



The Impact of Economic Accessibility of Healthcare Services on the Health of Elderly Individuals in China

Honglin Deng*

Faculty of Medicine Vajira Hospital,
Navamindradhiraj University, Bangkok, Thailand

Somchai Bovornkitti

Faculty of Medicine Siriraj Hospital,
Mahidol University, Bangkok, Thailand

Sarisak Soontornchai

Thammasat University, Bangkok, Thailand

Xiaoqiang Qiu

Guangxi Medical University, China

ssavvi2022w@163.com

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Abstract

Background: China is undergoing rapid population aging, with the share of citizens aged 65 and older projected to rise from 9.6% in 2015 to 27.6% by 2050. Despite expanding insurance coverage under the National Basic Public Health Service Program, out-of-pocket (OOP) healthcare expenditure remains substantial, raising concerns about whether economic barriers to care undermine the health of older adults. Evidence on how affordability translates into physical and mental health outcomes in the Chinese elderly population and through which behavioral mechanisms is limited.

Objective: To examine the association between economic accessibility of healthcare services and physical health, life satisfaction, and depressive symptoms among elderly individuals in China, and to identify behavioral mechanisms underlying this association.

Materials and Methods: This was a longitudinal panel study using secondary data from the China Family Panel Studies (CFPS), a nationally representative biennial household survey conducted by the Institute of Social Science Survey, Peking University. Four survey waves were analyzed (2016, 2018, 2020, and 2022). Participants were respondents aged 60 years and older at each wave (N = 7,524 unique individuals; total panel observations = 19,847). Inclusion criteria were age $\geq$ 60 years and non-missing healthcare expenditure data; observations with missing values on key variables were excluded using listwise deletion. Economic accessibility was measured as the household-



level ratio of out-of-pocket medical expenditure to total healthcare spending in the previous 12 months (continuous variable; lower ratio = greater accessibility). Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize sample characteristics. Associations between economic accessibility and health outcomes were estimated using panel fixed-effects regression, with mediation analysis (Baron and Kenny approach) for exercise, smoking, and alcohol consumption. Statistical significance was set at $p < 0.05$.

Results: Of 7,524 elderly respondents, 51.9% were female and 39.8% resided in urban areas (full descriptive characteristics in Table 1). Greater economic accessibility to healthcare was associated with better physical health ($\beta = -0.142$, 95% CI: -0.218 to -0.066 , $p < 0.001$), higher life satisfaction ($\beta = 0.098$, 95% CI: 0.045 to 0.151 , $p < 0.001$), and fewer depressive symptoms ($\beta = -0.185$, 95% CI: -0.267 to -0.103 , $p < 0.001$). Exercise frequency mediated approximately 34% of the association with physical health and 28% with life satisfaction ($\beta = 0.246$, $p < 0.01$), while mediation through smoking and alcohol was weak. Stronger associations were observed among women, individuals in the lowest income quartile, those aged 80 and above, and urban residents.

Conclusion: Improved economic accessibility of healthcare services is associated with better physical and mental health among elderly individuals in China, with increased physical activity acting as the principal behavioral mechanism. Healthcare policies should prioritize reducing out-of-pocket burdens, narrowing urban–rural disparities, and promoting preventive behaviors to support equitable healthy aging.

Keywords: economic accessibility, healthcare services, elderly health, China, aging population



Introduction

The COVID-19 pandemic posed unprecedented challenges to healthcare systems worldwide, disrupting medical service operations and exposing critical issues in healthcare accessibility.¹ In China, healthcare service delivery was substantially affected during 2020–2022: routine outpatient visits among older adults declined sharply at the height of the pandemic, telephone and online consultation became the dominant modality, and elective and preventive care was widely deferred patterns that persisted unevenly into the post-pandemic period and exacerbated pre-existing inequities in access.¹ In China, with a population exceeding 1.4 billion, the demand for medical resources is immense, yet supply remains insufficient, particularly in underdeveloped regions and rural areas.² Healthcare resources are unevenly distributed, leaving vulnerable groups such as rural elderly and internal migrants struggling to access timely and quality care.

China is rapidly aging, with the proportion of citizens aged 65 and older expected to increase from 9.6% in 2015 to 27.6% by 2050.³ Among the challenges posed by this demographic shift, access to affordable healthcare stands out as one of the most pressing. Health, poverty, and insurance coverage are deeply interconnected.⁴ Individuals with lower incomes are more likely to report poor health, and those without adequate insurance coverage face higher risks of poor health and medical debt, which further prevents them from seeking needed care. Despite the introduction of the National Basic Public Health Service Program (NBPHS) in 2009⁵, significant disparities in healthcare accessibility persist, especially among elderly populations.⁶⁻⁷ Geographical barriers disproportionately affect specific subgroups of the Chinese elderly: rural-dwelling older adults in western and central provinces (e.g., Gansu, Guizhou, Yunnan), the oldest-old (aged 80+), and "left-behind" elders in villages with adult children working in distant cities. Prior work has shown that rural elders travel significantly longer distances to reach a hospital compared with urban counterparts and report higher rates of foregone care due to transportation cost.⁶⁻⁷

Scholars have approached the measurement of healthcare accessibility from multiple perspectives including geographic indicators⁸⁻⁹, wait times¹⁰, provider attitudes¹¹, and insurance coverage.¹² Drawing on Andersen's Behavioral Model of Health Services Use, economic accessibility can be conceptualized as an "enabling factor" that conditions the translation of healthcare need into actual service utilization, which in turn shapes health outcomes both directly (through



treatment) and indirectly (through health-related behaviors such as exercise reinforced by contact with providers). For elderly populations in China, the intersection of economic barriers and health outcomes remains insufficiently examined, particularly in the context of rapid healthcare reforms and the COVID-19 pandemic.

Against this backdrop, the present study investigates the association between economic accessibility of healthcare services and health outcomes among elderly individuals in China. This research uses nationally representative survey data from the China Family Panel Studies (CFPS) for the survey years 2016, 2018, 2020, and 2022 providing a four-wave window that spans pre-pandemic, pandemic, and immediate post-pandemic periods. Furthermore, this study explores the mechanisms through which healthcare accessibility influences health, focusing on behavioral factors such as exercise, smoking, and alcohol consumption.

Research Objectives

This study objectives:

1. To examine the association between economic accessibility of healthcare services and physical health, life satisfaction, and depressive symptoms among elderly individuals in China.
2. To investigate heterogeneity in this association across gender, age, income, and urban–rural residence.
3. To identify behavioral mechanisms (exercise, smoking, alcohol consumption) mediating the relationship between healthcare accessibility and elderly health.

Policy implications are discussed in a separate section, framed as tentative and observational rather than as a primary objective, in recognition of the limitations of secondary data analysis.

Materials and Methods

Study Design

This was a longitudinal panel study using secondary data from the China Family Panel Studies (CFPS). The design is a true repeated-measures panel: the CFPS tracks the same individuals and households across waves, with refresher samples added to maintain national representativeness. The present analysis used four waves 2016, 2018, 2020, and 2022 corresponding to CFPS Waves 4 through 7. During the 2020 wave, conducted under COVID-19 conditions, approximately 89% of interviews were completed by telephone rather than face-to-face; this is acknowledged in the limitations.



Population

The source population was Chinese residents aged 60 years and older across 25 provinces, autonomous regions, and municipalities covered by the CFPS sampling frame (excluding Hong Kong, Macau, Taiwan, Xinjiang, Tibet, Qinghai, Inner Mongolia, Ningxia, and Hainan).

Sample Size and Inclusion/Exclusion Criteria

Inclusion criteria: (1) age ≥ 60 years at the time of the survey wave; (2) availability of valid healthcare expenditure data for the previous 12 months; (3) participation in at least two of the four study waves to permit within-individual estimation.

Exclusion criteria: (1) institutionalized respondents (e.g., nursing homes), since CFPS samples community-dwelling households only; (2) observations with missing values on the primary independent variable or any of the three dependent variables. Missing values on control variables were handled using listwise deletion, given the relatively low rate of missingness ($< 5\%$) on most covariates; sensitivity analyses using multiple imputation produced substantively similar estimates (available on request).

Final analytic sample: $N = 7,524$ individuals contributing 19,847 person-wave observations. Sample sizes for each subgroup analysis are reported in the corresponding tables.

Sampling Technique

CFPS uses a multi-stage probability proportional to size (PPS) sampling design: (1) primary sampling units (counties / districts) selected within strata defined by administrative region and urbanicity; (2) secondary sampling units (villages / neighborhood committees); (3) households within sampling units; (4) all eligible household members. The design produces a nationally representative sample of the Chinese non-institutionalized population.



Measurement

Health outcomes

Physical health (dichotomous): self-reported indicator of whether the respondent experienced illness or discomfort within the past two weeks (1 = yes, 0 = no).

Life satisfaction (continuous, five-point Likert scale): 1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, 5 = very satisfied.

Depressive symptoms (continuous): CFPS short version of the Center for Epidemiologic Studies Depression Scale (CES-D), 8 items, and score range 0–24. The Chinese-language CES-D-8 has been validated in older Chinese adults; higher scores indicate more severe depressive symptoms.

Economic accessibility of healthcare (primary exposure)

Continuous variable: ratio of household out-of-pocket (OOP) medical expenditure to total household healthcare spending over the previous 12 months, computed at the household level following S. Chen and J. Li.¹¹ A lower ratio indicates greater economic accessibility because a larger share of healthcare costs is borne by insurance or other non-personal sources. The household-level construction was chosen because healthcare financing decisions in Chinese families are typically pooled at the household rather than individual level.

Sociodemographic characteristics

Age (continuous, years); gender (male / female); urban or rural household registration (dichotomous).

Social support and other covariates

Caregiving support during illness (yes / no); employment status (employed / unemployed); quality of family relationships (five-point Likert scale: 1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = very good).

Mediating behavioral variables

Frequency of exercise (times per week, continuous); current smoking status (yes / no); current alcohol consumption (yes / no).



Statistical Analysis

Analyses proceeded in two stages. First, descriptive statistics – frequencies and percentages for categorical variables; means and standard deviations for continuous variables – were calculated to summarize sample characteristics and are reported in Table 1. Second, inferential analyses estimated the association between economic accessibility and each health outcome using panel fixed-effects regression, which accounts for unobserved time-invariant individual characteristics and isolates within-individual variation across waves. Mediation analysis followed the Baron and Kenny (1986) framework to test whether exercise, smoking, and alcohol consumption mediated the association between accessibility and health outcomes. All analyses were performed in Stata 17.0 (StataCorp LLC, College Station, TX, USA). Statistical significance was set at $p < 0.05$, with 95% confidence intervals reported.

Ethical Approval

This study used secondary data from the China Family Panel Studies (CFPS), which received ethical approval from the Biomedical Ethics Committee of Peking University (IRB00001052-14010). All CFPS participants provided written informed consent at the time of original data collection. No additional ethical approval was required for the present secondary analysis.



Results

Sample Characteristics

The final analytic sample included 7,524 elderly respondents contributing 19,847 person-wave observations across the four CFPS waves (2016, 2018, 2020, and 2022). Descriptive characteristics are presented in Table 1. Briefly, the sample had a mean age of 69.7 years (SD = 7.0), with 51.9% female and 39.8% residing in urban areas. Approximately 68.8% reported receiving caregiving support during illness, and the mean OOP-to-total healthcare expenditure ratio was 0.54 (SD = 0.27).

Table 1. Descriptive characteristics of the analytic sample (pooled across waves)

Characteristic	2016	2018	2020	2022
N (individuals)	5,236	5,891	4,562	4,158
Age, mean (SD), years	68.4 (6.7)	69.2 (6.9)	70.1 (7.1)	71.3 (7.3)
Female, n (%)	2,681 (51.2)	3,034 (51.5)	2,377 (52.1)	2,191 (52.7)
Urban residence, n (%)	2,011 (38.4)	2,303 (39.1)	1,834 (40.2)	1,726 (41.5)
Employed, n (%)	1,634 (31.2)	1,691 (28.7)	1,109 (24.3)	919 (22.1)
Caregiving support, n (%)	3,524 (67.3)	4,012 (68.1)	3,171 (69.5)	2,919 (70.2)
OOP ratio, mean (SD)	0.58 (0.28)	0.55 (0.27)	0.52 (0.26)	0.49 (0.25)
Exercise, mean times/week	2.4 (2.1)	2.6 (2.2)	2.7 (2.3)	2.9 (2.4)
Current smokers, n (%)	1,429 (27.3)	1,561 (26.5)	1,177 (25.8)	1,044 (25.1)
Current drinkers, n (%)	1,173 (22.4)	1,284 (21.8)	953 (20.9)	844 (20.3)
Reported illness past 2 weeks, n (%)	1,634 (31.2)	1,909 (32.4)	1,542 (33.8)	1,434 (34.5)
Life satisfaction, mean (SD)	3.62 (0.98)	3.68 (0.96)	3.71 (0.95)	3.74 (0.94)
CES-D-8 score, mean (SD)	6.84 (4.21)	6.71 (4.15)	6.58 (4.08)	6.42 (4.02)

Table 1 presents the descriptive characteristics of the analytic sample across the four CFPS waves. The wave-specific sample size declined from 5,236 individuals in 2016 to 4,158 in 2022, reflecting expected panel attrition due to mortality, loss to follow-up, and survey non-response — a pattern consistent with other longitudinal studies of older adults. As anticipated for a true panel cohort, the sample aged progressively across waves, with mean age rising from 68.4 years (SD = 6.7) in 2016 to 71.3 years (SD = 7.3) in 2022. The proportion of women increased modestly from 51.2% to 52.7%, reflecting women's longer life expectancy and the cumulative effect of differential mortality at older ages.



Urban residence rose from 38.4% to 41.5% across the four waves, consistent with ongoing urbanization in China during this period. Employment among the elderly declined substantially from 31.2% in 2016 to 22.1% in 2022 as the sample aged and more respondents transitioned into retirement. The proportion receiving caregiving support during illness increased correspondingly from 67.3% to 70.2%, indicating greater reliance on family or community support with advancing age.

The mean household out-of-pocket (OOP) expenditure ratio decreased steadily from 0.58 (SD = 0.28) in 2016 to 0.49 (SD = 0.25) in 2022, suggesting improved economic accessibility of healthcare across the study period likely reflecting the expansion of insurance coverage under Healthy China 2030 and related reforms. Exercise frequency rose modestly from 2.4 to 2.9 times per week, while current smoking (27.3% → 25.1%) and current alcohol use (22.4% → 20.3%) declined slightly, consistent with national trends in health-behavior promotion among older Chinese adults.

For the health outcomes, the proportion reporting illness or discomfort within the past two weeks rose from 31.2% to 34.5%, reflecting the higher burden of illness in the aging cohort. Despite this, mean life satisfaction improved slightly (3.62 → 3.74 on a 5-point scale) and mean CES-D-8 depressive-symptom scores declined (6.84 → 6.42), suggesting that mental health and subjective well-being were broadly preserved or improved across the study period — a finding that warrants further interpretation in the Discussion in light of the concurrent reductions in OOP burden.

Association between Economic Accessibility and Elderly Health

Panel fixed-effects regression demonstrated that greater economic accessibility (lower OOP ratio) was significantly associated with better health outcomes across all three dimensions examined (Table 2). Lower OOP was associated with better physical health ($\beta = -0.142$, 95% CI: -0.218 to -0.066 , $p < 0.001$), higher life satisfaction ($\beta = 0.098$, 95% CI: 0.045 to 0.151 , $p < 0.001$), and fewer depressive symptoms ($\beta = -0.185$, 95% CI: -0.267 to -0.103 , $p < 0.001$). The negative sign on the OOP coefficient for physical health and depressive symptoms indicates that as the OOP ratio decreases (i.e., as economic accessibility increases), these health outcomes improve.

Table 2. Association between healthcare economic accessibility and elderly health outcomes (panel fixed-effects regression)

Health outcome	β coefficient	95% CI	p-value
Physical health (illness past 2 wks)	-0.142	-0.218 to -0.066	<0.001
Life satisfaction	0.098	0.045 to 0.151	<0.001
Depressive symptoms (CES-D-8)	-0.185	-0.267 to -0.103	<0.001
Exercise frequency	0.246	0.178 to 0.314	<0.01

Note: Coefficients (β) from panel fixed-effects regression models adjusting for age, gender, urban/rural residence, caregiving support, employment status, and family relationship quality.

The exposure is the OOP-to-total healthcare expenditure ratio; a lower OOP ratio corresponds to greater economic accessibility, so negative coefficients on physical health and depressive symptoms (and positive coefficients on life satisfaction and exercise frequency) indicate that greater accessibility is associated with better health. CI = confidence interval.

Mediation by Health Behaviors

Exercise frequency emerged as the dominant mediator. Greater economic accessibility was associated with increased exercise frequency ($\beta = 0.246$, $p < 0.01$), and exercise in turn was associated with better physical health ($\beta = 0.189$, $p < 0.001$) and better mental health ($\beta = 0.156$, $p < 0.001$). The exercise pathway accounted for approximately 34% of the total association with physical health and 28% of the total association with life satisfaction. In contrast, mediation through smoking cessation and reduced alcohol consumption was weak and inconsistent across outcomes (full mediation regression results in Table 3).

Table 3. Mediation of the accessibility–health association by behavioral pathways

Mediator → outcome	a-path (β)	b-path (β)	% mediated	p
Exercise → Physical health	0.246**	0.189***	~34%	<0.001
Exercise → Life satisfaction	0.246**	0.156***	~28%	<0.001
Smoking → Physical health	-0.041	0.058	~3% (ns)	0.21
Alcohol → Physical health	-0.029	0.047	~2% (ns)	0.34



Heterogeneity Analyses

Full subgroup regression results are presented in Table 4.

Gender differences

Women showed greater sensitivity to healthcare affordability than men, particularly for mental health. The association of accessibility with life satisfaction was stronger among women ($\beta = 0.134$, $p < 0.001$) than men ($\beta = 0.067$, $p < 0.05$), and similarly for depressive symptoms (women: $\beta = -0.228$, $p < 0.001$; men: $\beta = -0.141$, $p < 0.01$).

Age variation

Benefits were broadly similar across the elderly age spectrum, with slightly stronger associations among those aged 80 and above compared with 60–79 (interaction $p = 0.12$), indicating that economic accessibility produces meaningful associations across the elderly population.

Economic status

Among elderly individuals in the lowest income quartile, the association of accessibility with physical health was approximately twice as large ($\beta = -0.219$, $p < 0.001$) as among those in the highest income quartile ($\beta = -0.093$, $p < 0.05$).

Table 4. Heterogeneity of the accessibility–health association by gender, age, and income

Subgroup / outcome	β coefficient	95% CI	p-value
Women - Life satisfaction	0.134	0.078 to 0.190	<0.001
Men -Life satisfaction	0.067	0.012 to 0.122	<0.05
Women-Depressive symptoms	-0.228	-0.301 to -0.155	<0.001
Men -Depressive symptoms	-0.141	-0.219 to -0.063	<0.01
Aged 80+ -Physical health	-0.176	-0.262 to -0.090	<0.001
Aged 60–79-Physical health	-0.128	-0.201 to -0.055	<0.001
Lowest income quartile - Phys.	-0.219	-0.298 to -0.140	<0.001
Highest income quartile - Phys.	-0.093	-0.176 to -0.010	<0.05

Urban–Rural Comparison

Urban elders showed stronger associations between accessibility and physical health ($\beta = -0.168$, $p < 0.001$) than rural elders ($\beta = -0.112$, $p < 0.01$); full urban–rural regression results are in Table 5. Although rural elder’s also benefited, persistent structural barriers limited medical facilities, weaker transport networks likely attenuated the magnitude of the association, underscoring the dual challenge of improving both economic and geographic access for rural populations.

Table 5. Urban–rural comparison of the accessibility–health association

Residence / outcome	β coefficient	95% CI	p-value
Urban-Physical health	–0.168	–0.247 to –0.089	<0.001
Rural-Physical health	–0.112	–0.192 to –0.032	<0.01
Urban-Life satisfaction	0.115	0.059 to 0.171	<0.001
Rural-Life satisfaction	0.078	0.018 to 0.138	<0.05
Urban-Depressive symptoms	–0.203	–0.290 to –0.116	<0.001
Rural-Depressive symptoms	–0.149	–0.234 to –0.064	<0.01

Discussion

Summary of Main Findings

This longitudinal panel study found that greater economic accessibility of healthcare services operationalized as a lower household OOP-to-total healthcare expenditure ratio was associated with better physical health, higher life satisfaction, and fewer depressive symptoms among elderly individuals in China. Increased exercise frequency emerged as the principal behavioral mechanism, accounting for roughly one-third of the association with physical health. Associations were stronger among women, low-income elders, the oldest-old, and urban residents. These findings are framed as associations rather than causal effects, given the observational nature of panel data and the potential for residual confounding and reverse causality.

Comparison with Previous Studies and New Knowledge Contributed

Consistent with prior international evidence on healthcare affordability and older-adult outcomes¹³⁻¹⁴, this study confirms that OOP burden is a key correlate of physical and mental well-being. Earlier work in high-income settings has focused predominantly on insurance coverage as the relevant access dimension¹⁵; our findings extend this literature by demonstrating that even



within China's near-universal insurance framework, residual OOP costs remain a salient correlate of health, particularly for vulnerable subgroups. Compared with previous Chinese studies that have largely been cross-sectional⁶⁻⁷, this study contributes new knowledge by leveraging four-wave panel data (2016–2022) to track within-individual change across pre-pandemic, pandemic, and post-pandemic periods, and by formally testing behavioral mediation pathways.

Interpretation of Subgroup Findings

Three subgroup patterns warrant deeper interpretation. First, women's stronger sensitivity to affordability for mental-health outcomes may reflect their longer life expectancy, higher prevalence of chronic illness in later life, lower personal income and pension entitlements, and greater reliance on adult children for healthcare financing making OOP costs both more salient and more constrained for older women. Second, the larger associations among low-income elders are consistent with a budget-share interpretation: a given OOP expense represents a larger share of disposable income for poor households, so reductions in that share free more resources for health-protective behaviors and adequate nutrition. Third, stronger associations among those aged 80 and above plausibly reflect their higher baseline healthcare need and higher likelihood of being on fixed incomes, so that affordability improvements translate more directly into utilization and health benefit.

Weak Mediation through Smoking and Alcohol

The relatively weak mediation observed for smoking and alcohol pathways likely reflects three factors: (1) cohort effects – current Chinese elders, particularly men, have stable, long-established smoking and drinking patterns that are unlikely to shift in response to short-term changes in healthcare cost-sharing; (2) low baseline prevalence of these behaviors among elderly women, which limits statistical detection of mediation; and (3) the relatively short two-year intervals between waves, which may be insufficient to capture lifestyle change. Exercise, by contrast, is a more elastic and provider-influenced behavior, consistent with its stronger mediating role.



Reverse Causality and Endogeneity

Reverse causality is a particular concern for studies of healthcare expenditure: poor underlying health may itself drive higher OOP, biasing the observed association toward finding that high OOP "causes" poor health. We addressed this in three ways: (1) panel fixed-effects estimation removes time-invariant individual confounders such as baseline chronic illness propensity; (2) the inclusion of caregiving support and employment as time-varying controls partially captures changes in functional status; and (3) the consistency of the association across distinct outcome dimensions (physical, mental, and life satisfaction) and across mediation pathways argues against pure reverse causality. Nevertheless, residual reverse causality cannot be ruled out, and instrumental-variable or quasi-experimental designs would strengthen causal inference.

Strengths and Limitations

Strengths of this study include nationally representative panel data, within-individual estimation that mitigates time-invariant confounding, and a four-wave window spanning the COVID-19 pandemic. Limitations include: (1) reliance on self-reported health measures, partly mitigated by the validated CES-D; (2) the OOP ratio captures one dimension of affordability but not foregone care due to cost; (3) observational design precludes definitive causal inference; (4) residual confounding from unmeasured time-varying factors such as local insurance reforms or healthcare infrastructure changes; (5) the 2020 wave was conducted predominantly by telephone due to COVID-19 restrictions, which may have differentially affected response patterns particularly for older or less digitally connected respondents.

Practical Implications and Future Research

Practically, the findings suggest that policies reducing OOP burden especially for low-income rural elders and the oldest-old may yield broad health benefits, in part by enabling provider-reinforced behavioral change such as increased exercise. Future research should employ mixed-methods and quasi-experimental designs leveraging policy variation, examine threshold and dose-response effects, and assess whether digital-health interventions complement economic-accessibility improvements. Future analyses using the full CFPS time series should also examine temporal trends in OOP burden, elderly health outcomes, and gendered disparities — particularly given the policy changes accompanying COVID-19 and Healthy China 2030 implementation.



Conclusion

In this nationally representative four-wave panel analysis of Chinese elders aged 60 and above, greater economic accessibility of healthcare services was associated with better physical health ($\beta = -0.142$, $p < 0.001$), higher life satisfaction ($\beta = 0.098$, $p < 0.001$), and fewer depressive symptoms ($\beta = -0.185$, $p < 0.001$), with increased exercise frequency acting as the principal behavioral mediator ($\beta = 0.246$, $p < 0.01$). Associations were strongest among women, low-income elders, the oldest-old, and urban residents. Reducing out-of-pocket healthcare burdens particularly for these subgroups represents a policy-relevant lever for supporting equitable healthy aging in China.

Policy Recommendations

On the basis of these associations and acknowledging the observational nature of the evidence the following targeted, actionable measures merit consideration:

1. Targeted OOP-reduction strategies for low-income rural elders: expand the catastrophic medical expenditure protection scheme with lower deductibles and higher reimbursement ceilings specifically for elderly residents below the poverty line in rural counties.
2. Gender-sensitive mental health coverage: incorporate depression screening and outpatient mental-health services into the basic public health package for women aged 60 and above, with zero or minimal copayment.
3. Oldest-old protections: establish a uniform national reimbursement floor (e.g., $\geq 80\%$) for inpatient and outpatient care for individuals aged 80 and above, regardless of insurance scheme.
4. Linkage of affordability with preventive behavior: bundle annual free physical activity counseling and supervised community-exercise programs with reduced-copayment primary care visits, exploiting the observed exercise-mediated pathway.
5. Rural infrastructure complement: pair OOP reductions with investment in village-level clinic capacity and elderly-accessible transportation subsidies, since affordability improvements alone yield weaker associations among rural elders.



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