**Table S1:** Source of data for variables

|  |  |  |
| --- | --- | --- |
| **Variable** | **Measure** | **Data provided by** |
| Neuropsychiatric symptoms | Neuropsychiatric inventory (NPI) | Informant (family member or close friend of participant) |
| Sensory loss | Hearing difficulty | Participant self-report during interview |
|  | Visual acuity | Assessed by trained interviewer |
| Covariates | Socio demographics, informant relationship, physical functioning, medication use | Participant self-report during interview |

**Table S2:** Occurrence of clinically relevant neuropsychiatric symptoms by level of sensory loss in the overall sample (N=1393).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Good**  **sensory**  **function** | |  | **Poor**  **vision**  **only a** | |  | **Poor**  **hearing**  **only b** | |  | **Dual**  **sensory**  **problems** | |  | **Total** | |
|  | **n** | **(%)** |  | **n** | **(%)** |  | **n** | **(%)** |  | **n** | **(%)** |  | **n** | **(%)** |
| Agitation | 7 | (1.1) |  | 5 | (7.6) |  | 18 | (2.8) |  | 4 | (5.9) |  | 34 | (2.4) |
| Irritability | 12 | (2.0) |  | 1 | (1.5) |  | 16 | (2.5) |  | 1 | (1.5) |  | 30 | (2.2) |
| Aberrant motor behavior | 7 | (1.1) |  | 0 | (0.0) |  | 7 | (1.1) |  | 1 | (1.5) |  | 15 | (1.1) |
| Disinhibition | 8 | (1.3) |  | 3 | (4.5) |  | 11 | (1.7) |  | 2 | (2.9) |  | 24 | (1.7) |
| Depression | 16 | (2.6) |  | 3 | (4.5) |  | 24 | (3.7) |  | 4 | (5.9) |  | 47 | (3.4) |
| Anxiety | 8 | (1.3) |  | 1 | (1.5) |  | 10 | (1.5) |  | 2 | (2.9) |  | 21 | (1.5) |
| Apathy | 7 | (1.1) |  | 8 | (12.1) |  | 17 | (2.6) |  | 4 | (5.9) |  | 36 | (2.6) |
| Sleep problems | 19 | (3.1) |  | 4 | (6.1) |  | 33 | (5.1) |  | 7 | (10.3) |  | 63 | (4.5) |
| Appetite change | 15 | (2.5) |  | 3 | (4.5) |  | 28 | (4.3) |  | 4 | (5.9) |  | 50 | (3.6) |
| Delusions | 1 | (0.2) |  | 3 | (4.5) |  | 5 | (0.8) |  | 1 | (1.5) |  | 10 | (0.7) |
| Hallucinations | 0 | (0.0) |  | 1 | (1.5) |  | 2 | (0.3) |  | 0 | (0.0) |  | 3 | (0.2) |
| Euphoria | 1 | (0.2) |  | 0 | (0.0) |  | 2 | (0.3) |  | 1 | (1.5) |  | 4 | (0.3) |

**a** Poor vision defined by impaired visual acuity (>0.3logMAR). **b** Poor hearing defined by self-reported hearing problems.

**Table S3:** Sensitivity analysis of modifying effect of neurocognitive diagnosis on associations between any sensory impairment and number of clinically relevant neuropsychiatric symptoms estimated by negative binomial regression (n=1393).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Model 1** | |  | **Model 2** | |  | **Model 3** | |
|  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |
| **Total sample** |  |  |  |  |  |  |  |  |
| Good sensory function | ref. |  |  | ref. |  |  | ref. |  |
| Any sensory problems | 1.57\* | (1.04,2.36) |  | 1.25 | (0.82,1.90) |  | 1.16 | (0.71,1.90) |
| **Diagnosis** |  |  |  |  |  |  |  |  |
| None |  |  |  | ref. |  |  | ref. |  |
| Mild neurocognitive disorder |  |  |  | 1.54\* | (1.05,2.26) |  | 1.54 | (0.82,2.90) |
| Major neurocognitive disorder |  |  |  | 5.80\*\*\* | (3.52,9.55) |  | 1.61 | (0.72,3.60) |
| **Interaction terms** |  |  |  |  |  |  |  |  |
| Any sensory problems by Mild ND |  |  |  |  |  |  | 1.00 | (0.45,2.22) |
| Any sensory problems by Major ND |  |  |  |  |  |  | 4.51\*\* | (1.70,11.96) |

*\* p<.05, \*\* p<.01, \*\*\* p<.001*

*Note:* all models adjusted for age, sex, marital status, informant relationship, physical functioning, and medication use. Sensory problems reflect any visual impairment or self-reported hearing difficulties. **IRR:** Incident rate ratio.

**Table S4:** Sensitivity analysis of modifying effect of neurocognitive diagnosis on associations between visual impairment or self-reported hearing difficulties and number of clinically relevant neuropsychiatric symptoms estimated by negative binomial regression (n=1393).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Model 1** | |  | **Model 2** | |  | **Model 3** | |
|  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |
| **Sensory impairment** |  |  |  |  |  |  |  |  |
| No hearing problems | ref. |  |  | ref. |  |  | ref. |  |
| Slight hearing problems | 1.24 | (0.82,1.87) |  | 1.16 | (0.75,1.77) |  | 1.20 | (0.72,2.01) |
| Definite hearing problems | 1.47 | (0.81,2.68) |  | 1.20 | (0.72,1.99) |  | 1.01 | (0.54,1.89) |
| No visual impairment | ref. |  |  | ref. |  |  | ref. |  |
| Visual impairment | 2.00\*\* | (1.25,3.21) |  | 1.44 | (0.93,2.21) |  | 0.91 | (0.45,1.85) |
| **Diagnosis** |  |  |  |  |  |  |  |  |
| None |  |  |  | ref. |  |  | ref. |  |
| Mild ND |  |  |  | 1.48\* | (1.01,2.16) |  | 1.35 | (0.73,2.51) |
| Major ND |  |  |  | 5.62\*\*\* | (3.45,9.16) |  | 1.17 | (1.02,4.41) |
| **Interaction terms** |  |  |  |  |  |  |  |  |
| Slight hearing problems by Mild ND |  |  |  |  |  |  | 0.78 | (0.34,1.82) |
| Slight hearing problems by Major ND |  |  |  |  |  |  | 1.76 | (0.70,4.43) |
| Definite hearing problems by Mild ND |  |  |  |  |  |  | 1.17 | (0.38,3.62) |
| Definite hearing problems by Major ND |  |  |  |  |  |  | 5.91\* | (1.43,24.45) |
| Vision by Mild ND |  |  |  |  |  |  | 2.75\* | (1.02,7.43) |
| Vision by Major ND |  |  |  |  |  |  | 5.25\*\* | (1.60,17.22) |

*\* p<05, \*\* p<.01, \*\*\* p<.001*

*Note:* all models adjusted for age, sex, marital status, informant relationship, physical functioning, and medication use. **IRR:** Incident rate ratio. **ND:** Neurocognitive disorder.

**Table S5:** Sensitivity analysis of modifying effect of any diagnosis on the associations between sensory impairment and number of clinically relevant neuropsychiatric symptoms estimated by negative binomial regression (n=1393).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Model 1** | |  | **Model 2** | |  | **Model 3** | |
|  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |
| **Sensory impairment** |  |  |  |  |  |  |  |  |
| Good sensory function | ref. |  |  | ref. |  |  | ref. |  |
| Poor vision only | 2.69\*\* | (1.32,5.48) |  | 2.01\* | (1.01,4.00) |  | 1.18 | (0.39,3.56) |
| Poor hearing only | 1.40 | (0.91,2.16) |  | 1.29 | (0.83,2.00) |  | 1.18 | (0.71,1.96) |
| Dual sensory problems | 2.01\* | (1.09,3.69) |  | 1.51 | (0.84,2.72) |  | 0.87 | (0.36,2.14) |
| **Diagnosis** |  |  |  |  |  |  |  |  |
| None |  |  |  | ref. |  |  | ref. |  |
| Any neurocognitive disorder |  |  |  | 2.40\*\*\* | (1.68,3.42) |  | 1.58 | (0.89,2.80) |
| **Interaction** |  |  |  |  |  |  |  |  |
| VI by Any ND |  |  |  |  |  |  | 3.51 | (0.83,14.74) |
| HI by Any ND |  |  |  |  |  |  | 1.52 | (0.70,3.30) |
| DSL by Any ND |  |  |  |  |  |  | 3.92\* | (1.24,12.35) |

*\* p<.05, \*\* p<.01, \*\*\* p<.001*

*Note:* all models adjusted for age, sex, marital status, informant relationship, physical functioning, and medication use. **IRR:** Incident rate ratio. **ND:** Neurocognitive disorder.

**Table S6:** Sensitivity analyses negative binomial regression models of association between sensory impairment and number of neuropsychiatric symptoms stratified by DSM-IV diagnosis (no diagnosis, mild neurocognitive disorder, major neurocognitive disorder).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No diagnosis** | |  | **Mild ND** | |  | **Major ND** | |
|  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |  | **IRR** | **(95% CI)** |
| **Dual sensory problems** |  |  |  |  |  |  |  |  |
| Good sensory function | ref. |  |  | ref. |  |  | ref. |  |
| Poor vision only | 1.18 | (0.39,3.57) |  | 1.15 | (0.40,3.29) |  | 6.58\*\* | (1.94,22.34) |
| Poor hearing only | 1.23 | (0.72,2.10) |  | 0.84 | (0.42,1.68) |  | 2.50\* | (1.07,5.85) |
| Dual sensory problems | 0.86 | (0.34,2.14) |  | 4.19\*\* | (1.68,10.43) |  | 4.19\*\* | (1.55,11.29) |
| **Any sensory problems** |  |  |  |  |  |  |  |  |
| Good sensory function | ref. |  |  | ref. |  |  | ref. |  |
| Any sensory impairment | 1.20 | (0.72,2.00) |  | 1.15 | (0.61,2.16) |  | 3.25\*\* | (1.46,7.21) |
| **Vision and hearing** |  |  |  |  |  |  |  |  |
| No hearing problems | ref. |  |  | ref. |  |  | ref. |  |
| Slight hearing problems | 1.24 | (0.72,2.14) |  | 1.03 | (0.52,2.03) |  | 1.32 | (0.70,2.49) |
| Definite hearing problems | 1.00 | (0.52,1.93) |  | 1.46 | (0.59,3.59) |  | 2.44 | (0.96,6.17) |
| No visual impairment | ref. | (1.00,1.00) |  | ref. | (1.00,1.00) |  | ref. | (1.00,1.00) |
| Visual impairment | 0.89 | (0.43,1.82) |  | 3.03\*\* | (1.53,6.03) |  | 3.57\*\*\* | (1.90,6.72) |

*\* p<.05, \*\* p<.01, \*\*\* p<.001*

*Note:* all models adjusted for age, sex, marital status, informant relationship, physical functioning, and medication use. **IRR:** Incident rate ratio.