

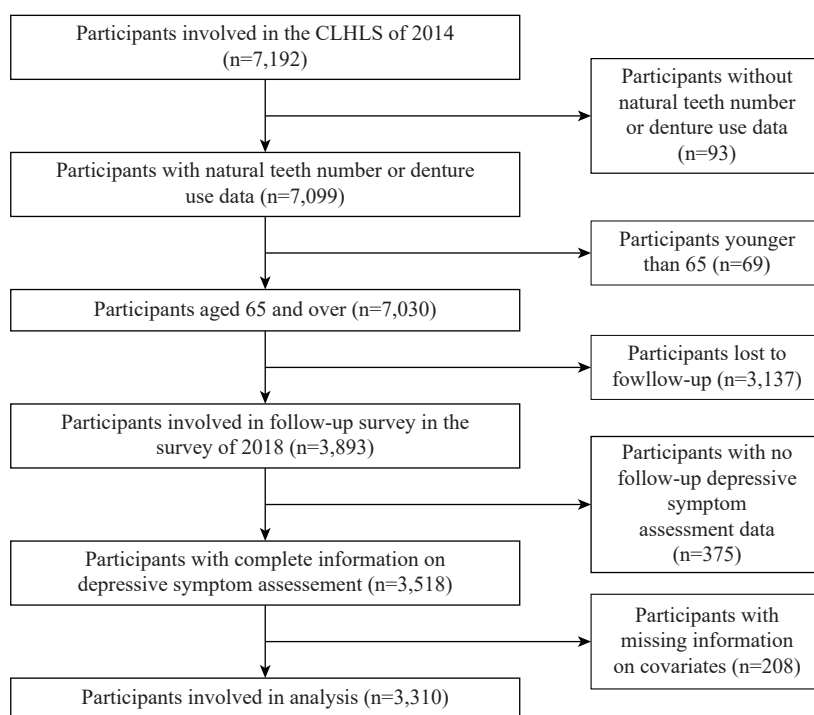
## SUPPLEMENTARY MATERIALS

### Supplementary Information of Sample Selection and Variables

Self-reported number of natural teeth and the use of dentures were collected by use of the questions of “A: how many natural teeth (teeth that are naturally grown) do you still have?” and “B: do you have false teeth? (false teeth referred to any type of non-natural teeth, including partial or complete, removable, or implant-retained fixed dentures).” The remaining teeth were classified into four categories: (0, 1–9, 10–19, and 20 plus). We assessed the combined effects by sorting the participants into eight categories based on teeth number and denture use.

A five-item scale, which has been applied in several studies to represent depressive symptoms via the Chinese Longitudinal Healthy Longevity Survey (CLHLS) data (1–2), was adopted in CLHLS to evaluate depressive symptoms. Two questions, including “do you look on the bright side of things?” and “are you as happy now as when you were young?” measured positive feelings while three questions measured negative feelings, including the following: “do you often feel anxious or fearful?” “do you often feel lonely and isolated?” and “do you feel the older you get, the more useless you are?”. The interviewees answered those questions by choosing from five frequency options of “Always,” “Often,” “Sometimes,” “Seldom,” and “Never.” Each response was assigned a value from 0 to 4, and a higher frequency of negative feeling indicated a higher value. Then the summed value varied from 0 to 20. Cronbach  $\alpha$  coefficient assessed the internal consistency reliability based on the 2014 sample is 0.84, which is higher than the acceptable values of 0.6. We operated principal component analysis to generate one factor explaining 93% of the total variance with eigenvalues  $\geq 1$ .

We controlled for three groups of covariates that could be significantly associated with depression of older adults according to previous studies (3–5). The first group consisted of the demographic and socioeconomic factors, including age, gender (male or female), ethnicity (Han or minority groups), marital status (married or non-married), residence (urban or rural), years of education, and pension status (having a pension or not). The second group included lifestyle and health characteristics, including smoking (current smoker, former smoker or non-smoker),



SUPPLEMENTARY FIGURE S1. Flow chart of sample selection.  
Abbreviation: CLHLS=Chinese Longitudinal Healthy Longevity Survey.

SUPPLEMENTARY TABLE S1. Baseline characteristics of the included participants.

Item	Number of natural teeth (N=3,310)					P-value
	Overall	20+	10–19	0–9	0	
Number of participants, n (%)	3,310(100.00)	846(25.56)	654(19.76)	870(26.28)	940(28.40)	
Number of natural teeth, mean (SD)	10.56(10.30)	25.69(3.94)	13.71(2.89)	4.68(2.69)	0.00(0.00)	<0.001
Denture usage (%)						
Yes	1,304(39.40)	158(18.68)	219(33.49)	322(37.01)	605(64.36)	<0.001
No	2,006(60.60)	688(81.32)	435(66.51)	548(62.99)	335(35.64)	
Depressive symptom, mean (SD)	6.78(3.19)	6.09(3.10)	6.97(3.15)	7.20(3.22)	6.85(3.17)	<0.001
Age, mean (SD)	81.29(10.32)	74.21(8.10)	79.10(8.90)	84.54(9.45)	86.23(9.90)	<0.001
Male, n (%)	1,576(46.99)	490(57.36)	323(48.04)	369(44.15)	394(39.33)	<0.001
Married, n (%)	1,639(46.92)	549(68.97)	367(50.87)	366(36.95)	357(33.57)	<0.001
Urban residence, n (%)	1,426(39.13)	387(41.26)	291(39.7)	370(37.20)	378(39.16)	0.093
Years of education, mean (SD)	2.53(3.65)	3.87(4.02)	2.66(3.75)	1.88(3.27)	1.86(3.18)	<0.001
Have pension, n (%)	1,191(35.98)	367(43.38)	254(38.84)	311(35.75)	259(27.55)	<0.001
Smoking, n (%)						
Current smoker	586(20.98)	172(26.78)	112(18.82)	141(19.41)	161(18.75)	<0.001
Former smoker	385(15.66)	121(16.84)	81(16.79)	88(14.75)	95(14.66)	
Non-smoker	2,319(63.36)	549(56.38)	459(64.39)	635(65.84)	676(66.59)	
Drinking, n (%)						
Current drinker	558(20.43)	174(24.60)	111(20.86)	128(18.50)	145(18.20)	<0.001
Former drinker	289(13.05)	91(14.89)	56(13.81)	73(13.38)	69(10.34)	
Non-drinker	2,425(66.52)	571(60.52)	480(65.33)	656(68.12)	718(71.46)	
Frequent fruit intake, n (%)	487(13.12)	134(16.49)	85(10.61)	119(10.39)	149(14.77)	<0.001
Frequent vegetable intake, n (%)	521(22.13)	162(24.50)	87(25.24)	129(20.27)	143(19.52)	<0.001
Restricted ADL, n (%)	300(5.61)	45(2.53)	41(3.27)	85(6.54)	129(9.35)	<0.001
MMSE score, mean (SD)	25.95(4.87)	27.73(3.18)	26.59(4.11)	25.04(5.38)	24.75(5.52)	<0.001
Playing card/mahjong, n (%)	276(7.84)	106(10.80)	52(7.41)	59(6.89)	59(6.36)	<0.001
Community activity, n (%)	125(3.38)	45(4.89)	26(3.49)	28(2.69)	26(2.60)	<0.001
Travel, n (%)	287(7.00)	113(11.09)	55(6.83)	65(5.22)	54(5.14)	<0.001

Note: *P* values are calculated with analysis of variance (ANOVA) for continuous variables and Chi-squared test for categorical variable. Abbreviations: ADL=Activities of daily living; MMSE=Mini-mental state examination.

drinking (current drinker, former drinker or non-drinker), frequent fruit intake (yes or no), frequent vegetable intake (yes or no), Activities of daily living (ADL) (restricted or not), and mini-mental state examination (MMSE) score. The third group were made up of social engagement variables, including playing cards or mahjong (yes or no), participation in community activities (yes or no), and travel (yes or no).

SUPPLEMENTARY TABLE S2. Depressive symptom scores by covariates (N=3,310).

Item	Depressive symptoms, mean (SD)
Sex	
Female	6.57(3.28)
Male	5.75(3.19)
Age, years	
65–74	5.90(3.11)
75+	6.27(3.31)
Ethnicity	
Han	6.12(3.20)
Minority	6.19(3.30)
Marital status	
Married	5.74(3.11)
Unmarried or widowed	6.66(3.35)
Pension	
Yes	5.83(3.23)
No	6.36(3.26)
Residence	
Urban	5.72(3.32)
Rural	6.51(3.17)
Denture usage	
Yes	5.95(3.27)
No	6.29(3.25)
Smoking	
Current smoker	5.92(3.20)
Former smoker	5.24(3.27)
Non-smoker	6.39(3.24)
Drinking	
Current drinker	5.56(3.17)
Former drinker	5.54(3.32)
Non-drinker	6.38(3.25)
Frequent fruit intake	
Yes	4.87(3.19)
No	6.39(3.22)
Frequent vegetable intake	
Yes	5.77(3.33)
No	6.24(3.25)
Restricted ADL	
Yes	6.83(3.17)
No	6.10(3.27)
Playing card/mahjong	
Yes	4.64(2.93)
No	6.31(3.25)
Community activity	
Yes	4.89(3.10)
No	6.22(3.26)
Travel	
Yes	4.51(2.92)
No	6.34(3.25)

Abbreviation: ADL=Activities of daily living.

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