Supplementary Table 1. Univariable analysis of associations between socio-demographic characteristics and the incidences of intracranial aneurysm versus subarachnoid hemorrhage

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Univariate model | | |
|  |  | OR  (Odds UA/SAH) | 95%CI | p-*value* |
| Sex | Female | 1.41 | (1.39-1.44) | <.0001 |
|  | Male | Ref |  |  |
| Age group | <50 | Ref |  |  |
|  | 50-59 | 1.86 | (1.81-1.90) | <.0001 |
|  | 60-69 | 2.19 | (2.13-2.25) | <.0001 |
|  | 70-79 | 2.05 | (1.99-2.10) | <.0001 |
|  | ≥80 | 1.32 | (1.27-1.37) | <.0001 |
| Insurance | Self-employed | 0.88 | (0.84-0.91) | <.0001 |
|  | Employee-insured | 1.16 | (1.12-1.21) | <.0001 |
|  | Medical aid | Ref |  |  |
| Family income\* | 0 | Ref |  |  |
|  | 1 | 0.87 | (0.83-0.91) | <.0001 |
|  | 2 | 0.82 | (0.78-0.85) | <.0001 |
|  | 3 | 0.90 | (0.86-0.94) | 0.003 |
|  | 4 | 1.10 | (1.06-1.15) | <.0001 |
|  | 5 | 1.36 | (1.30-1.41) | <.0001 |
| CCI | 0 | Ref |  |  |
|  | 1-4 | 0.74 | (0.73-0.76) | <.0001 |
|  | ≥5 | 0.63 | (0.59-0.66) | <.0001 |
| Year | 2005 | Ref |  |  |
|  | 2006 | 1.57 | (1.48-1.66) | <.0001 |
|  | 2007 | 2.17 | (2.05-2.30) | <.0001 |
|  | 2008 | 2.63 | (2.48-2.78) | <.0001 |
|  | 2009 | 3.20 | (3.03-3.38) | <.0001 |
|  | 2010 | 3.65 | (3.46-3.86) | <.0001 |
|  | 2011 | 4.76 | (4.51-5.03) | <.0001 |
|  | 2012 | 5.30 | (5.02-5.60) | <.0001 |
|  | 2013 | 5.99 | (5.67-6.32) | <.0001 |
|  | 2014 | 6.48 | (6.14-6.84) | <.0001 |
|  | 2015 | 7.30 | (6.92-7.70) | <.0001 |
| Region | Seoul | Ref |  |  |
|  | Busan | 1.73 | (1.66-1.79) | <.0001 |
|  | Daegu | 1.38 | (1.32-1.44) | <.0001 |
|  | Incheon | 1.02 | (0.97-1.06) | 0.47 |
|  | Gwangju | 1.44 | (1.36-1.53) | <.0001 |
|  | Daejun | 1.41 | (1.33-1.49) | <.0001 |
|  | Ulsan | 1.69 | (1.58-1.81) | <.0001 |
|  | Saejong | 2.39 | (1.88-3.05) | <.0001 |
|  | Geonggido | 1.07 | (1.04-1.10) | <.0001 |
|  | Gangwondo | 0.93 | (0.88-0.98) | 0.01 |
|  | Chungcheongbukdo | 1.48 | (1.41-1.56) | <.0001 |
|  | Chungcheongnamdo | 0.99 | (0.94-1.04) | 0.63 |
|  | Jeollabukdo | 1.31 | (1.24-1.37) | <.0001 |
|  | Jeollanamdo | 1.19 | (1.13-1.25) | <.0001 |
|  | Gyeongsangbukdo | 1.57 | (1.50-1.63) | <.0001 |
|  | Gyeongsangnamdo | 1.57 | (1.51-1.63) | <.0001 |
|  | Jejudo | 1.31 | (1.21-1.42) | <.0001 |

\*Family income: 0 (the beneficiary of medical aid), 1(1st quintile: the lowest), 2(2nd quintile), 3(3rd quintile), 4(4th quintile), 5(5th quintile: the highest)

CCI: Charlson Comorbidity Index. UA: unruptured aneurysm, SAH: subarachnoid hemorrhage

Supplementary Table 2. Univariable logistic regression results of associations between socio-demographic characteristics and the treatment decision of unruptured intracranial aneurysm or subarachnoid hemorrhage

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | UA | |  | SAH | |
|  | |  | OR†  (Odds treated/untreated) | 95%CI |  | OR†  (Odds treated/untreated) | 95%CI |
| Sex | | |  |  |  |  |  |
|  | Female | | 1.22 | (1.19-1.26) |  | 1.22 | (1.19-1.26) |
|  | Male | | Ref |  |  | Ref |  |
| Age group | | |  |  |  |  |  |
|  | <50 | | 7.05 | (6.35-7.83) |  | 4.95 | (4.65-5.27) |
|  | 50-59 | | 9.74 | (8.79-10.80) |  | 5.28 | (4.95-5.63) |
|  | 60-69 | | 8.94 | (8.06-9.91) |  | 4.18 | (3.92-4.46) |
|  | 70-79 | | 4.35 | (3.91-4.83) |  | 2.57 | (2.41-2.75) |
|  | ≥80 | | Ref |  |  | Ref |  |
| Insurance | | |  |  |  |  |  |
|  | Self-insured | | 1.47 | (1.38-1.56) |  | 2.09 | (1.97-2.21) |
|  | Employee-insured | | 1.41 | (1.33-1.49) |  | 1.88 | (1.77-1.99) |
|  | Medical aid | | Ref |  |  | Ref |  |
| Family income\* | | |  |  |  |  |  |
|  | 0 | | Ref |  |  | Ref |  |
|  | 1 | | 1.36 | (1.27-1.46) |  | 1.98 | (1.86-2.11) |
|  | 2 | | 1.48 | (1.38-1.58) |  | 2.13 | (1.99-2.27) |
|  | 3 | | 1.48 | (1.39-1.58) |  | 2.12 | (1.99-2.26) |
|  | 4 | | 1.52 | (1.43-1.62) |  | 1.93 | (1.81-2.06) |
|  | 5 | | 1.36 | (1.28-1.45) |  | 1.76 | (1.66-1.87) |
| CCI | | |  |  |  |  |  |
|  | 0 | | Ref |  |  | Ref |  |
|  | 1-4 | | 1.27 | (1.24-1.31) |  | 1.28 | (1.24-1.31) |
|  | ≥5 | | 0.72 | (0.66-0.78) |  | 0.85 | (0.79-0.91) |
| Year | | |  |  |  |  |  |
|  | 2005 | | Ref |  |  | Ref |  |
|  | 2006 | | 1.09 | (0.98-1.21) |  | 1.06 | (1.00-1.13) |
|  | 2007 | | 1.08 | (0.97-1.19) |  | 1.20 | (1.13-1.27) |
|  | 2008 | | 1.08 | (0.98-1.19) |  | 1.27 | (1.19-1.35) |
|  | 2009 | | 1.12 | (1.02-1.24) |  | 1.39 | (1.31-1.48) |
|  | 2010 | | 1.11 | (1.01-1.23) |  | 1.38 | (1.30-1.47) |
|  | 2011 | | 1.18 | (1.07-1.30) |  | 1.49 | (1.40-1.59) |
|  | 2012 | | 1.08 | (0.98-1.18) |  | 1.42 | (1.34-1.51) |
|  | 2013 | | 1.08 | (0.99-1.19) |  | 1.59 | (1.49-1.69) |
|  | 2014 | | 1.10 | (1.01-1.21) |  | 1.69 | (1.58-1.80) |
|  | 2015 | | 1.01 | (0.92-1.11) |  | 1.73 | (1.62-1.84) |
| Region | | |  |  |  |  |  |
|  | Seoul | | Ref |  |  | Ref |  |
|  | Busan | | 0.98 | (0.93-1.03) |  | 1.24 | (1.17-1.32) |
|  | Daegu | | 1.07 | (1.01-1.14) |  | 1.43 | (1.33-1.54) |
|  | Incheon | | 0.81 | (0.75-0.87) |  | 0.95 | (0.90-1.02) |
|  | Gwangju | | 1.03 | (0.95-1.12) |  | 1.12 | (1.02-1.22) |
|  | Daejun | | 0.85 | (0.78-0.91) |  | 0.88 | (0.81-0.96) |
|  | Ulsan | | 1.08 | (1.00-1.18) |  | 1.51 | (1.36-1.68) |
|  | Saejong | | 0.67 | (0.49-0.90) |  | 1.05 | (0.70-1.57) |
|  | Geonggido | | 0.95 | (0.91-1.00) |  | 1.10 | (1.06-1.15) |
|  | Gangwondo | | 0.82 | (0.75-0.89) |  | 0.90 | (0.83-0.97) |
|  | Chungcheongbukdo | | 0.68 | (0.63-0.74) |  | 0.97 | (0.89-1.04) |
|  | Chungcheongnamdo | | 0.85 | (0.79-0.92) |  | 1.02 | (0.96-1.10) |
|  | Jeollabukdo | | 0.94 | (0.88-1.01) |  | 1.00 | (0.93-1.07) |
|  | Jeollanamdo | | 1.04 | (0.97-1.11) |  | 1.04 | (0.97-1.11) |
|  | Gyeongsangbukdo | | 0.89 | (0.84-0.94) |  | 1.15 | (1.08-1.22) |
|  | Gyeongsangnamdo | | 0.88 | (0.83-0.93) |  | 1.11 | (1.04-1.17) |
|  | Jejudo | | 0.98 | (0.88-1.10) |  | 1.38 | (1.22-1.56) |

\*Family income: 0 (the beneficiary of medical aid), 1(1st quintile: the lowest), 2(2nd quintile), 3(3rd quintile), 4(4th quintile), 5(5th quintile: the highest)

CCI: Charlson Comorbidity Index. UA: unruptured aneurysm, SAH: subarachnoid hemorrhage

OR†: Odds treated (coiling or clipping)/untreated (neither coiling nor clipping)

Supplementary Table 3. Univariable logistic regression results for associations between sociodemographic characteristics and treatment with coiling versus clipping for newly detected intracranial aneurysm and subarachnoid hemorrhage

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | UA | |  | SAH | |
|  |  | OR  (Odds coiling/clipping) | 95%CI |  | OR  (Odds coiling/clipping) | 95%CI |
| Gender | Female | 1.20 | (1.15-1.26) |  | 1.09 | (1.05-1.13) |
|  | Male | Ref |  |  | Ref |  |
| Age group | <50 | Ref |  |  | Ref |  |
|  | 50-59 | 0.85 | (0.80-0.90) |  | 1.05 | (1.01-1.10) |
|  | 60-69 | 0.85 | (0.80-0.90) |  | 1.00 | (0.95-1.05) |
|  | 70-79 | 1.36 | (1.27-1.47) |  | 1.42 | (1.34-1.50) |
|  | ≥80 | 3.26 | (2.53-4.21) |  | 2.71 | (2.44-3.03) |
| Insurance | Self-employed | 1.03 | (0.93-1.14) |  | 0.93 | (0.85-1.02) |
|  | Employee-insured | 1.14 | (1.03-1.25) |  | 1.00 | (0.92-1.10) |
|  | Medical aid | Ref |  |  | Ref |  |
| Family income\* | 0 | Ref |  |  | Ref |  |
|  | 1 | 1.06 | (0.94-1.18) |  | 0.91 | (0.83-1.00) |
|  | 2 | 1.05 | (0.94-1.18) |  | 0.94 | (0.85-1.03) |
|  | 3 | 1.05 | (0.94-1.17) |  | 0.93 | (0.85-1.02) |
|  | 4 | 1.05 | (0.94-1.16) |  | 0.98 | (0.89-1.07) |
|  | 5 | 1.19 | (1.08-1.32) |  | 1.08 | (0.98-1.18) |
| CCI | 0 | Ref |  |  | Ref |  |
|  | 1-4 | 0.98 | (0.94-1.02) |  | 0.96 | (0.93-1.00) |
|  | ≥5 | 1.05 | (0.91-1.22) |  | 1.05 | (0.95-1.17) |
| Year | 2005 | Ref |  |  | Ref |  |
|  | 2006 | 1.13 | (0.95-1.35) |  | 1.20 | (1.09-1.33) |
|  | 2007 | 1.09 | (0.93-1.29) |  | 1.56 | (1.41-1.71) |
|  | 2008 | 1.12 | (0.95-1.31) |  | 1.77 | (1.61-1.95) |
|  | 2009 | 1.10 | (0.94-1.28) |  | 1.91 | (1.74-2.09) |
|  | 2010 | 1.18 | (1.01-1.38) |  | 2.21 | (2.01-2.42) |
|  | 2011 | 1.26 | (1.08-1.47) |  | 2.34 | (2.13-2.57) |
|  | 2012 | 1.32 | (1.13-1.53) |  | 2.66 | (2.42-2.92) |
|  | 2013 | 1.59 | (1.36-1.84) |  | 3.43 | (3.13-3.77) |
|  | 2014 | 1.53 | (1.32-1.77) |  | 4.16 | (3.79-4.56) |
|  | 2015 | 1.68 | (1.45-1.95) |  | 4.64 | (4.23-5.09) |
| Region | Seoul | Ref |  |  | Ref |  |
|  | Busan | 0.88 | (0.81-0.95) |  | 0.89 | (0.83-0.96) |
|  | Daegu | 0.85 | (0.77-0.94) |  | 0.96 | (0.88-1.05) |
|  | Incheon | 0.68 | (0.61-0.76) |  | 0.98 | (0.90-1.07) |
|  | Gwangju | 0.44 | (0.38-0.50) |  | 0.35 | (0.30-0.41) |
|  | Daejun | 1.77 | (1.54-2.03) |  | 1.87 | (1.67-2.10) |
|  | Ulsan | 1.67 | (1.45-1.92) |  | 2.19 | (1.93-2.49) |
|  | Saejong | 2.42 | (1.33-4.40) |  | 4.61 | (2.47-8.62) |
|  | Geonggido | 0.98 | (0.92-1.05) |  | 1.11 | (1.05-1.17) |
|  | Gangwondo | 1.30 | (1.13-1.50) |  | 1.10 | (0.99-1.22) |
|  | Chungcheongbukdo | 1.56 | (1.37-1.78) |  | 1.26 | (1.13-1.40) |
|  | Chungcheongnamdo | 1.65 | (1.45-1.87) |  | 1.65 | (1.51-1.81) |
|  | Jeollabukdo | 0.85 | (0.77-0.95) |  | 0.56 | (0.50-0.62) |
|  | Jeollanamdo | 0.50 | (0.45-0.56) |  | 0.33 | (0.30-0.37) |
|  | Gyeongsangbukdo | 0.79 | (0.72-0.86) |  | 1.22 | (1.12-1.32) |
|  | Gyeongsangnamdo | 0.93 | (0.85-1.02) |  | 1.06 | (0.98-1.14) |
|  | Jejudo | 1.17 | (0.97-1.40) |  | 1.61 | (1.39-1.88) |

\*Family income: 0 (the beneficiary of medical aid), 1(1st quintile: the lowest), 2(2nd quintile), 3(3rd quintile), 4(4th quintile), 5(5th quintile: the highest)

\*\*adjusted for sex, age group, CCI, year, region

CCI: Charlson Comorbidity Index. UA: unruptured aneurysm, SAH: subarachnoid hemorrhage

OR†: Odds coiling/clipping

Supplementary Table 4. Multivariable logistic regression results for associations between sociodemographic characteristics and treatment with coiling versus clipping for newly detected intracranial aneurysm and subarachnoid hemorrhage

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | UA | |  | SAH | |
|  |  | aOR\*\*  (Odds coiling/clipping) | 95%CI |  | aOR\*\*  (Odds coiling/clipping) | 95%CI |
| Gender | Female | 1.20 | (1.15-1.26) |  | 1.02 | (0.98-1.06) |
|  | Male | Ref |  |  | Ref |  |
| Age group | <50 | Ref |  |  | Ref |  |
|  | 50-59 | 0.82 | (0.77-0.87) |  | 1.01 | (0.96-1.05) |
|  | 60-69 | 0.83 | (0.78-0.88) |  | 1.01 | (0.96-1.06) |
|  | 70-79 | 1.30 | (1.20-1.40) |  | 1.35 | (1.27-1.44) |
|  | ≥80 | 3.02 | (2.33-3.92) |  | 2.39 | (2.13-2.68) |
| Insurance | Self-employed | 1.12 | (1.00-1.24) |  | 0.98 | (0.89-1.07) |
|  | Employee-insured | 1.22 | (1.10-1.35) |  | 1.00 | (0.91-1.10) |
|  | Medical aid | Ref |  |  | Ref |  |
| Family income\* | 0 | Ref |  |  | Ref |  |
|  | 1 | 1.14 | (1.02-1.28) |  | 0.93 | (0.84-1.03) |
|  | 2 | 1.16 | (1.03-1.30) |  | 0.98 | (0.88-1.08) |
|  | 3 | 1.15 | (1.03-1.29) |  | 0.97 | (0.88-1.07) |
|  | 4 | 1.15 | (1.03-1.28) |  | 1.00 | (0.91-1.11) |
|  | 5 | 1.25 | (1.13-1.39) |  | 1.04 | (0.95-1.15) |
| CCI | 0 | Ref |  |  | Ref |  |
|  | 1-4 | 0.95 | (0.91-0.99) |  | 0.94 | (0.90-0.97) |
|  | ≥5 | 1.02 | (0.88-1.19) |  | 0.96 | (0.87-1.07) |
| Year | 2005 | Ref |  |  | Ref |  |
|  | 2006 | 1.11 | (0.93-1.33) |  | 1.19 | (1.08-1.32) |
|  | 2007 | 1.07 | (0.90-1.26) |  | 1.58 | (1.43-1.74) |
|  | 2008 | 1.10 | (0.93-1.30) |  | 1.78 | (1.61-1.96) |
|  | 2009 | 1.06 | (0.91-1.25) |  | 1.93 | (1.75-2.12) |
|  | 2010 | 1.17 | (1.00-1.37) |  | 2.23 | (2.03-2.46) |
|  | 2011 | 1.25 | (1.07-1.46) |  | 2.35 | (2.14-2.59) |
|  | 2012 | 1.28 | (1.1-1.5) |  | 2.69 | (2.45-2.96) |
|  | 2013 | 1.55 | (1.33-1.81) |  | 3.45 | (3.14-3.79) |
|  | 2014 | 1.49 | (1.28-1.73) |  | 4.24 | (3.86-4.66) |
|  | 2015 | 1.65 | (1.42-1.92) |  | 4.71 | (4.28-5.18) |
| Region | Seoul | Ref |  |  | Ref |  |
|  | Busan | 0.86 | (0.79-0.93) |  | 0.88 | (0.82-0.95) |
|  | Daegu | 0.82 | (0.74-0.90) |  | 0.95 | (0.87-1.04) |
|  | Incheon | 0.67 | (0.60-0.75) |  | 0.95 | (0.87-1.04) |
|  | Gwangju | 0.42 | (0.37-0.48) |  | 0.32 | (0.28-0.37) |
|  | Daejun | 1.71 | (1.49-1.96) |  | 1.84 | (1.64-2.08) |
|  | Ulsan | 1.64 | (1.42-1.89) |  | 2.29 | (2.01-2.62) |
|  | Saejong | 2.01 | (1.1-3.67) |  | 2.86 | (1.52-5.39) |
|  | Geonggido | 0.97 | (0.9-1.04) |  | 1.08 | (1.02-1.14) |
|  | Gangwondo | 1.25 | (1.09-1.45) |  | 1.08 | (0.97-1.21) |
|  | Chungcheongbukdo | 1.52 | (1.33-1.73) |  | 1.26 | (1.13-1.4) |
|  | Chungcheongnamdo | 1.55 | (1.36-1.76) |  | 1.61 | (1.47-1.77) |
|  | Jeollabukdo | 0.82 | (0.73-0.91) |  | 0.52 | (0.47-0.58) |
|  | Jeollanamdo | 0.48 | (0.43-0.53) |  | 0.29 | (0.26-0.33) |
|  | Gyeongsangbukdo | 0.76 | (0.69-0.83) |  | 1.17 | (1.08-1.27) |
|  | Gyeongsangnamdo | 0.91 | (0.83-0.99) |  | 1.04 | (0.96-1.13) |
|  | Jejudo | 1.17 | (0.97-1.41) |  | 1.54 | (1.32-1.8) |

\*Family income: 0 (the beneficiary of medical aid), 1(1st quintile: the lowest), 2(2nd quintile), 3(3rd quintile), 4(4th quintile), 5(5th quintile: the highest)

\*\*adjusted for sex, age group, CCI, year, region

CCI: Charlson Comorbidity Index. UA: unruptured aneurysm, SAH: subarachnoid hemorrhage

OR†: Odds coiling/clipping

Supplementary Figure 1. Trends in the age-standardized prevalences of risk factors for unruptured intracranial aneurysm and subarachnoid hemorrhage (2005-2015)