

Additional file 2 Trajectories of HRQOL (i.e., mental scores) by regular exercise and covariates (n = 6182 persons, 16281 observations)

Covariates	Mental scores				
	VT (n=5961)	SF (n=5956)	RE (n=5960)	MH (n=5960)	MCS (n=5922)
<i>Fixed effects</i>					
For intercept					
Intercept	59.75*** (56.18~63.32)	88.54*** (85.27~91.81)	86.89*** (80.40~93.39)	66.05*** (62.80~69.30)	44.51*** (42.80~46.21)
Gender (female) [¶]	-0.91 (-1.92~0.10)	-0.50 (-1.42~0.43)	-0.02 (-1.86~1.82)	-1.17* (-2.09~-0.25)	-0.26 (-0.74~0.22)
Education (years)	0.06 (-0.06~0.18)	-0.07 (-0.17~0.04)	0.04 (-0.17~0.25)	0.01 (-0.10~0.11)	-0.002 (-0.06~0.05)
AGE (years)	0.09*** (0.05~0.14)	-0.03 (-0.07~0.01)	-0.03 (-0.11~0.05)	0.12*** (0.08~0.16)	0.09*** (0.07~0.11)
<i>Time-varying covariates</i>					
Living with the spouse [¶]	3.19*** (1.86~4.53)	2.96*** (1.74~4.17)	5.33*** (2.91~7.75)	2.89*** (1.68~4.11)	1.77*** (1.14~2.40)
Tobacco smoking (yes)	0.38 (-0.89~1.66)	0.09 (-1.07~1.26)	-1.54 (-3.86~0.77)	0.77 (-0.39~1.93)	0.06 (-0.54~0.67)
Betel-nut chewing (yes)	1.12 (-1.46~3.70)	-1.52 (-3.88~0.85)	-3.22 (-7.92~1.48)	0.97 (-1.37~3.32)	-0.32 (-1.55~0.91)
Psychiatric disorder [¶]	-11.19*** (-12.17~-10.22)	-7.95*** (-8.84~-7.06)	-16.71*** (-18.49~-14.93)	-12.11*** (-13.00~-11.23)	-6.17*** (-6.64~-5.71)
# of chronic diseases [†]	-0.28 (-0.59~0.03)	-0.33* (-0.61~-0.04)	-0.71* (-1.27~-0.15)	-0.05 (-0.33~0.23)	0.09 (-0.05~0.24)

# of Medications [‡]	-4.76*** (-5.93~-3.59)	-4.84*** (-5.90~-3.77)	-6.52*** (-8.64~-4.39)	-4.83*** (-5.90~-3.77)	-2.42*** (-2.97~-1.86)
Regular exercise status [¶]					
≥ 300 minutes	8.97*** (7.24~10.70)	3.16*** (1.58~4.74)	4.08* (0.94~7.22)	5.04*** (3.47~6.62)	2.03*** (1.21~2.85)
150-299 minutes	6.12*** (4.24~8.00)	3.57*** (1.87~5.27)	4.02* (0.62~7.42)	2.89** (1.18~4.61)	1.55** (0.65~2.44)
< 150 minutes	3.62*** (2.14~5.11)	1.89** (0.53~3.25)	0.76 (-1.94~3.47)	1.73* (0.38~3.09)	0.65 (-0.06~1.36)
Ineffective exercise	3.85*** (2.86~4.83)	1.53** (0.63~2.43)	2.26* (0.47~4.05)	2.04*** (1.15~2.94)	0.87*** (0.40~1.33)
For time slope					
Time (years) [§]	3.32** (0.87~5.77)	3.00** (0.89~5.10)	8.04*** (3.97~12.11)	1.15 (-1.06~3.36)	1.49** (0.37~2.62)
Time ² (years)	-0.12 (-0.41~0.18)	-0.17 (-0.43~0.09)	-0.66* (-1.17~-0.16)	-0.12 (-0.39~0.14)	-0.05 (-0.19~0.08)
Gender (female) [¶]	-0.06 (-0.70~0.58)	0.16 (-0.39~0.70)	-0.87 (-1.93~0.18)	-0.38 (-0.95~0.20)	-0.14 (-0.43~0.15)
Education (years)	-0.07 (-0.14~0.01)	-0.01 (-0.08~0.05)	-0.09 (-0.22~0.03)	0.02 (-0.05~0.09)	-0.01 (-0.05~0.02)
AGE (years)	-0.02 (-0.04~0.01)	-0.02 (-0.05~0.003)	-0.04 (-0.09~0.01)	0.004 (-0.02~0.03)	-0.005 (-0.02~0.01)
<i>Time-varying covariates</i>					
Living with the spouse [¶]	-0.79 (-1.59~0.02)	-0.38 (-1.09~0.32)	-1.47* (-2.84~-0.11)	-0.44 (-1.17~0.29)	-0.40* (-0.77~-0.03)

Tobacco smoking (yes)	-0.34 (-1.19~0.51)	-0.01 (-0.74~0.72)	0.22 (-1.20~1.63)	-0.49 (-1.26~0.27)	-0.15 (-0.54~0.24)
Betel-nut chewing (yes)	1.06 (-0.90~3.01)	1.64 (-0.07~3.34)	1.35 (-1.96~4.66)	1.59 (-0.17~3.36)	0.69 (-0.21~1.59)
Psychiatric disorder [¶]	0.01 (-0.61~0.62)	0.03 (-0.51~0.57)	0.27 (-0.78~1.32)	0.60* (0.04~1.16)	0.19 (-0.09~0.48)
# of 15 diseases [†]	-0.07 (-0.26~0.11)	-0.12 (-0.28~0.04)	-0.26 (-0.57~0.06)	-0.07 (-0.24~0.10)	-0.08 (-0.17~0.005)
# of Medications [‡]	0.15 (-0.55~0.86)	0.51 (-0.11~1.13)	-0.02 (-1.23~1.19)	-0.03 (-0.67~0.61)	0.10 (-0.22~0.43)
Regular exercise status [¶]					
≥ 300 minutes	0.07 (-0.94~1.08)	0.12 (-0.76~1.01)	-0.61 (-2.33~1.11)	-0.07 (-0.98~0.84)	0.001 (-0.46~0.47)
150-299 minutes	-0.03 (-1.12~1.05)	-0.64 (-1.59~0.32)	-0.18 (-2.04~1.69)	-0.003 (-0.99~0.98)	-0.11 (-0.62~0.39)
< 150 minutes	-0.17 (-1.08~0.74)	-0.92* (-1.72~-0.12)	-0.13 (-1.69~1.43)	-0.06 (-0.88~0.76)	-0.12 (-0.54~0.30)
Ineffective exercise	0.23 (-0.37~0.83)	-0.05 (-0.57~0.48)	0.17 (-0.86~1.19)	0.12 (-0.42~0.66)	0.07 (-0.20~0.35)

Random effects

Variance (Wave 1)	294.5***	249.0***	989.8***	243.5***	65.81***
Variance (Wave 2)	223.5***	200.5***	750.9***	186.1***	48.30***
Variance (Wave 3)	227.6***	173.7***	740.6***	188.0***	47.63***
Variance (Wave 4)	190.5***	152.8***	579.0***	155.6***	37.01***
Variance (Time)	15.9***	6.4***	16.6***	12.1***	2.80***

-2LL	124994.8	120934.8	141107.9	121958.0	100337.1
AIC	125004.8	120944.8	141117.9	121968.0	100347.1
BIC	125042.8	120982.7	141155.9	122006.0	100385.0

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

[§]Time interval between two adjacent waves

[†]Self-reported and/or diagnosed chronic diseases, including T2DM, hypertension, hyperlipidemia, kidney disease, cardiac disease, stroke, hepatic disease, gout, osteoporosis, asthma, psychiatric disease, nerve-related disease, intestinal disease, Tuberculosis, and metabolic syndrome

[‡]4 pills, including refreshing drugs, sleeping pills, sedative medicine, and painkiller

[¶]The reference group: gender (male), age (≥ 65 years old), marital status (living alone), psychiatric disorder (CHQ-12 < 4), exercise status (no exercise)

Abbreviations: HRQOL, health-related quality of life; VT, vitality; SF, social functioning; RE, role emotional; MH, mental health; MCS, mental component summary; T2DM, type 2 Diabetes mellitus; -2LL, -2 restricted log-likelihood; AIC, Akaike's information criterion; BIC, Schwarz's Bayesian criterion