4, 4.6)\*\* | 2.6 (1.5, 4.8)\*\* |
| Smoking status |  |  |  |
| Non-smoker | 1.0 |
| Smoker | 0.5 (0.3, 1.0)\* | 0.5 (0.3, 0.9)\* | 0.5 (0.3, 0.9)\* |
| Depression |  |  |  |
| No | 1.0 |
| Yes | 0.9 (0.3, 3.2) | 0.8 (0.3, 2.3) | 0.8 (0.3, 2.2) |
| Generalized Anxiety |  |  |  |
| Minimal and mild | 1.0 |
| Moderate and severe | 2.7 (1.0, 7.1)\* | 2.5 (1.1, 5.9)\* | 2.3 (1.1, 4.8)\* |
| Mental stress burden |  |  |  |
| No | 1.0 |
| Yes | 1.1 (0.7, 1.7) | 1.2 (0.8, 1.8) | 0.8 (0.6, 1.2) |
| Type-D personality |  |  |  |
| No | 1.0 |
| Yes | 0.7 (0.4, 1.3) | 0.7 (0.4, 1.2) | 0.9 (0.6, 1.5) |
| Social classes |  |  |  |
| Lower class  | 1.0 |
| Middle class | 1.1 (0.5, 2.2) | 1.3 (0.7, 2.5) | 1.3 (0.7, 2.4) |
| Upper class | 0.9 (0.4, 1.9) | 1.2 (0.6, 2.2) | 1.2 (0.6, 2.3) |
| a Model 1 (n=992): Missing values in psychosocial factors were excluded.b Model 2 (n=1782): Missing values in psychosocial factors were defined as non-existing psychosocial burden.c Model 3 (n=1782): Missing values in psychosocial factors were defined as existing psychosocial burden\* The association is significant on the level <0.05 (significance level is given only for adjusted OR)\*\* The association is significant on the level <0.01 (significance level is given only for adjusted OR)\*\*\* The association is significant on the level <0.0001 (significance level is given only for adjusted OR) |

**Table S2.** Sensitivity analysis: Perennial allergies

|  |  |
| --- | --- |
|  | Perennial Allergies |
|  | Model 1a | Model 2b | Model 3c |
| Sex |  |  |  |
| Male | 1.0 |
| Female | 1.2 (0.7, 1.9) | 1.2 (0.8, 1.8) | 1.2 (0.8, 1.8) |
| Age groups |  |  |  |
| 39-50 | 1.0 |
| 51-60 | 0.6 (0.4, 1.1) | 0.7 (0.4, 1.2) | 0.7 (0.4, 1.2) |
| 61-70 | 0.2 (0.1, 0.3)\*\*\* | 0.2 (0.1, 0.4)\*\*\* | 0.2 (0.1, 0.4)\*\*\* |
| ≥ 71 | 0.2 (0.04, 0.7)\*\* | 0.2 (0.1, 0.4)\*\*\* | 0.2 (0.1, 0.6)\*\* |
| Family predisposition |  |  |  |
| No | 1.0 |
| Yes | 2.9 (1.5, 5.8)\*\* | 3.7 (2.0, 6.6)\*\*\* | 3.8 (2.1, 6.9)\*\*\* |
| Smoking status |  |  |  |
| Non-smoker | 1.0 |
| Smoker | 0.3 (0.1, 0.7)\*\* | 0.4 (0.2, 0.8)\*\* | 0.4 (0.2, 0.8)\*\* |
| Depression |  |  |  |
| No | 1.0 |
| Yes | 7.6 (2.1, 27.9)\*\* | 2.5 (1.0, 6.7) | 2.4 (0.9, 6.1) |
| Generalized Anxiety |  |  |  |
| Minimal and mild | 1.0 |
| Moderate and severe | 0.1 (0.02, 0.7)\* | 0.3 (0.1, 1.2) | 0.5 (0.2, 1.2) |
| Mental stress burden |  |  |  |
| No | 1.0 |
| Yes | 1.0 (0.6, 1.6) | 1.1 (0.7, 1.8) | 0.9 (0.6, 1.4) |
| Type-D personality |  |  |  |
| No | 1.0 |
| Yes | 1.6 (0.9, 2.7) | 1.6 (1.0, 2.6) | 1.6 (1.0, 2.6) |
| Social classes |  |  |  |
| Lower class  | 1.0 |
| Middle class | 0.5 (0.3, 1.1) | 0.7 (0.4, 1.2) | 0.7 (0.4, 1.2) |
| Upper class | 0.8 (0.4, 1.8) | 0.9 (0.5, 1.7) | 0.9 (0.5, 1.7) |
| a Model 1 (n=992): Missing values in psychosocial factors were excluded.b Model 2 (n=1782): Missing values in psychosocial factors were defined as non-existing psychosocial burden.c Model 3 (n=1782): Missing values in psychosocial factors were defined as existing psychosocial burden\* The association is significant on the level <0.05 (significance level is given only for adjusted OR)\*\* The association is significant on the level <0.01 (significance level is given only for adjusted OR)\*\*\* The association is significant on the level <0.0001 (significance level is given only for adjusted OR) |

**Table S3.** Sensitivity analysis: Other allergies

|  |  |
| --- | --- |
|  | Other allergies |
|  | Model 1a | Model 2b | Model 3c |
| Sex |  |  |  |
| Male | 1.0 |
| Female | 1.9 (1.3, 2.8)\*\* | 1.9 (1.4, 2.6)\*\*\* | 1.9 (1.4, 2.6)\*\*\* |
| Age groups |  |  |  |
| 39-50 | 1.0 |
| 51-60 | 1.0 (0.7, 1.5) | 0.9 (0.6, 1.4) | 0.9 (0.6, 1.4) |
| 61-70 | 0.8 (0.5, 1.3) | 0.8 (0.5, 1.2) | 0.7 (0.5, 1.1) |
| ≥ 71 | 0.4 (0.1, 1.1) | 0.6 (0.4, 1.0)\* | 0.3 (0.2, 0.6)\*\* |
| Family predisposition |  |  |  |
| No | 1.0 |
| Yes | 3.2 (1.9, 5.4)\*\*\* | 3.2 (2.0, 5.1)\*\*\* | 3.4 (2.1, 5.4)\*\*\* |
| Smoking status |  |  |  |
| Non-smoker | 1.0 |
| Smoker | 0.6 (0.4, 1.0)\* | 0.5 (0.3, 0.8)\*\* | 0.5 (0.3, 0.8)\*\* |
| Depression |  |  |  |
| No | 1.0 |
| Yes | 0.9 (0.3, 2.7) | 1.0 (0.4, 2.2) | 0.9 (0.4, 1.8) |
| Generalized Anxiety |  |  |  |
| Minimal and mild | 1.0 |
| Moderate and severe | 1.9 (0.8, 4.3) | 1.7 (0.8, 3.4) | 2.1 (1.2, 3.6)\* |
| Mental stress burden |  |  |  |
| No | 1.0 |
| Yes | 1.4 (0.9, 2.0) | 1.6 (1.2, 2.2)\*\* | 1.2 (0.9, 1.6) |
| Type-D personality |  |  |  |
| No | 1.0 |
| Yes | 1.0 (0.7, 1.6) | 0.9 (0.6, 1.3) | 0.9 (0.6, 1.4) |
| Social classes |  |  |  |
| Lower class  | 1.0 |
| Middle class | 1.2 (0.6, 2.3) | 1.1 (0.7, 1.6) | 1.1 (0.7, 1.7) |
| Upper class | 1.4 (0.7, 2.7) | 1.1 (0.7, 1.8) | 1.2 (0.7, 1.9) |
| a Model 1 (n=992): Missing values in psychosocial factors were excluded.b Model 2 (n=1782): Missing values in psychosocial factors were defined as non-existing psychosocial burden.c Model 3 (n=1782): Missing values in psychosocial factors were defined as existing psychosocial burden\* The association is significant on the level <0-05 (significance level is given only for adjusted OR)\*\* The association is significant on the level <0.01 (significance level is given only for adjusted OR)\*\*\* The association is significant on the level <0.0001 (significance level is given only for adjusted OR) |

**Table S4.** Comparison of excluded and included study participants

|  |  |  |  |
| --- | --- | --- | --- |
|  | Excluded from study population (n=497) | Included in study population (n=1782) | Significance |
|  | n | % | n | % | p-valuea |
|  |  | Mean ± SD |  | Mean ± SD |  |
| Sex (n=2279) |  |  |  |  |  |
| Male | 230 | 46.3 | 872 | 48.9 | 0.3 |
| Female | 267 | 53.7 | 910 | 51.1 |
| Age (n=2279) | 497 | 60.0 ± 13.4 | 1782 | 61.0 ± 12.1 | 0.07 |
| Age groups (n=2279) |  |  |  |  |  |
| 39-50 | 161 | 32.4 | 431 | 24.2 | 0.001 |
| 51-60 | 106 | 21.3 | 446 | 25.0 |
| 61-70 | 103 | 20.7 | 451 | 25.3 |
| ≥ 71 | 127 | 25.6 | 454 | 25.5 |
| Family predisposition(n=1782) |  |  |  |  |  |
| No | - | - | 1655 | 92.9 | - |
| Yes | - | - | 127 | 7.1 |
| Smoking status (n=2279) |  |  |  |  |  |
| Non-smoker | 388 | 78.1 | 1539 | 86.4 | <0.0001 |
| Smoker | 109 | 21.9 | 243 | 13.6 |
| Depressive Disorder (n=2276) |  |  |  |  |  |
| No | 466 | 94.1 | 1712 | 96.1 | 0.05 |
| Yes | 29 | 5.9 | 69 | 3.9 |
| Generalized anxiety (n=1821) |  |  |  |  |  |
| Minimal and mild | 353 | 91.7 | 1364 | 95.0 | 0.01 |
| Moderate and severe | 32 | 8.3 | 72 | 4.0 |
| Mental stress burden (n=1340) |  |  |  |  |  |
| No | - | - | 755 | 56.3 | - |
| Yes | - | - | 585 | 43.7 |
| Type-D personality (n=1442) |  |  |  |  |  |
| No | 299 | 77.5 | 1141 | 79.1 | 0.5 |
| Yes | 87 | 22.5 | 301 | 20.9 |
| Social class indexb (n=2267) | 14.5 | 5.4 | 15.1 | 5.0 | 0.02 |
| Social class (n=2267) |  |  |  |  |  |
| Lower class  | 105 | 21.5 | 271 | 15.2 | 0.004 |
| Middle class | 265 | 54.2 | 1033 | 58.0 |
| Upper class | 119 | 24.3 | 478 | 26.8 |
| Allergy status (n=1782) |  |  |  |  |  |
| No allergies | - | - | 1293 | 72.6 | - |
| Seasonal allergies | - | - | 159 | 7.7 |
| Perennial allergies | - | - | 123 | 6.1 |
| Other allergies | - | - | 207 | 13.6 |
| a Results of Chi-Square Tests for nominal and ordinal measurement scales or Kruskall-Wallis-Tests for not normally distributed variables with interval measurement scales (age and social class index, Kolmogorov-Smirnov-Test: p<0.01 respectively) b after Helmert (Scale from 1 to 27) |

The included study population did not differ from the excluded study participants regarding to sex and Type-D personality. However, there were more 60-69 year olds and less 39-49 year olds, more smokers and the social status was higher in the investigated study population. Depression and generalized anxiety were less likely in included than in excluded participants. Other variables (allergy status, stress) could not be compared because only data of the included subpopulation was available.