**SUPPLEMENT**

Supplemental Table 1. Responses and scores of the original ESS items based on close relative report (n=7)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Chance of dozing off n(%) | | | | | Median score (Q1;Q3) | Mean score (SD) | |
| 0 never | 1 slight | 2 moderate | 3 high | missing |  |  |
| ESS1 Sitting and reading | 5(71.4) | 1(14.3) | 0(0.0) | 1(14.3) | 0(0.0) | 0(0;1) | 0.57(1.13) |
| ESS2 Watching TV | 2(28.6) | 2(28.6) | 1(14.3) | 1(14.3) | 1(14.3) | 1(0;2) | 1.17(1.17) |
| ESS3 Sitting inactively in a public place … | 5(71.4) | 1(14.3) | 0(0.0) | 0(0.0) | 1(14.3) | 0(0;0) | 0.17(0.41) |
| ESS4 As a passenger in a car … | 5(71.4) | 0(0.0) | 0(0.0) | 1(14.3) | 1(14.3) | 0(0;1) | 0.50(1.23) |
| ESS5 Lying down to rest in the afternoon | 0(0.0) | 0(0.0) | 3(42.9) | 4(57.1) | 0(0.0) | 3(2;3) | 2.57(0.54) |
| ESS6 Sitting and talking to someone | 7(100.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0;0) | 0.0(0.0) |
| ESS7 Sitting quietly after lunch … | 1(14.3) | 4(57.1) | 2(28.6) | 0(0.0) | 0(0.0) | 1(1;2) | 1.14(0.69) |
| ESS8 In a car while stopped … | 3(42.9) | 0(0.0) | 0(0.0) | 0(0.0) | 4(57.1) | 0(0;0) | 0.0(0.0) |
| ESS total |  |  |  |  | 4(57.1) | 4(4;7) | 8.67(5.69) |

Supplemental Table 2. Comparison of patients with complete (n=14) vs. incomplete (n=38) original ESS data

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Complete ESS | Incomplete ESS | p |
| Age (years), mean±SD | 82.9±7.7 | 84.4±5.9 | 0.470 |
| Male sex, n(%) | 8(57.1) | 9(23.7) | 0.043 |
| Emergency admission, n(%)  Elective admission, n(%) | 2(14.3)  12(85.7) | 11(28.9)  27(71.1) | 0.472 |
| Main diagnosis at admission  Cardiovascular, n(%)  Neurological, n(%)  Pulmonary, n(%)  Gastroenterological, n(%)  Nephrological, n(%)  Orthopedic, n(%) | 2(14.3)  1(7.1)  0(0.0)  1(7.1)  0(0.0)  10(71.4) | 8(21.1)  5(13.2)  3(7.9)  1(2.6)  1(2.6)  20(52.6) | 0.668 |
| Number of diseases, median(Q1;Q3) | 11.0(6.8;14.0) | 11.0(7.8;13.3) | 0.844 |
| Number of medications, mean±SD | 8.0±3.3 | 7.1±2.6 | 0.361 |
| Hypnotics, n(%) | 1(7.1) | 10(26.3) | 0.251 |
| History of stroke, n(%) | 2(14.3) | 2(5.3) | 0.279 |
| History of coronary heart disease, n(%) | 10(71.4) | 22(57.9) | 0.374 |
| NYHA classes of heart failure  I, n(%)  II, n(%)  III, n(%)  IV, n(%) | 7(50.0)  3(21.4)  4(28.6)  0(0.0) | 18(47.4)  7(18.4)  7(18.4)  6(15.8) | 0.428 |
| Arrhythmia, n(%) | 7(50.0) | 17(44.7) | 0.736 |
| Anemia, n(%) | 12(85.7) | 25(65.8) | 0.300 |
| Dementia, n(%) | 1(7.1) | 13(34.2) | 0.051 |
| Thyroid dysfunction, n(%) | 7(18.9) | 0(0.0) | 0.179 |
| Cancer, n(%) | 0(0.0) | 10(26.3) | 0.046 |
| Osteoporosis, n(%) | 3(23.1) | 16(44.4) | 0.175 |
| Arthrosis, n(%) | 4(28.6) | 13(34.2) | 0.999 |
| Chronic obstructive pulmonary disease, n(%) | 4(28.6) | 3(7.9) | 0.075 |
| Arterial hypertension, n(%) | 12(85.7) | 32(84.2) | 0.999 |
| Diabetes mellitus, n(%) | 4(28.6) | 12(31.6) | 0.999 |
| Hypercholesterolemia, n(%) | 2(20.0) | 7(21.9) | 0.999 |
| Current smoking, n(%)  Former smoker, n(%)  Never smoked, n(%) | 0(0.0)  2(14.3)  12(85.7) | 0(0.0)  5(13.5)  32(86.5) | 0.999 |
| BMI (kg/m2), n(%) | 25.7(23.4;28.0) | 24.0(21.1;26.9) | 0.436 |
| Renal insufficiency, n(%) | 11(78.6) | 23(60.5) | 0.329 |
| Hearing loss  None, n(%)  Slight, n(%)  Moderate, n(%)  Deaf, n(%) | 0(0.0)  14(100.0)  0(0.0)  0(0.0) | 2(5.4)  33(89.2)  1(2.7)  1(2.7) | 0.650 |
| Visual impairment  None, n(%)  Slight, n(%)  Moderate, n(%)  Blind, n(%) | 2(14.3)  12(85.7)  0(0.0)  0(0.0) | 2(5.4)  32(86.5)  1(2.7)  2(5.4) | 0.540 |
| Barthel-Index, mean±SD | 42.5±15.7 | 40.4±17.3 | 0.692 |
| De Morton Mobility Index, median(Q1;Q3) | 40.0(33.8;44.0) | 33.0(24.5;42.5) | 0.123 |
| Mini-Mental State Examination, median(Q1;Q3) | 28.0(24.5;29.5) | 27.0(23.5;29.0) | 0.547 |
| Geriatric depression scale, median(Q1;Q3) | 3.0(2.5;5.5) | 3.5(2.0;5.3) | 0.835 |
| Clinical frailty scale, median(Q1;Q3) | 5.0(5.0;6.0) | 6.0(5.0;6.0) | 0.386 |
| Fall during the last 3 months, n(%) | 7(50.0) | 20(52.6) | 0.866 |
| Housing situation  With partner/family, n(%)  Alone, with external support, n(%)  Alone, without external support, n(%)  Nursing home, n(%)  Assisted living, n(%) | 5(35.7)  0(0.0)  8(57.1)  1(7.1)  0(0.0) | 7(18.4)  4(10.5)  23(60.5)  3(7.9)  1(2.6) | 0.526 |

Supplemental Table 3. Adequacy evaluation of the original ESS items based on patient’s self-report (n=52)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Help needed n(%) | Median seconds needed (Q1;Q3) | Adequacy to assess daytime sleepiness  n(%) | | | | | Median adequacy (Q1;Q3) | Mean adequacy (SD) |
|  |  | 0 none | 1 slight | 2 moderate | 3 high | missing |  |  |
| ESS1 Sitting and reading | 6(11.5) | 4(2;7) | 6(11.5) | 8(15.4) | 14(26.9) | 19(36.5) | 5(9.6) | 2(1;3) | 1.98(1.05) |
| ESS2 Watching TV | 0(0.0) | 4(2;5) | 3(5.8) | 6(11.5) | 14(26.9) | 24(46.2) | 5(9.6) | 3(2;3) | 2.26(0.92) |
| ESS3 Sitting inactively in a public place … | 0(0.0) | 3(2;4) | 22(42.3) | 10(19.2) | 10(19.2) | 5(9.6) | 5(9.6) | 1(0;2) | 0.96(1.06) |
| ESS4 As a passenger in a car … | 1(1.9) | 3(2;6) | 9(17.3) | 7(13.5) | 11(21.2) | 20(38.5) | 5(9.6) | 2(1;3) | 1.89(1.17) |
| ESS5 Lying down to rest in the afternoon | 0(0.0) | 3(2;4) | 2(3.8) | 5(9.6) | 16(30.8) | 24(46.2) | 5(9.6) | 3(2;3) | 2.32(0.84) |
| ESS6 Sitting and talking to someone | 0(0.0) | 2(1;3) | 28(53.8) | 11(21.2) | 5(9.6) | 3(8.8) | 5(9.6) | 0(0;1) | 0.64(0.92) |
| ESS7 Sitting quietly after lunch … | 0(0.0) | 3(2;5) | 5(9.6) | 16(30.8) | 13(25.0) | 13(25.0) | 5(9.6) | 2(1;3) | 1.72(0.99) |
| ESS8 In a car while stopped … | 0(0.0) | 2(1;4) | 33(63.5) | 6(11.5) | 4(7.7) | 4(7.7) | 5(9.6) | 0(0;1) | 0.55(0.97) |

Supplemental Table 4. Adequacy evaluation of the original ESS items based on close relative report (n=7)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Help needed n(%) | Median seconds needed(Q1;Q3) | Adequacy to assess daytime sleepiness  n(%) | | | | | Median adequacy (Q1;Q3) | Mean adequacy (SD) |
|  |  | 0 none | 1 slight | 2 moderate | 3 high | missing |  |  |
| ESS1 Sitting and reading | 0(0.0) | 2(2;9) | 2(28.6) | 2(28.6) | 1(14.3) | 2(28.6) | 0(0.0) | 1(0;3) | 1.43(1.27) |
| ESS2 Watching TV | 0(0.0) | 2(2;5) | 0(0.0) | 1(14.3) | 1(14.3) | 5(71.4) | 0(0.0) | 3(2;3) | 2.57(0.79) |
| ESS3 Sitting inactively in a public place … | 0(0.0) | 3(2;6) | 3(42.9) | 2(28.6) | 1(14.3) | 1(14.3) | 0(0.0) | 1(0;2) | 1.00(1.16) |
| ESS4 As a passenger in a car … | 0(0.0) | 2(2;5) | 0(0.0) | 3(42.9) | 3(42.9) | 1(14.3) | 0(0.0) | 2(1;2) | 1.71(0.76) |
| ESS5 Lying down to rest in the afternoon | 0(0.0) | 2(2;6) | 1(14.3) | 0(0.0) | 1(14.3) | 5(71.4) | 0(0.0) | 3(2;3) | 2.43(1.13) |
| ESS6 Sitting and talking to someone | 0(0.0) | 2(2;3) | 5(71.4) | 1(14.3) | 1(14.3) | 0(0.0) | 0(0.0) | 0(0;1) | 0.43(0.79) |
| ESS7 Sitting quietly after lunch … | 0(0.0) | 4(3;5) | 0(0.0) | 3(42.9) | 3(42.9) | 1(14.3) | 0(0.0) | 2(1;2) | 1.71(0.78) |
| ESS8 In a car while stopped … | 0(0.0) | 2(2;3) | 6(85.7) | 0(0.0) | 0(0.0) | 1(14.3) | 0(0.0) | 0(0;0) | 0.43(1.13) |

Supplemental Table 5. Adequacy evaluation of the new items based on patient’s self-report (n=52)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Help needed n(%) | Median  seconds needed (Q1;Q3) | Adequacy to assess daytime sleepiness  n(%) | | | | | Median adequacy (Q1;Q3) | | Mean adequacy (SD) |
|  |  | 0 none | 1 slight | 2 moderate | 3 high | missing | |  |  |
| NEW1 During lunch | 0(0.0) | 2(1;2) | 41(78.8) | 2(3.8) | 1(1.9) | 3(5.8) | 5(9.6) | | 0(0;0) | 0.28(0.80) |
| NEW2 During breakfast | 0(0.0) | 2(1;2) | 41(78.8) | 2(3.8) | 1(1.9) | 3(5.8) | 5(9.6) | | 0(0;0) | 0.28(0.80) |
| NEW3 sitting and talking in a small group | 0(0.0) | 2(2;3) | 31(59.6) | 7(13.5) | 5(9.6) | 4(7.7) | 5(9.6) | | 0(0;1) | 0.62(0.99) |
| NEW4 during train ride | 0(0.0) | 3(2;4) | 12(23.1) | 8(15.4) | 16(30.8) | 9(17.3) | 5(9.6) | | 2(0;2) | 1.15(1.10) |
| NEW5 during family celebration | 0(0.0) | 2(1;3) | 33(63.5) | 8(15.4) | 3(5.8) | 2(3.8) | 5(9.6) | | 0(0;1) | 0.43(0.81) |
| NEW6 sitting in a waiting room | 0(0.0) | 2(2;4) | 22(42.3) | 9(17.3) | 11(21.2) | 5(9.6) | 5(9.6) | | 1(0;2) | 0.98(1.07) |
| NEW7 sitting and waiting for the bus | 0(0.0) | 2(1;3) | 38(73.1) | 5(9.6) | 3(6.4) | 1(1.9) | 5(9.6) | | 0(0;0) | 0.30(0.69) |
| NEW8 during crossword, Sudoku or parlor games | 0(0.0) | 3(2;4) | 27(51.9) | 13(25.0) | 1(1.9) | 6(11.5) | 5(9.6) | | 0(0;1) | 0.70(1.02) |

Supplemental Table 6. Responses and scores of the new items based on close relative report (n=7)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Chance of dozing off n(%) | | | | | Median score (Q1;Q3) | Mean score (SD) |
| 0 never | 1 slight | 2 moderate | 3 high | missing |  |  |
| NEW1 During lunch | 7(100.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0;0) | 0.00(0.00) |
| NEW2 During breakfast | 7(100.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0;0) | 0.00(0.00) |
| NEW3 sitting and talking in a small group | 7(100.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0;0) | 0.00(0.00) |
| NEW4 during train ride | 4(57.1) | 0(0.0) | 1(14.3) | 0(0.0) | 2(28.6) | 0(0;1) | 0.40(0.89) |
| NEW5 during family celebration | 6(85.7) | 1(14.3) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0;0) | 0.14(0.38) |
| NEW6 sitting in a waiting room | 6(85.7) | 1(14.3) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0;0) | 0.14(0.38) |
| NEW7 sitting and waiting for the bus | 5(71.4) | 0(0.0) | 0(0.0) | 0(0.0) | 2(28.6) | 0(0;0) | 0.00(0.00) |
| NEW8 during crossword, Sudoku or parlor games | 4(57.1) | 1(14.3) | 1(14.3) | 0(0.0) | 1(14.3) | 0(0;0) | 0.50(0.84) |

Supplemental Table 7. Adequacy evaluation of the new items based on close relative report (n=7)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Help needed n(%) | Median seconds needed (Q1;Q3) | Adequacy to assess daytime sleepiness  n(%) | | | | | Median adequacy (Q1;Q3) | | Mean adequacy (SD) |
|  |  | 0 none | 1 slight | 2 moderate | 3 high | missing | |  |  |
| NEW1 During lunch | 0(0.0) | 1(1;2) | 5(71.4) | 1(14.3) | 0(0) | 1(14.3) | 0(0.0) | | 0(0;1) | 0.57(1.13) |
| NEW2 During breakfast | 0(0.0) | 2(1;2) | 5(71.4) | 1(14.3) | 0(0) | 1(14.3) | 0(0.0) | | 0(0;1) | 0.57(1.13) |
| NEW3 sitting and talking in a small group | 0(0.0) | 2(2;3) | 4(57.1) | 1(14.3) | 1(14.3) | 1(14.3) | 0(0.0) | | 0(0;2) | 0.86(1.22) |
| NEW4 during train ride | 0(0.0) | 3(2;4) | 2(28.6) | 3(42.9) | 1(1.9) | 1(1.9) | 0(0.0) | | 1(0;2) | 1.14(1.07) |
| NEW5 during family celebration | 0(0.0) | 2(2;3) | 4(57.1) | 0(0.0) | 2(28.6) | 1(14.3) | 0(0.0) | | 0(0;2) | 1.00(1.29) |
| NEW6 sitting in a waiting room | 0(0.0) | 3(2;6) | 2(28.6) | 3(42.9) | 1(14.3) | 1(14.3) | 0(0.0) | | 1(0;2) | 1.14(1.07) |
| NEW7 sitting and waiting for the bus | 0(0.0) | 2(2;2) | 6(85.7) | 0(0.0) | 1(14.3) | 0(0.0) | 0(0.0) | | 0(0;0) | 0.29(0.76) |
| NEW8 during crossword, Sudoku or parlor games | 0(0.0) | 2(2;3) | 3(42.9) | 2(28.6) | 0(0.0) | 2(28.6) | 0(0.0) | | 1(0;3) | 1.14(1.35) |

Supplemental Table 8. Adapted version of the ESS (ESS-ALT) based on close relative report (n=7)

|  |  |  |
| --- | --- | --- |
| Item | Reliability and Validity | |
|  | Missings  n(%) | Difficulty  (%) |
| ESS-ALT1 Sitting and reading | 0(0.0) | 19.0 |
| ESS-ALT2 Watching TV | 1(14.3) | 38.9 |
| ESS-ALT3 Sitting in a waiting room\* | 0(0.0) | 4.8 |
| ESS-ALT4 As a passenger in the car | 1(14.3) | 16.7 |
| ESS-ALT5 Lying down in the afternoon | 0(0.0) | 85.7 |
| ESS-ALT6 Sitting and talking | 0(0.0) | 0.0 |
| ESS-ALT7 Sitting quietly after a lunch | 0(0.0) | 38.1 |
| ESS-ALT8 Sitting and eating a meal\* | 0(0.0) | 0.0 |
| ESS-ALT total | 2(28.6) |  |

\*ESS3 (sitting inactively in a public place), was replaced by NEW6 (sitting in a waiting room); ESS8 (sleepy in traffic) was replaced by NEW2 (during breakfast, now termed ‘sitting and eating a meal’)

Supplemental Table 9. Comparison of patients with complete (n=40) vs. incomplete (n=12) ESS-ALT data

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Complete ESS-ALT | Incomplete ESS-ALT | p |
| Age (years), mean±SD | 83.9±6.4 | 84.4±6.8 | 0.800 |
| Male sex, n(%) | 14(35.0) | 3(25.0) | 0.729 |
| Emergency admission, n(%)  Elective admission, n(%) | 10(25.0)  30(75.0) | 3(25.0)  9(75.0) | 0.999 |
| Main diagnosis at admission  Cardiovascular, n(%)  Neurological, n(%)  Pulmonary, n(%)  Gastroenterological, n(%)  Nephrological, n(%)  Orthopedic, n(%) | 8(20.0)  5(12.5)  3(7.5)  2(5.0)  1(2.5)  21(52.5) | 2(16.7)  1(8.3)  0(0.0)  0(0.0)  0(0.0)  9(75.0) | 0.730 |
| Number of diseases, median(Q1;Q3) | 11.0(8.0;14.0) | 9.0(6.3;12.8) | 0.191 |
| Number of medications, mean±SD | 7.8±2.7 | 6.3±3.1 | 0.107 |
| Hypnotics, n(%) | 7(17.5) | 4(33.3) | 0.253 |
| History of stroke, n(%) | 4(10.0) | 0(0.0) | 0.562 |
| History of coronary heart disease, n(%) | 28(70.0) | 4(33.3) | 0.040 |
| NYHA classes of heart failure  I, n(%)  II, n(%)  III, n(%)  IV, n(%) | 18(45.0)  10(25.0)  8(20.0)  4(10.0) | 7(58.3)  0(0.0)  3(25.0)  2(16.7) | 0.283 |
| Arrhythmia, n(%) | 20(50.0) | 4(33.3) | 0.310 |
| Anemia, n(%) | 27(67.5) | 10(83.3) | 0.470 |
| Dementia, n(%) | 10(25.0) | 4(33.3) | 0.712 |
| Thyroid dysfunction, n(%) | 3(8.3) | 4(33.3) | 0.055 |
| Cancer, n(%) | 8(20.0) | 2(16.7) | 0.999 |
| Osteoporosis, n(%) | 11(28.9) | 8(72.7) | 0.014 |
| Arthrosis, n(%) | 14(35.0) | 3(25.0) | 0.729 |
| Chronic obstructive pulmonary disease, n(%) | 7(17.5) | 0(0.0) | 0.181 |
| Arterial hypertension, n(%) | 33(82.5) | 11(91.7) | 0.663 |
| Diabetes mellitus, n(%) | 15(37.5) | 1(8.3) | 0.078 |
| Hypercholesterolemia, n(%) | 6(18.8) | 3(30.0) | 0.660 |
| Current smoking, n(%)  Former smoker, n(%)  Never smoked, n(%) | 0(0.0)  7(17.5)  33(82.5) | 0(0.0)  0(0.0)  11(100.0) | 0.323 |
| BMI (kg/m2), n(%) | 24.4(22.2;26.8) | 24.0(21.4;26.8) | 0.850 |
| Renal insufficiency, n(%) | 29(72.5) | 5(41.7) | 0.082 |
| Hearing loss  None, n(%)  Slight, n(%)  Moderate, n(%)  Deaf, n(%) | 2(5.1)  37(94.9)  0(0.0)  0(0.0) | 0(0.0)  10(83.3)  1(8.3)  1(8.3) | 0.064 |
| Visual impairment  None, n(%)  Slight, n(%)  Moderate, n(%)  Blind, n(%) | 3(7.7)  34(87.2)  0(0.0)  2(5.1) | 1(8.3)  10(83.3)  1(8.3)  0.0 | 0.274 |
| Barthel-Index, mean±SD | 41.8±16.2 | 38.3±19.0 | 0.541 |
| De Morton Mobility Index, median(Q1;Q3) | 39.0(24.8;44.0) | 30.0(27.0;36.0) | 0.419 |
| Mini-Mental State Examination, median(Q1;Q3) | 28.0(23.8;29.0) | 26.5(23.3;29.0) | 0.945 |
| Geriatric depression scale, median(Q1;Q3) | 4.0(3.0;6.0) | 2.5(2.0;4.0) | 0.050 |
| Clinical frailty scale, median(Q1;Q3) | 6.0(5.0;6.0) | 6.0(4.5;6.0) | 0.812 |
| Fall during the last 3 months, n(%) | 20(50.0) | 7(58.3) | 0.612 |
| Housing situation  With partner/family, n(%)  Alone, with external support, n(%)  Alone, without external support, n(%)  Nursing home, n(%)  Assisted living, n(%) | 11(27.5)  3(7.5)  23(57.5)  3(7.5)  0(0.0) | 1(8.3)  1(8.3)  8(66.7)  1(8.3)  1(8.3) | 0.293 |