Article title: Health beliefs mediates the association between the number of non-communicable diseases and preventive behaviors in middle-aged and older adults in southern China

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Table S1 Characteristics of study participants(N=2095).

Characteristics		Number (%)
Sex	Male	872(41.6)
	Female	1223(58.4)
Age(years)	45~59	1697(81.0)
	60~74	343(16.4)
	≥75	55(2.6)
Education levels	Elementary school	24(1.1)
	Middle/high school	626(29.9)
	University or above	1445(69.0)
Marital status	Married	1931(92.2)
	Widowed/others	164(7.8)
Working status	Employed	1376(65.7)
	Unemployed	67(3.2)
	Retired	461(22.0)
	Others	191(9.1)
Monthly family income (RMB)	＜3000	167(8.0)
	3000-6000	735(35.1)
	6000-10000	653(31.2)
	≥10000	540(25.8)
Region of residence	Rural	80(3.8)
	Suburban	406(19.4)
	Urban	1609(76.8)
Health insurance coverage	Yes	2070(98.8)
	No	25(1.2)
Living arrangement	Alone	101(4.8)
	With others	1994(95.2)
Number of non-communicable diseases	0	922(44.0)
	1	487(23.2)
	2	352(16.8)
	≥3	334(15.9)

Figure S1 Fitting model of health beliefs**.**
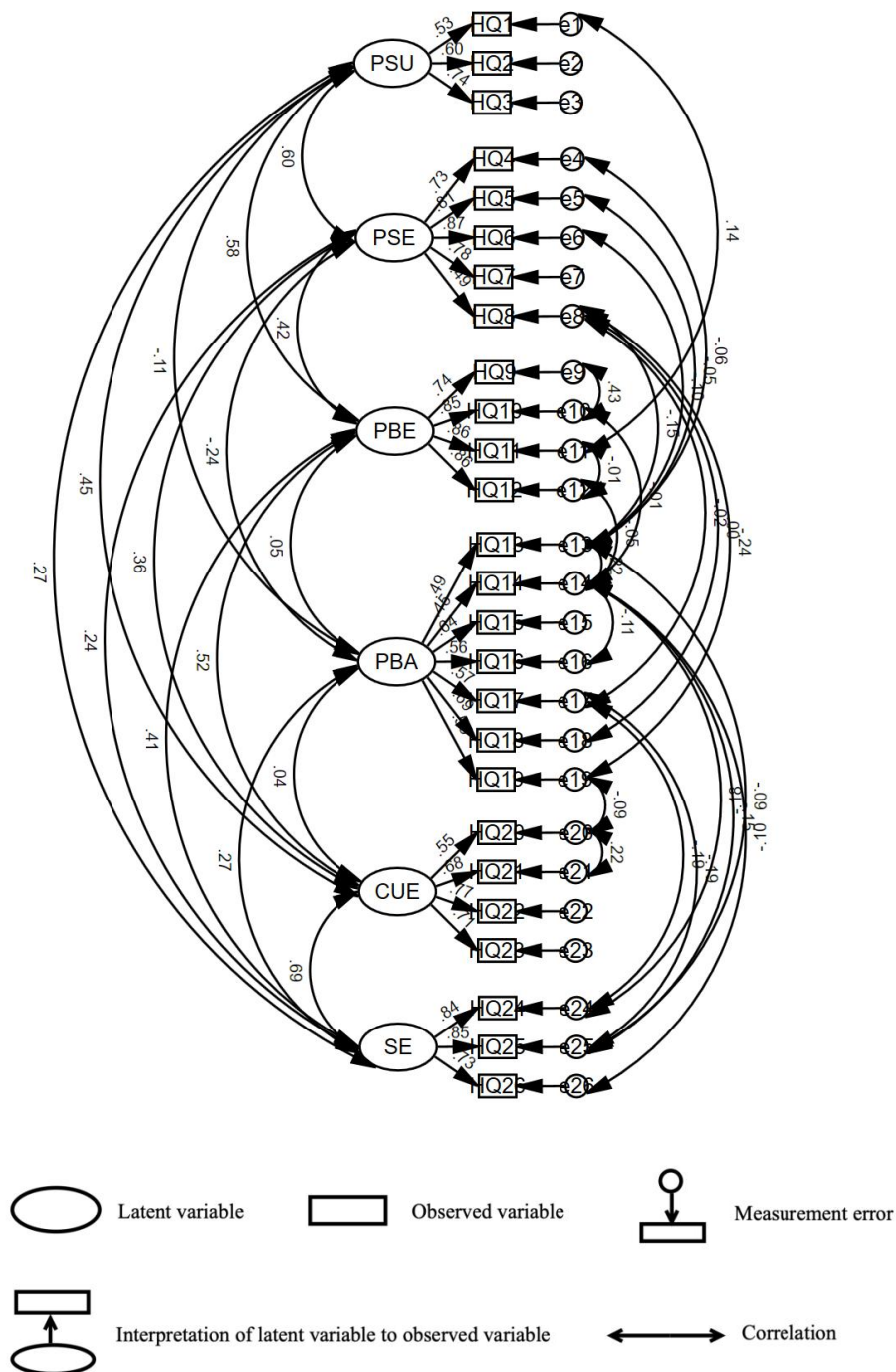
Note: An empirical model was built based on the correlation of health belief model constructs.

PSU: perceived susceptibility; PSE: perceived severity; PBE: perceived benefits; PBA: perceived

barriers; CUE: cues to action; SE: self-efficacy.

HQ: health belief item.

Table S2 Reliability and validity analysis.

Items	Index	Criteria	Value
Internal consistency	Cronbach's α	>0.70	Health beleifs= 0.793; Perceived susceptibility = 0.650 Perceived severity=0.839; Perceived benefits=0.905 Perceived barriers=0.775; Cues to action=0.779 Self-efficacy=0.848; Preventive behaviors=0.752
Exploratory factor analyses	Kaiser-Meyer-Olkin (KMO) Bartlett's test	KMO > 0.70 Bartlett's test< 0.05 ($P < 0.05$)	The results of the KMO and Bartlett's test were 0.893 and 23406.757, respectively. Additionally, the significance level of Bartlett's test was significiant ($\chi^2 = 23406.757$, df $= 325$, $P < 0.001$), indicating that performing EFA on this questionnaire is justified.
Confirmatory factor analyses: Fit indices	χ^2/df	<3	$1062/262 = 4.053$
	Root Mean Square Error of Approximation, RMSEA	<0.08	0.038
	Standardized Root Mean Square Residual, SRMR	<0.08	0.034
	Goodness of Fit Index, GFI	> 0.90	0.962
	Normed Fit Index, NFI	> 0.90	0.955
	Comparative Fit Index, CFI	>0.90	0.965
	Tucker Lewis index, TLI	>0.90	0.957
Convergent validity	Average Variances Extracted, AVE	>0.50	Perceived susceptibility=0.397; Perceived severity=0.558 Perceived benefits=0.685; Perceived barriers=0.334 Cues to action=0.478; Self-efficacy=0.655
	Composite Reliability, CR	>0.70	Perceived susceptibility=0.660; Perceived severity=0.860

Perceived benefits=0.897; Perceived barriers=0.776

Cues to action=0.783; Self-efficacy=0.850

Table S3 Multiple linear regression analysis of preventive behaviors.

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	P	β	P	β	P	β	P	β	P
Number of NCDs (0 as Reference)										
1	− 0.008	0.734	0.024	0.286	0.027	0.183	− 0.005	0.795	0.007	0.735
2	− 0.050	0.032*	− 0.027	0.211	− 0.022	0.269	− 0.063	0.003**	− 0.047	0.015*
≥3	− 0.081	0.001**	− 0.040	0.071	− 0.020	0.313	− 0.107	<0.001**	− 0.067	<0.001***
Health beliefs			0.356	<0.001***	/		0.358	<0.001***	/	
Perceived susceptibility					0.028	0.210			0.027	0.218
Perceived severity					− 0.129	<0.001***			− 0.088	<0.001***
Perceived benefits					0.002	0.923			0.010	0.655
Perceived barriers					0.284	<0.001***			0.268	<0.001***
Cues to action					0.052	0.030*			0.050	0.033*
Self-efficacy					0.366	<0.001***			0.340	<0.001***
Sex										
Male(Ref)										
Female							0.126	<0.001***	0.105	<0.001***
Age(years)										
45~59(Ref)										
60~74							0.188	<0.001***	0.156	<0.001***
≥75							0.132	<0.001***	0.103	<0.001***

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Education levels				
Elementary school(Ref)				
Middle/high school	0.182	0.039*	0.200	0.015*
University or above	0.124	0.170	0.157	0.061
Marital status				
Married(Ref)				
Widowed/others	0.008	0.723	0.005	0.802
Working status				
Employed(Ref)				
Unemployed	0.002	0.930	− 0.001	0.955
Retired	0.073	0.007**	0.020	0.426
Others	0.011	0.577	0.001	0.973
Monthly family income (RMB)				
＜3000(Ref)				
3000-6000	− 0.025	0.528	− 0.012	0.740
6000-10000	− 0.003	0.933	0.003	0.929
≥10000	0.013	0.743	0.019	0.599
Region of residence				
Rural(Ref)				
Suburban	0.074	0.104	0.059	0.161
Urban	0.083	0.082	0.067	0.129

	Model 1 β	Model 1 P	Model 2 β	Model 2 P	Model 3 β	Model 3 P	Model 4 β	Model 4 P	Model 5 β	Model 5 P
Health insurance coverage										
Yes(Ref)										
No							0.006	0.746	-0.003	0.864
Living arrangement										
Alone(Ref)										
With others							0.016	0.454	0.029	0.132
Constants	44.229	<0.001***	20.540	<0.001***	24.718	<0.001***	12.824	<0.001***	17.486	<0.001***
Adjusted R^2	0.006		0.130		0.286		0.220		0.331	
F	4.955	0.002**	79.436***	<0.001***	94.321	<0.001***	30.529	<0.001***	42.408	<0.001***

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Note: Perceived barriers are scored inversely, with a higher score indicating fewer perceived barriers and a lower score indicating more perceived barriers.

Model 1 was an unadjusted model. Model 2 and 3 were adjusted for health beliefs and six dimensions based on the HBM (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, self-efficacy). Model 4 and 5 were further adjusted for demographic characteristics (sex, age, education, marital status, employment status, monthly family income, region of residence, health insurance coverage, living arrangement).