Table S1 Association between nutrition status and EQ-5D scores in males

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | 95% CI | |  |  |
| **Model A** | β | lower | upper | Standard β | P |
| MNA-SF (continuous) | 0.050 | 0.033 | 0.067 | 0.395 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.091 | -0.182 | -0.001 | -0.174 | 0.047 |
| Malnutrition | -0.322 | -0.443 | -0.200 | -0.454 | 0.000 |
| **Model B** |  |  |  |  |  |
| MNA-SF (continuous) | 0.050 | 0.033 | 0.067 | 0.396 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.089 | -0.180 | 0.003 | -0.169 | 0.057 |
| Malnutrition | -0.321 | -0.443 | -0.199 | -0.453 | 0.000 |
| **Model C** |  |  |  |  |  |
| MNA-SF (continuous) | 0.047 | 0.030 | 0.064 | 0.375 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.080 | -0.172 | 0.013 | -0.152 | 0.091 |
| Malnutrition | -0.301 | -0.425 | -0.177 | -0.424 | 0.000 |
| **Model D** |  |  |  |  |  |
| MNA-SF (continuous) | 0.045 | 0.028 | 0.062 | 0.357 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.080 | -0.168 | 0.009 | -0.151 | 0.077 |
| Malnutrition | -0.279 | -0.399 | -0.159 | -0.394 | 0.000 |

Model A: crude model;

Model B: Adjusted for age;

Model C: Adjusted for age, ethnic, education level, residential type;

Model D: Adjusted for age, ethnic, education level, residential type, smoking, drinking, physical activity.

Table S2 Association between nutrition status and EQ-5D scores in females

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | 95% CI | |  |  |
| **Model A** | β | lower | upper | Standard β | P |
| MNA-SF (continuous) | 0.067 | 0.060 | 0.074 | 0.557 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.106 | -0.152 | -0.059 | -0.201 | 0.000 |
| Malnutrition | -0.387 | -0.440 | -0.334 | -0.650 | 0.000 |
| **Model B** |  |  |  |  |  |
| MNA-SF (continuous) | 0.067 | 0.060 | 0.074 | 0.557 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.105 | -0.152 | -0.058 | -0.201 | 0.000 |
| Malnutrition | -0.387 | -0.440 | -0.333 | -0.650 | 0.000 |
| **Model C** |  |  |  |  |  |
| MNA-SF (continuous) | 0.067 | 0.060 | 0.074 | 0.558 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.103 | -0.151 | -0.056 | -0.197 | 0.000 |
| Malnutrition | -0.387 | -0.440 | -0.333 | -0.649 | 0.000 |
| **Model D** |  |  |  |  |  |
| MNA-SF (continuous) | 0.064 | 0.057 | 0.070 | 0.530 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -0.099 | -0.144 | -0.054 | -0.189 | 0.000 |
| Malnutrition | -0.369 | -0.420 | -0.318 | -0.620 | 0.000 |

Model A: crude model;

Model B: Adjusted for age;

Model C: Adjusted for age, ethnic, education level, residential type;

Model D: Adjusted for age, ethnic, education level, residential type, smoking, drinking, physical activity.

Table S3 Association between nutrition status and VAS in males

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | 95% CI | |  |  |
| **Model A** | β | lower | upper | Standard β | P |
| MNA-SF (continuous) | 1.952 | 0.887 | 3.017 | 0.262 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -4.163 | -9.726 | 1.399 | -0.133 | 0.141 |
| Malnutrition | -14.308 | -21.807 | -6.810 | -0.339 | 0.000 |
| **Model B** |  |  |  |  |  |
| MNA-SF (continuous) | 2.013 | 0.971 | 3.056 | 0.270 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -3.003 | -8.495 | 2.488 | -0.096 | 0.282 |
| Malnutrition | -14.170 | -21.503 | -6.837 | -0.336 | 0.000 |
| **Model C** |  |  |  |  |  |
| MNA-SF (continuous) | 1.883 | 0.825 | 2.941 | 0.252 | 0.001 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -2.826 | -8.410 | 2.757 | -0.090 | 0.319 |
| Malnutrition | -13.458 | -20.954 | -5.962 | -0.319 | 0.001 |
| **Model D** |  |  |  |  |  |
| MNA-SF (continuous) | 1.765 | 0.700 | 2.831 | 0.237 | 0.001 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -2.881 | -8.427 | 2.665 | -0.092 | 0.307 |
| Malnutrition | -12.323 | -19.850 | -4.795 | -0.292 | 0.001 |

Model A: crude model;

Model B: Adjusted for age;

Model C: Adjusted for age, ethnic, education level, residential type;

Model D: Adjusted for age, ethnic, education level, residential type, smoking, drinking, physical activity.

Table S4 Association between nutrition status and VAS in females

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | 95% CI | |  |  |
| **Model A** | β | lower | upper | Standard β | P |
| MNA-SF (continuous) | 2.648 | 2.160 | 3.137 | 0.349 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -4.054 | -7.349 | -0.758 | -0.122 | 0.016 |
| Malnutrition | -14.622 | -18.359 | -10.885 | -0.388 | 0.000 |
| **Model B** |  |  |  |  |  |
| MNA-SF (continuous) | 2.638 | 2.150 | 3.127 | 0.347 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -3.974 | -7.272 | -0.675 | -0.120 | 0.018 |
| Malnutrition | -14.512 | -18.254 | -10.770 | -0.385 | 0.000 |
| **Model C** |  |  |  |  |  |
| MNA-SF (continuous) | 2.645 | 2.158 | 3.132 | 0.348 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -3.760 | -7.049 | -0.471 | -0.113 | 0.025 |
| Malnutrition | -14.493 | -18.220 | -10.766 | -0.385 | 0.000 |
| **Model D** |  |  |  |  |  |
| MNA-SF (continuous) | 2.555 | 2.069 | 3.041 | 0.336 | 0.000 |
| Normal nutritional status (reference) |  |  |  |  |  |
| At risk of malnutrition | -3.716 | -6.973 | -0.459 | -0.112 | 0.025 |
| Malnutrition | -14.093 | -17.797 | -10.389 | -0.374 | 0.000 |

Model A: crude model;

Model B: Adjusted for age;

Model C: Adjusted for age, ethnic, education level, residential type;

Model D: Adjusted for age, ethnic, education level, residential type, smoking, drinking, physical activity.

Table S5 The Odds Ratio of nutrition status on low QoL sub-domains in males

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Model A | Model B | Model C | Model D |
| **Low Mobility** |  |  |  |  |
| MNA-SF (continuous variable) | 0.85 (0.72-1) | 0.84 (0.71-1) | 0.85 (0.72-1.01) | 0.84 (0.7-1.01) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 1.20 (0.53-2.71) | 1.07 (0.47-2.46) | 1.12 (0.48-2.61) | 1.15 (0.48-2.77) |
| Malnutrition | 4.67 (1.14-19.17) | 4.66 (1.13-19.21) | 4.8 (1.13-20.35) | 4.66 (1.04-20.9) |
| P for trend | 0.084 | 0.069 | 0.072 | 0.102 |
| **Low Self-care** |  |  |  |  |
| MNA-SF (continuous variable) | 0.63 (0.52-0.76) | 0.62 (0.51-0.75) | 0.63 (0.52-0.76) | 0.61 (0.49-0.75) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 3.87 (1.48-10.12) | 3.61 (1.37-9.5) | 3.69 (1.38-9.86) | 4.04 (1.46-11.19) |
| Malnutrition | 20 (4.94-80.89) | 20.08 (4.95-81.4) | 19.64 (4.73-81.63) | 20.84 (4.59-94.65) |
| P for trend | <0.001 | <0.001 | <0.001 | <0.001 |
| **Low Usual Activities** |  |  |  |  |
| MNA-SF (continuous variable) | 0.76 (0.64-0.91) | 0.76 (0.64-0.91) | 0.77 (0.65-0.92) | 0.76 (0.62-0.92) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 1.47 (0.66-3.28) | 1.37 (0.61-3.09) | 1.21 (0.53-2.78) | 1.24 (0.51-3.03) |
| Malnutrition | 9.62 (1.91-48.42) | 9.61 (1.91-48.4) | 8.25 (1.61-42.3) | 7.92 (1.38-45.57) |
| P for trend | 0.023 | 0.022 | 0.034 | 0.06 |
| **Pain/discomfort** |  |  |  |  |
| MNA-SF (continuous variable) | 0.89 (0.77-1.04) | 0.9 (0.77-1.05) | 0.92 (0.78-1.08) | 0.92 (0.78-1.09) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 1.16 (0.52-2.61) | 1.23 (0.54-2.78) | 1.08 (0.46-2.52) | 1.09 (0.46-2.57) |
| Malnutrition | 2.1 (0.7-6.26) | 2.12 (0.71-6.32) | 1.69 (0.55-5.23) | 1.55 (0.49-4.9) |
| P for trend | 0.354 | 0.374 | 0.583 | 0.719 |
| **Anxiety/Depression** |  |  |  |  |
| MNA-SF (continuous variable) | 0.64 (0.5-0.82) | 0.63 (0.49-0.81) | 0.65 (0.49-0.85) | 0.67 (0.51-0.89) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 3.62 (0.46-28.71) | 3.39 (0.42-27.09) | 3.21 (0.39-26.41) | 3 (0.34-26.22) |
| Malnutrition | 20.71 (2.41-178.24) | 20.68 (2.4-178.11) | 17.41 (1.93-156.93) | 12.93 (1.32-126.36) |
| P for trend | 0.001 | <0.001 | 0.002 | 0.015 |

Model A: crude model;

Model B: Adjusted for age;

Model C: Adjusted for age, ethnic, education level, residential type;

Model D: Adjusted for age, ethnic, education level, residential type, smoking, drinking, physical activity.

Table S6 The Odds Ratio of nutrition status on low QoL sub-domains in females

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Model A | Model B | Model C | Model D |
| **Low Mobility** |  |  |  |  |
| MNA-SF (continuous variable) | 0.62 (0.56-0.69) | 0.62 (0.56-0.69) | 0.61 (0.55-0.68) | 0.61 (0.54-0.68) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 3.05 (1.94-4.8) | 3.03 (1.92-4.77) | 3.07 (1.94-4.85) | 3.29 (2.03-5.33) |
| Malnutrition | 40.41 (13.84-117.94) | 40.09 (13.73-117.06) | 40.72 (13.92-119.15) | 43.85 (14.5-132.67) |
| P for trend | <0.001 | <0.001 | <0.001 | <0.001 |
| **Low Self-care** |  |  |  |  |
| MNA-SF (continuous variable) | 0.61 (0.56-0.67) | 0.61 (0.56-0.67) | 0.61 (0.56-0.67) | 0.6 (0.54-0.66) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 2.12 (1.35-3.35) | 2.11 (1.34-3.32) | 2.12 (1.35-3.35) | 2.15 (1.34-3.47) |
| Malnutrition | 21.07 (10.58-41.98) | 20.87 (10.47-41.59) | 20.94 (10.5-41.76) | 25.28 (11.84-53.98) |
| P for trend | <0.001 | <0.001 | <0.001 | <0.001 |
| **Low Usural Activities** |  |  |  |  |
| MNA-SF (continuous variable) | 0.68 (0.62-0.75) | 0.68 (0.62-0.75) | 0.68 (0.61-0.74) | 0.67 (0.61-0.75) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 2.41 (1.53-3.8) | 2.39 (1.51-3.77) | 2.39 (1.51-3.77) | 2.57 (1.57-4.22) |
| Malnutrition | 14.68 (6.69-32.2) | 14.52 (6.61-31.87) | 14.55 (6.62-31.97) | 15.46 (6.66-35.89) |
| P for trend | <0.001 | <0.001 | <0.001 | <0.001 |
| **Pain/discomfort** |  |  |  |  |
| MNA-SF (continuous variable) | 0.82 (0.76-0.88) | 0.82 (0.76-0.88) | 0.82 (0.76-0.88) | 0.82 (0.77-0.88) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 1.31 (0.84-2.05) | 1.3 (0.83-2.04) | 1.3 (0.83-2.05) | 1.29 (0.82-2.03) |
| Malnutrition | 2.91 (1.74-4.86) | 2.88 (1.72-4.83) | 2.89 (1.72-4.84) | 2.78 (1.66-4.68) |
| P for trend | <0.001 | <0.001 | <0.001 | <0.001 |
| **Anxiety/Depression** |  |  |  |  |
| MNA-SF (continuous variable) | 0.72 (0.65-0.79) | 0.72 (0.65-0.79) | 0.72 (0.65-0.79) | 0.73 (0.66-0.81) |
| Normal nutritional status (reference) | 1 | 1 | 1 | 1 |
| At risk of malnutrition | 1.93 (0.81-4.59) | 1.97 (0.83-4.69) | 1.98 (0.83-4.73) | 1.91 (0.8-4.58) |
| Malnutrition | 6.67 (2.76-16.15) | 6.89 (2.84-16.7) | 6.92 (2.85-16.79) | 6.3 (2.59-15.36) |
| P for trend | <0.001 | <0.001 | <0.001 | <0.001 |

Model A: crude model;

Model B: Adjusted for age;

Model C: Adjusted for age, ethnic, education level, residential type;

Model D: Adjusted for age, ethnic, education level, residential type, smoking, drinking, physical activity.

Table S7 The Odds Ratio of nutrition status on low QoLand its sub-domains in multimorbidity group and without multimorbidity group

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Multimorbidity | Model A | Model B | Model C | Model D |
| **Low QOL** | 0.68 (0.60-0.76) | 0.68 (0.61-0.77) | 0.69 (0.61-0.77) | 0.68 (0.60-0.77) |
| **Low Mobility** | 0.67 (0.61-0.74) | 0.68 (0.61-0.74) | 0.67 (0.61-0.74) | 0.66 (0.60-0.73) |
| **Low Self-care** | 0.63 (0.58-0.69) | 0.63 (0.58-0.69) | 0.63 (0.58-0.69) | 0.62 (0.56-0.68) |
| **Low Usural Activities** | 0.70 (0.64-0.77) | 0.71 (0.65-0.78) | 0.71 (0.65-0.78) | 0.69 (0.63-0.77) |
| **Pain/discomfort** | 0.82 (0.76-0.88) | 0.82 (0.76-0.88) | 0.82 (0.76-0.88) | 0.82 (0.77-0.88) |
| **Anxiety/Depression** | 0.71 (0.65-0.79) | 0.71 (0.64-0.79) | 0.71 (0.64-0.79) | 0.72 (0.65-0.80) |
| Without Multimorbidity |  |  |  |  |
| **Low QOL** | 0.67 (0.52-0.86) | 0.69 (0.54-0.89) | 0.68 (0.52-0.88) | 0.69 (0.52-0.92) |
| **Low Mobility** | 0.62 (0.50-0.76) | 0.63 (0.51-0.78) | 0.62 (0.50-0.77) | 0.62 (0.49-0.79) |
| **Low Self-care** | 0.52 (0.42-0.64) | 0.52 (0.42-0.65) | 0.52 (0.42-0.65) | 0.49 (0.39-0.62) |
| **Low Usural Activities** | 0.64 (0.52-0.78) | 0.64 (0.53-0.79) | 0.64 (0.52-0.78) | 0.63 (0.51-0.79) |
| **Pain/discomfort** | 0.87 (0.75-1.01) | 0.87 (0.76-1.01) | 0.87 (0.75-1.01) | 0.88 (0.76-1.03) |
| **Anxiety/Depression** | 0.71 (0.57-0.88) | 0.70 (0.56-0.88) | 0.70 (0.56-0.88) | 0.69 (0.55-0.88) |

Model A: crude model;

Model B: Adjusted for gender, age;

Model C: Adjusted for gender, age, ethnic, education level, residential type;

Model D: Adjusted for gender, age, ethnic, education level, residential type, smoking, drinking, physical activity.