论著·公共卫生智库

中国日益加重的压疮公共卫生负担:基于GBD数据的年龄与性别差异分析

黄震佳,吴 丽,汤 勇,李 丹,兰晓东 四川大学华西临床医学院,四川大学附属成都市第二人民医院烧伤整形科,四川成都

[摘要] **目的** 基于1990—2021年全球疾病负担(global burden of disease,GBD)数据,分析中国一般人群(所有年龄组)及≥65岁老年人群压疮负担及其变化趋势,并预测2022—2035年的负担趋势,解决压疮防控中长期趋势不明及精准干预不足的公共卫生问题,为制定针对性防控策略提供依据。**方法** 从GBD数据库提取中国1990—2021年一般人群及≥65岁老年人群压疮的发病数、死亡数及伤残调整生命年数(disability-adjusted life years,DALYs);同时提取一般人群的年龄标准化发病率(age-standardized incidence rate,ASIR)、死亡率(age-standardized mortality rate,ASMR)及伤残调整生命年率(age-standardized disability-adjusted life year rate,ASDR),并基于GBD 2021标准人口估算≥65岁老年人群对应的年龄标准化率(age-standardized rates,ASRs)。计算ASRs的年均变化百分比(estimated annual percentage changes,EAPCs)以评估趋势。采用贝叶斯年龄-时期-队列(bayesian age-period-cohort,BAPC)模型,分别预测一般人群和老年人群2022—2035年的ASRs及变化趋势。**结果** 1990—2021年,中国一般人群压疮发病数由163 508.67例(95%*CI*:142 891.48~184 055.10)增至397 312.27例(95%*CI*:360 058.44~444 875.78),死亡数由242.51例(95%*CI*:125.26~702.84)激增至3 131.54例(95%*CI*:1 562.60~4 126.85),DALYs由11 965.10人年(95%*CI*:7 820.54~21 703.78)增至61 933.91人年(95%*CI*:36 313.26~77 402.42)。同期,ASIR、ASMR及ASDR的EAPC分别为1.06(95%*CI*:0.84~1.28)、3.63(95%*CI*:3.45~3.81)和2.76(95%*CI*:2.60~2.92),均显著上升。2021年,男性发病数及DALYs均高于女性,死亡数相近;男性ASIR、ASMR及ASDR均高于女性,且两性增长均较快。各指标随年龄显著增加,预测至2035年,中国一般人群ASIR、ASMR和ASDR将继续显著上升。1990—2021年,中国老年人群(≥65岁)压疮发病数由42 334.95例(95%*CI*:35 739.05~48 930.84)增至238 431.65例(95%*CI*:212 539.53~264 323.77),死亡数由204.97例(95%*CI*:93.33~316.60)增至2 871.02例(95%*CI*:2 334.39~3 407.66),DALYs由4 619.74人年(95%*CI*:2 990.73~6 248.76)增至43 968.28人年(95%*CI*:37 542.85~50 393.70)。ASIR、ASMR和ASDR的EAPC分别为2.62(95%*CI*:2.44~2.80)、3.54(95%*CI*:3.38~3.70)和3.28(95%*CI*:3.14~3.42),均显著上升。2021年,老年男性与女性的发病数、死亡数及DALYs相近,但男性ASIR、ASMR及ASDR均高于女性,且增长更快。预计到2035年,老年人群的ASIR显著下降至146.24(95%*CI*:140.35~152.14),EAPC为-0.57(95%*CI*:-0.64~-0.50),但ASMR和ASDR将继续上升,且男性高于女性。**结论** 1990-2021年,中国一般人群及老年人群压疮发病数、死亡数及DALYs显著增加,且ASRs快速上升。压疮负担随年龄增长显著增加,男性高于女性。预测显示,一般人群ASIR将持续上升,老年人ASIR略降,但ASMR、ASDR将继续升高。**对策** 持续加强压疮防控,针对老年人,尤其是老年男性实施精准干预,推广标准化护理指南,提升基层医疗培训和资源投入,建立全国压疮监测系统。

[关键词] 压疮;老年人;疾病负担;流行病学特征;预测分析

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[通信作者] 兰晓东,E-mail:86lanniao@163.com

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Increasing pressure ulcer burden in China: Age and gender differences based on GBD data

HUANG Zhenjia, WU Li, TANG Yong, LI Dan, LAN Xiaodong Department of Burn and Plastic Surgery, Chengdu Second People's Hospital Affiliated to Sichuan University, West China School of Medicine, Sichuan University, Chengdu, Sichuan, China

[**Abstract**] **Objective** To analyze the burden of pressure ulcers and its changing trends among the general population (all age groups) and the elderly aged 65 years and above in China based on the global burden of disease (GBD) data from 1990 to 2021, predict the burden trends from 2022 to 2035, and address the public health issues of its unclear medium- and long-term trends and insufficient precise interventions in its prevention and control in order to provide support for formulating targeted prevention and control strategies. **Methods** The GBD database was used to extract the incidence, mortality and disability-adjusted life years (DALYs) of pressure ulcers in the general population and in the elderly aged 65 years and above in China from 1990 to 2021. Meanwhile, the age-standardized incidence rate (ASIR), mortality rate (ASMR), and disability-adjusted life rate (ASDR) of the general population were also extracted, and the age-standardized rate (ASRs) corresponding to the elderly population aged 65 years and above were estimated based on the GBD 2021 standard population. The average annual percentage changes (EAPCs) of ASRs were calculated to assess the trends. Bayesian age-period-cohort (BAPC) model was adopted to predict the ASRs and their changing trends of the general and elderly population from 2022 to 2035, respectively. **Results** From 1990 to 2021, the number of pressure ulcer cases in the general population of China increased from 163 508.67 (95%*CI*: 142 891.48~184 055.10) cases to 397 312.27 (95%*CI*: 360 058.44~444 875.78) cases, the number of deaths soared from 242.51 (95%*CI*: 125.26~702.84) cases to 3 131.54 (95%*CI*: 1 562.60~4 126.85) cases, and DALYs increased from 11 965.10 (95%*CI*: 7 820.54~21 703.78) to 61 933.91 (95%*CI*: 36 313.26~77 402.42). During the same period, the EAPCs of ASIR, ASMR and ASDR were 1.06 (95%*CI*: 0.84~1.28), 3.63 (95%*CI*: 3.45~3.81), and 2.76 (95%*CI*: 2.60~2.92), respectively. In 2021, the number of male cases and DALYs were both higher than those of females, while the number of deaths was similar. The ASIR, ASMR and ASDR of the males were all higher than those of the females, and the growth rates of both genders were relatively fast. All indicators were increased significantly with age. It is predicted that by 2035, the ASIR, ASMR, and ASDR in the general Chinese population will continue to rise significantly. From 1990 to 2021, the number of pressure ulcer cases among the elderly (≥65 years old) in China increased from 42 334.95 (95%*CI*: 35 739.05~48 930.84) to 238 431.65 (95%*CI*: 212 539.53~264 323.77). The number of deaths rose from 204.97 (95%*CI*: 93.33~316.60) to 2 871.02 (95%*CI*: 2 334.39~3 407.66), and DALYs increased from 4 619.74 (95%*CI*: 2 990.73~6 248.76) to 43 968.28 (95%*CI*: 37 542.85~50 393.70). The EAPCs of ASIR, ASMR, and ASDR were 2.62 (95%*CI*: 2.44~2.80), 3.54 (95%*CI*: 3.38~3.70), and 3.28 (95%*CI*: 3.14~3.42), all of which increased significantly. In 2021, the number of cases, deaths and DALYs among elderly men and women were similar, but the ASIR, ASMR and ASDR of men were all higher than those of women, and their growth rates were faster. It is projected that by 2035, the ASIR of the elderly population will significantly decline to 146.24(95%*CI*: 140.35~152.14), with an EAPC of −0.57 (95%*CI*: −0.64~−0.50), while the ASMR and ASDR will continue to rise and remain higher in males than in females. **Conclusion** From 1990 to 2021, the number of pressure ulcer cases, deaths and DALYs among the general population and the elderly in China increased significantly, and the ASRs rose rapidly. The burden of pressure ulcers increases significantly with age and is higher in men than in women. Predictions show that ASIR in the general population will continue to rise, while that in the elderly will slightly decline. However, the ASMR and ASDR will continue to increase. **Countermeasures** Continuously strengthen the prevention and control of pressure ulcers, implement precise intervention for the elderly, especially older men, promote

standardized nursing guidelines, enhance training and resource input in primary medical care, and establish a national pressure ulcer monitoring system.

[**Key words**] pressure ulcer; aged; disease burden; epidemiological characteristics; predictive analysis

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压疮,又称褥疮、压力性溃疡或床疮,是由于局部皮肤长期受压力、摩擦力或剪切力作用,导致血液循环障碍及组织缺血缺氧,从而引发皮肤及皮下组织损伤的疾病,常发生于骨性突出部位及医疗器械接触处[1-2]。其临床表现包括皮肤发红、水疱、溃疡,甚至深部组织坏死,严重病例可累及肌肉和骨骼,并可能引发感染及败血症等并发症。Ⅲ期及以上重症病例约占30%,病死率达到10%~20%[3]。压疮的主要病因涵盖长期卧床、营养不良、大小便失禁以及糖尿病等引起的局部血供障碍[1,4]。压疮不仅显著延长住院时间、增加医疗费用,还降低患者生活自理能力,增加护理负担。尤其是慢性难愈性压疮,需长期治疗,对患者、家庭及社会均构成沉重的医疗与经济压力[5-6]。尽管治疗手段已从传统敷料和药物扩展至负压封闭引流、生长因子等新技术[7-8],但压疮的防治仍然是全球公共卫生领域的重要挑战。

在全球范围内,压疮是常见且复杂的护理相关疾病之一,发病率呈逐年上升趋势,其在体表损伤性疾病中的负担日益突出。根据全球疾病负担研究(global burden of disease,GBD)2021年数据,全球新发压疮病例约为246.8万例,年龄标准化发病率为30.3/10万人,相关死亡病例约3.7万例,伤残调整生命年(disability-adjusted life years,DALYs)达到80.4万人年[9-10]。不同地区之间负担存在显著差异,人口老龄化严重且医疗资源紧张的地区负担尤为沉重,美国、中国、印度等国家对全球负担贡献显著[9-11]。

老年人群是压疮的高发群体。60岁及以上人群的年龄标准化发病率(age-standardized incidence rate,ASIR)高达169.86/10万,年龄标准化死亡率(age-standardized mortality rate,ASMR)和年龄标准化DALYs率(age-standardized DALYs rate,ASDR)分别为3.16/10万和50.73/10万,均明显高于一般人群;且随年龄增长,负担显著增加[12]。老年人表皮-真皮交界区扁平化、微血管密度下降及胶原蛋白流失,导致皮肤的抗剪切和抗压能力显著减弱;同时,合并糖尿病、周围血管病、营养不良、大小便失禁及活动受限等多重危险因素[1,4,13],致使压疮发生率更高、病程更长且愈合难度更大,合并症率及死亡率均高于年轻患者,尤以95岁及以上高龄者最为显著[12]。中国已于2021年底成为全球65岁及以上老年人口最多的国家,约2亿人,占全球老年人口的20%之多[14]。随着人口老龄化进程加快,中国的压疮疾病负担预计将进一步加重。

基于GBD 2021数据,本研究系统梳理了1990—2021年中国一般人群与老年人群压疮的发病、死亡、DALYs负担及其变化趋势,并预测2022—2035年发展态势,填补了国内该领域的数据空白。此外,在中国人口老龄化加速的背景下,本研究将老年人群单独作为研究对象,以揭示其特有的压疮负担特征。研究结果可为制定分级预防策略、优化资源配置及建立老年压疮专病管理体系提供循证依据,进而减轻患者痛苦及社会经济负担。

1 资料与方法

1.1 数据来源

本研究所用数据均来源于公开发布的GBD 2021数据库(https://vizhub.healthdata.org/gbd-results/)[15]。为开展分析,本研究从GBD 2021数据库中提取了1990—2021年中国所有年龄组人群(定义为"一般人群")及年龄≥65岁人群(定义为"老年人群")的压疮发病、死亡和DALYs数据。具体步骤如下:在"GBD Results Tool"界面中,于"GBD Estimate"下选择"Cause of death or injury";在"Measure"下依次选择"Incidence""Deaths"和"DALYs";在"Metric"下选择"Number"和"Rate";在"Cause"下选择"Decubitus ulcer";在"Location"下选择"China";在"Age"下针对老年人群选择从"<5 years"至"95+ years"按5岁分组的各年龄组数据,同时提取"All ages"及"Age-standardized"数据以代表一般人群;在"Sex"下选择"Female""Male"和"Both";在"Year"下选择1990—2021年的全部年份;最后点击"Download"获取数据。

1.2 统计学分析

所有统计分析与绘图均采用R软件(4.1.3)及Excel 2019完成。首先,以GBD 2021标准人口为参照,按照既定方法[16]计算中国≥65岁人群的ASIR、ASMR、ASDR及其95%置信区间(*CI*)。年龄标准化率

(age-standardized rate,ASR)用于消除不同人群间年龄结构差异对比较结果的影响。其次,按照既定方法[10],采用对数线性回归模型拟合计算估计年均百分比变化(estimated annual percentage change,EAPC)及其95% *CI*,以此评估ASR的时间趋势。当95% *CI*的上限<0时,表示趋势下降;下限>0时表示趋势上升;若95% *CI*包含0,则认为趋势相对稳定。此外,本研究基于不同性别和年龄组进行了亚组分析,以更全面地描述中国一般人群及老年人群的压疮负担。最后,采用贝叶斯年龄-时期-队列(bayesian age-period-cohort,BAPC)模型[17]预测2022—2035年中国一般人群及老年人群的ASIR、ASMR、ASDR和该时期的EAPCs,以评估未来压疮负担及其变化趋势。所有统计检验均为双侧检验,当95% *CI*不包括0或*P*<0.05时,认为差异具有统计学意义。

2 结果

2.1 一般人群压疮负担的现状、趋势及预测

2.1.1 压疮负担的现状 1990—2021年,中国一般人群压疮发病数由163 508.67例(95%*CI*:142 891.48~184 055.10)升至397 312.27例(95%*CI*:360 058.44~444 875.78),增长142.99%。死亡数由242.51例(95%*CI*:125.26~702.84)增至3 131.54例(95%*CI*:1 562.60~4 126.85),增长1 191.30%。DALYs由11 965.10人年(95%*CI*:7 820.54~21 703.78)升至61 933.91人年(95%*CI*:36 313.26~77 402.42),增长417.62%(表1)。ASIR、ASMR及ASDR分别由18.32/10万(95%*CI*:16.37~20.52)、0.08/10万(95%*CI*:0.04~0.21)和1.75/10万(95%*CI*:1.15~3.5)升至22.69/10万(95%*CI*:20.68~25.15)、0.21/10万(95%*CI*:0.11~0.27)和3.65/10万(95%*CI*:2.16~4.55)。EAPC分别为1.06、3.63和2.76(95%*CI*均不含0),均显著上升(图1)。

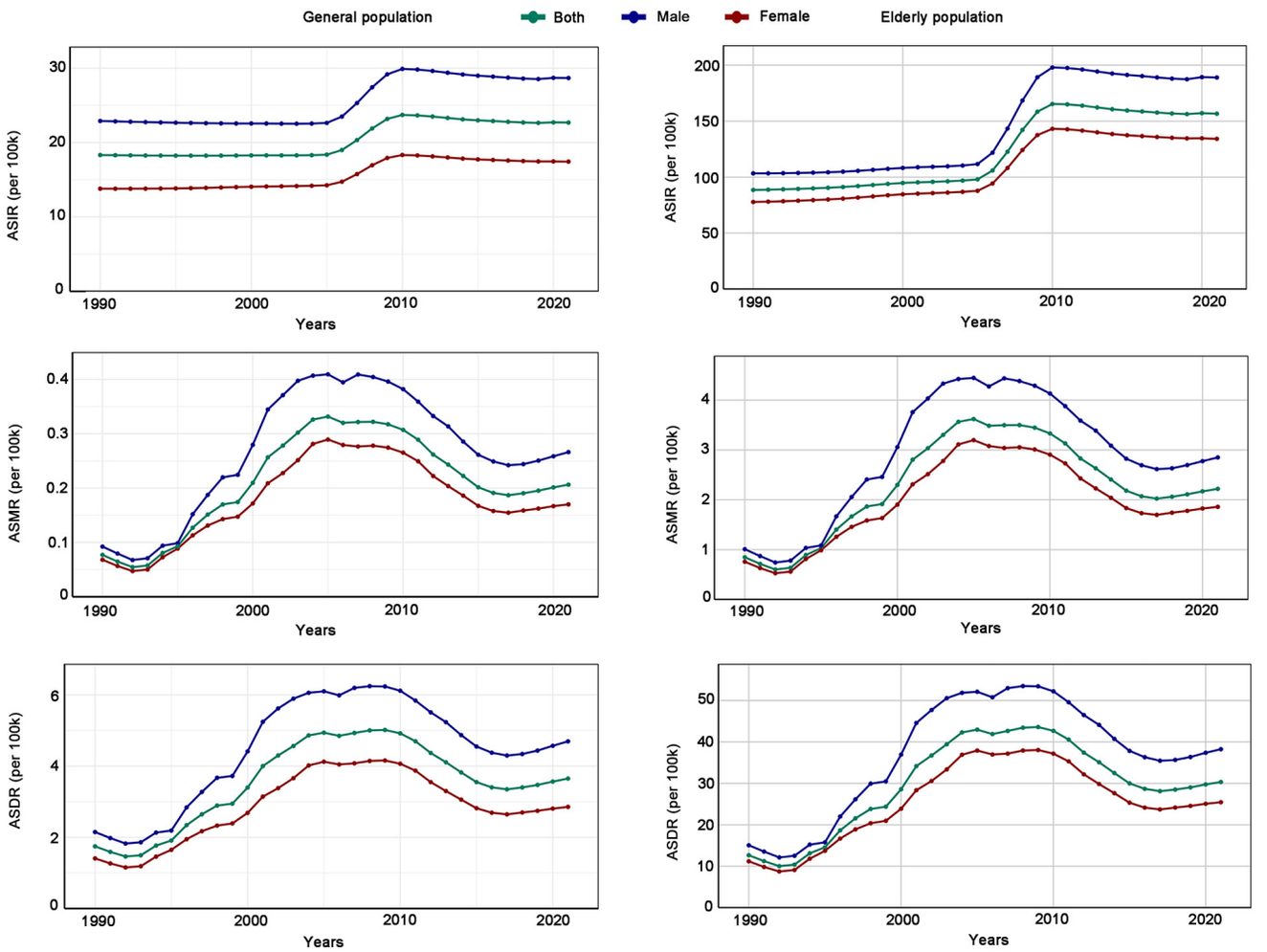
2.1.2 压疮负担的年龄与性别差异 2021年,中国男性压疮发病数为232 498.95例(95%*CI*:209 054.27~259 869.32),女性为164 813.32例(95%*CI*:148 298.81~184 210.14),男女比约1.41∶1;死亡数分别为1 553.81例(95%*CI*:502.48~2 133.21)和1 577.73例(95%*CI*:624.84~2279.71),接近持平。男性DALYs为34 550.38人年(95%*CI*:17 483.56~45 040.74),女性为27 383.53人年(95%*CI*:14 016.69~36 289.77),男女DALYs比约1.26∶1(表1)。压疮发病数、死亡数及DALYs均随年龄增长显著增加(图2)。

表1 1990、2021年中国一般人群压疮的疾病负担及趋势

Table 1 Disease burden and trends of pressure ulcers in the general population in China, 1990 and 2021

Characteristics		1990		2021		1990—2021
		Number (95% *CI*)	ASR (95% *CI*) (per 100 k)	Number (95% *CI*)	ASR(95% *CI*) (per 100 k)	EAPC (95% *CI*)
Incidence	Both	163 508.67 (142 891.48~184 055.10)	18.32 (16.37~20.52)	397 312.27 (360 058.44~444 875.78)	22.69 (20.68~25.15)	1.06 (0.84~1.28)
	Male	104 094.34 (90 844.31~117 001.86)	22.9 (20.46~25.73)	232 498.95 (209 054.27~259 869.32)	28.67 (26.00~31.91)	1.13 (0.89~1.37)
	Female	59 414.34 (52 044.77~67 266.99)	13.8 (12.36~15.43)	164 813.32 (148 298.81~184 210.14)	17.43 (15.83~19.34)	1.13 (0.92~1.34)
Deaths	Both	242.51 (125.26~702.84)	0.08 (0.04~0.21)	3 131.54 (1 562.60~4 126.85)	0.21 (0.11~0.27)	3.63 (1.95~5.34)
	Male	117.74 (51.50~466.03)	0.09 (0.04~0.33)	1 553.81 (502.48~2 133.21)	0.27 (0.10~0.36)	3.86 (2.12~5.63)
	Female	124.77 (62.54~450.29)	0.07 (0.03~0.22)	1 577.73 (624.84~2 279.71)	0.17 (0.07~0.24)	3.42 (1.75~5.12)
DALYs	Both	11 965.1 (7 820.54~21 703.78)	1.75 (1.15~3.50)	61 933.91 (36 313.26~77 402.42)	3.65 (2.16~4.55)	2.76 (1.60~3.93)
	Male	7 222.28 (4 607.30~14 674.56)	2.15 (1.36~5.18)	34 550.38 (17 483.56~45 040.74)	4.7 (2.37~6.08)	2.9 (1.72~4.09)
	Female	4 742.83 (3 045.71~10 107.76)	1.41 (0.91~3.36)	27 383.53 (14 016.69~36 289.77)	2.86 (1.48~3.77)	2.68 (1.49~3.89)

ASR: Age-standardized rate; EAPC: Estimated annual percentage change; DALYs: Disability-adjusted life years



ASIR: Age-standardized incidence rate; ASMR: Age-standardized mortality rate; ASDR: age-standardized disability-adjusted life year rate

图1 1990—2021年中国一般人群及老年人群压疮的疾病负担及趋势

Figure 1 Trends and disease burden of pressure ulcers in China's general and elderly populations, 1990—2021

2021年,男性ASIR为28.67/10万(95%*CI*:26.00~31.91),高于女性的17.43/10万(95%*CI*:15.83~19.34)。1990—2021年,男女ASIR快速上升,EAPC均为1.13(95%*CI*均不含0)。2021年,男性ASMR为0.27/10万(95%*CI*:0.10~0.36),女性为0.17/10万(95%*CI*:0.07~0.24),男性略高。同期ASMR显著上升,男性EAPC=3.86,女性EAPC=3.42(95%*CI*均不含0)。2021年,男性ASDR为4.70/10万(95%*CI*:2.37~6.08),女性为2.86/10万(95%*CI*:1.48~3.77),男性高于女性。1990—2021年,ASDR显著上升,男性EAPC=2.90,女性EAPC=2.68(95%*CI*均不含0)(表1、图1)。总体而言,ASIR、ASMR和ASDR均随年龄增长升高(图2)。

2.1.3 压疮负担的预测 预计至2035年,中国一般人群ASIR升至24.62/10万(95%*CI*:24.51~24.73),EAPC=0.17(95%*CI*:0.10~0.23),呈显著上升趋势。按性别,男性ASIR为30.85/10万(95%*CI*:30.52~31.19),上升明显(EAPC=0.16,95%*CI*:0.10~0.22);女性为18.65/10万(95%*CI*:18.47~18.83),女性趋势较稳(EAPC=0.04,95%*CI*:-0.04~0.11)。ASMR和ASDR预测分别为0.35/10万(95%*CI*:0.32~0.39)和6.50/10万(95%*CI*:6.19~6.81),均显著上升,其EAPC分别为2.72(95%*CI*:2.66~2.78)和3.21(95%*CI*:3.18~3.25)(表3)。

2.2 老年人群(≥65岁)压疮负担的现状、趋势及预测

2.2.1 压疮负担的现状 1990—2021年,老年人压疮发病数由42 334.95例(95%*CI*:35 739.05~48 930.84)激增至238 431.65例(95%*CI*:212 539.53~264 323.77),增长463.19%;死亡数由204.97例(95%*CI*:93.33~316.60)增至2 871.02例(95%*CI*:2 334.39~3 407.66),增长1 300.69%;DALYs由4 619.74人年(95%*CI*:2 990.73~6 248.76)升至43 968.28人年(95%*CI*:

37 542.85~50 393.70),增长851.70%(表2)。ASIR、ASMR和ASDR分别由88.51/10万(95%*CI*:62.3~115.74)、0.85/10万(95%*CI*:0.12~1.87)和12.66/10万(95%*CI*:4.17~24.1)升至156.63/10万(95%*CI*:117.08~197.27)、2.22/10万(95%*CI*:1.18~3.17)和30.32/10万(95%*CI*:18.34~41.3),EAPC分别为2.62、3.54和3.28(95%*CI*均不含0),均显著上升(图1)。

2.2.2 压疮负担的年龄与性别差异 2021年,老年男性压疮发病数120 563.63例(95%*CI*:106 763.08~134 364.17),女性117 868.02例(95%*CI*:105 579.31~130 156.74),比例约1∶0.98;死亡数分别为1 379.18例(95%*CI*:1 041.29~1 717.07)和1 491.84例(95%*CI*:1 148.58~1 835.10);DALYs分别为22 131.97人年(95%*CI*:17 969.43~26 294.51)和21 836.31人年(95%*CI*:18 005.04~25 667.57),比例约1.02∶1,性别差异较小(表2)。发病数随年龄升高,85~89岁组最高,死亡数及DALYs也在85~89岁达峰(图2)。

2021年,老年男性ASIR为188.93/10万(95%*CI*:141.12~238.26),女性为134.17/10万(95%*CI*:100.35~168.92)。1990—2021年,老年男女ASIR快速上升,男性EAPC=2.80,女性EAPC=2.49(95%*CI*均不含0)。2021年,老年男性ASMR为2.85/10万(95%*CI*:1.18~4.34),女性为1.86/10万(95%*CI*:0.79~2.85),男性高于女性。同期ASMR显著上升,男性EAPC=3.78,女性EAPC=3.34(95%*CI*均不含0)。2021年,老年男性ASDR为38.25/10万(95%*CI*:19.55~55.12),女性为25.45/10万(95%*CI*:13.38~36.72),男性高于女性。1990—2021年间,老年男女ASDR显著上升,男性EAPC=3.47,女性EAPC=3.12(95%*CI*均不含0)(表2、图1)。ASIR、ASMR及ASDR均随年龄增长升高,ASIR及老年女性ASMR和ASDR在≥95岁组达峰,老年男性ASMR和ASDR在90~94岁组达峰(图2)。

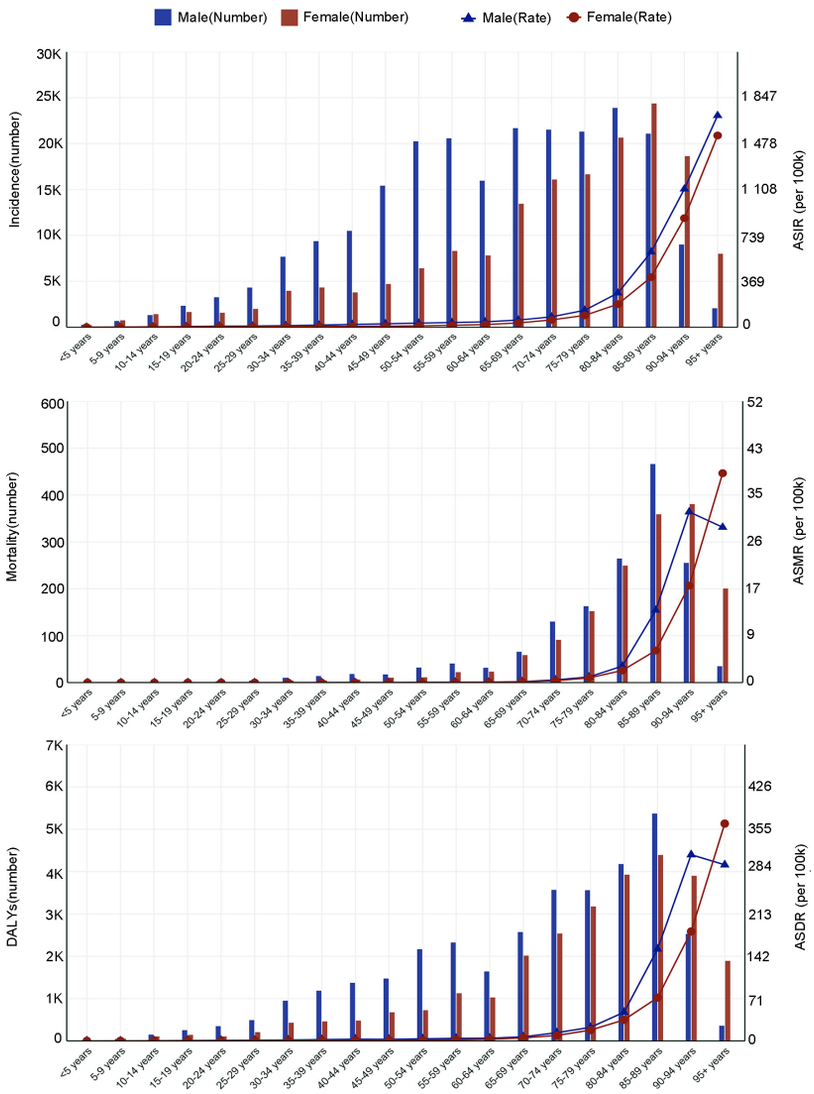
2.2.3 压疮负担的预测 预计至2035年,老年人

表2 1990、2021年中国老年人群压疮的疾病负担及趋势

Table 2 Disease burden and trends of pressure ulcers in the elderly population in China, 1990 and 2021

Characteristics		1990		2021		1990—2021
		Number(95% *CI*)	ASR (95% *CI*) (per 100k)	Number (95% *CI*)	ASR (95% *CI*) (per 100k)	EAPC (95% *CI*)
Incidence	Both	42 334.95 (35 739.05~48 930.84)	88.51 (62.30~115.74)	238 431.65 (212 539.53~264 323.77)	156.63 (117.08~197.27)	2.62 (2.19~3.05)
	Male	22 153.79 (18 490.91~25 816.66)	103.34 (72.76~135.14)	120 563.63 (106 763.08~134 364.17)	188.93 (141.12~238.26)	2.8 (2.33~3.28)
	Female	20 181.16 (17 211.07~23 151.25)	77.75 (54.75~101.60)	117 868.02 (105 579.31~130 156.74)	134.17 (100.35~168.92)	2.49 (2.09~2.89)
Deaths	Both	204.97 (93.33~316.60)	0.85 (0.12~1.87)	2 871.02 (2 334.39~3 407.66)	2.22 (1.18~3.17)	3.54 (1.86~5.24)
	Male	92.9 (22.64~163.16)	1.01 (−0.12~2.65)	1 379.18 (1 041.29~1 717.07)	2.85 (1.18~4.34)	3.78 (2.04~5.54)
	Female	112.06 (37.40~186.73)	0.76 (0~1.84)	1 491.84 (1 148.58~1 835.10)	1.86 (0.79~2.85)	3.34 (1.68~5.03)
DALYs	Both	4 619.74 (2 990.73~6 248.76)	12.66 (4.17~24.10)	43 968.28 (37 542.85~50 393.70)	30.32 (18.34~41.30)	3.28 (1.92~4.65)
	Male	2 285.69 (1 226.92~3 344.45)	15.06 (2.12~33.49)	22 131.97 (17 969.43~26 294.51)	38.25 (19.55~55.12)	3.47 (2.07~4.89)
	Female	2 334.06 (1 284.79~3 383.33)	11.19 (2.42~23.39)	21 836.31 (18 005.04~25 667.57)	25.45 (13.38~36.72)	3.12 (1.77~4.48)

ASR: Age-standardized rate; EAPC: Estimated annual percentage change; DALYs: Disability-adjusted life years



ASIR: Age-standardized incidence rate; ASMR: Age-standardized mortality rate; ASDR: Age-standardized disability-adjusted life year rate; DALYs: Disability-adjusted life years

图2 不同年龄组及不同性别人群的压疮负担

Figure 2 Burden of pressure ulcers by age and sex in China, 1990—2021

ASIR 降至 146.24/10 万(95%*CI*: 140.35~152.14),EAPC=-0.57(95%*CI*:-0.64~-0.50),呈显著下降。男性和女性 ASIR 分别为 182.38/10 万(95%*CI*: 174.38~190.38)和 123.83/10 万(95%*CI*: 119.17~128.50)。EAPC 分别为-0.34 和-0.69(95%*CI* 均不含 0),均下降明显。ASMR 和 ASDR 预测升至 3.55/10 万(95%*CI*:3.25~3.85)和 43.11/10 万(95%*CI*:32.42~37.62),EAPC 分别为 3.28(95%*CI*: 3.24-3.32)和 2.50(95%*CI*: 2.47~2.52)。男性 ASMR 和 ASDR 为 4.59/10 万(95%*CI*: 4.25~4.93)和 55.70/10 万(95%*CI*: 51.87~59.52),均高于女性的 2.88/10 万(95%*CI*: 2.66~3.10)和 35.02/10 万(95%*CI*: 32.42~37.62)(表3)。

3 讨论

本研究基于GBD 2021数据库,系统评估了1990—2021年中国一般人群及老年人群压疮负担及变化趋势,并预测2022—2035年的演变。结果显示,中国压疮呈现“绝对负担激增+相对风险上升”的双重特征,老年人群增幅尤为显著。这一发现凸显了中国在医疗照护体系建设方面的独特挑战。

3.1 压疮的发病趋势及特征

过去30年,全球压疮的绝对发病数显著增加,但ASIR整体稳定[9-11]。这表明压疮“表观流行”的扩张

表3 2022—2035年中国一般人群及老年人群压疮的疾病负担预测及趋势

Table 3 Predicted disease burden and trends of pressure ulcers in the general and elderly populations in China, 2022—2035

Characteristics			2035	2022-2035
			ASR(per 100k)	EPAC (95% *CI*)
General populations	Incidence	Both	24.62(24.51~24.73)	0.17(0.10~0.23)
		Male	30.85(30.52~31.19)	0.15(0.09~0.21)
		Female	18.65(18.47~18.83)	0.04(-0.04~0.11)
	Deaths	Both	0.35(0.32~0.39)	2.72(2.66~2.78)
		Male	0.47(0.43~0.51)	3.04(2.98~3.10)
		Female	0.27(0.25~0.29)	2.22(2.16~2.28)
	DALYs	Both	6.50(6.19~6.81)	3.21(3.18~3.25)
		Male	8.44(8.04~8.84)	3.30(3.27~3.34)
		Female	4.73(4.51~4.95)	2.75(2.72~2.77)
Elderly population	Incidence	Both	146.24(140.35~152.14)	-0.57(-0.63~-0.50)
		Male	182.38(174.38~190.38)	-0.34(-0.4~-0.27)
		Female	123.83(119.17~128.50)	-0.69(-0.76~-0.62)
	Deaths	Both	3.55(3.25~3.85)	3.28(3.24~3.32)
		Male	4.59(4.25~4.93)	3.35(3.33~3.38)
		Female	2.88(2.66~3.10)	3.04(2.98~3.10)
	DALYs	Both	43.11(40.03~46.19)	2.50(2.47~2.52)
		Male	55.70(51.87~59.52)	2.59(2.57~2.61)
		Female	35.02(32.42~37.62)	2.25(2.22~2.28)

ASR: Age-standardized rate; EAPC: Estimated annual percentage change; DALYs: Disability-adjusted life years

主要由人口老龄化和人口规模扩大驱动,而非疾病本身的风险增加。医疗水平提升、护理意识增强以及预防措施的逐步落实,使得ASIR未随绝对负担同步上升。与此相对,中国不仅压疮的绝对发病数显著增加,ASIR亦持续上升。这一趋势除反映人口快速老龄化[18]外,还揭示出基层照护资源不足、识别能力有限以及预防干预体系缺口显著等深层问题[19-20]。尤其值得注意的是,1990—2021年中国老年人口增加214%[18],而同期压疮发病数却增长463%,提示人口结构变化不足以解释其增幅,照护体系薄弱和区域发展不均衡是重要驱动因素。总体而言,中国压疮的发病特点呈现出"绝对负担激增"与"相对风险攀升"并存的局面,其本质反映了"未富先老"背景下初级预防体系的滞后。

在性别与年龄分布方面,全球压疮绝对发病数女性高于男性,尤其是老年人群;但男性ASIR则高于女性[10-12]。女性患者总数更多,是因为女性寿命更长,高龄人口基数大,从而拉高了绝对数量[21];而ASIR男性更高,则表明男性本身的内在患病风险实际上高于女性[21-22]。然而,中国的发病负担却呈"男重女轻"模式,无论一般人群还是老年人群,无论发病绝对数还是AISR,男性均显著高于女性。可能的解释包括:男性吸烟率高、卒中后偏瘫发生率大[22-23];男性患者在家庭照护情境下(尤其由女儿或儿媳提供护理时)翻身依从性较低[24-25];男性参与体检、社区健康项目和健康管理的比例亦普遍偏低[26]。在年龄分布上,中国压疮ASIR随年龄升高而递增,并在≥95岁组达到峰值,这与全球趋势一致[9-12]。

3.2 压疮的死亡与DALYs趋势及特征

全球范围内,压疮相关死亡数和DALYs在绝对值上均显著增加,但ASMR与ASDR总体呈下降趋势[9-11]。这说明虽然人口老龄化推动了死亡与健康损失数的增长,但在个体层面,压疮的致死风险与健康寿命损失风险并未加剧,反映出创面管理、感染控制、康复治疗及综合医疗干预的逐步改善。与全球趋势不同,中国压疮相关死亡和DALYs绝对数以及其ASRs均呈持续上升趋势,提示在老龄化和人口增长的双重作用下,压疮不仅导致更多死亡病例和健康损失,同时对个体健康寿命的威胁亦不断加重。这种差异可能与我国医疗资源配置不均衡、城乡二元体系又限制了优质医疗资源下沉、农村及边远地区基层医疗机构早期识别和干预不足、长期照护与康复体系建设滞后等因素密切相关[19-20]。

在性别差异方面,全球整体呈现"女重男轻"的格

局,女性ASMR和ASDR普遍高于男性,尤其在老年群体中更为突出[10-12],主要由于女性寿命更长、长期处于压疮高风险阶段,且慢病负担较重[21-22]。与此形成鲜明对比,中国则呈"男重女轻"格局,即男性ASMR和ASDR均显著高于女性。这一差异可能源于多方面的因素,男性在卒中后失能风险更高,吸烟、饮酒等危险行为更为普遍,对翻身、体位变换等基础护理的依从性较差,同时在健康管理和社区预防项目中的参与度也相对不足[22-26]。此外,社会角色对男性健康行为的影响以及就医意识相对薄弱,也可能进一步加剧其压疮发生与不良结局的风险[27]。在年龄分布上,中国男性ASMR与ASDR均在90~94岁组达到峰值,早于女性的≥95岁组。该结果揭示了高龄老年人群健康轨迹的显著性别差异。90~94岁是老年男性共病累积与功能衰退所致的"健康窗口期",压疮作为终末事件,其风险与致死/致残风险叠加,从而使该阶段死亡和健康损失最为沉重。而存活至≥95岁的男性,其死亡及寿命损失原因更多转向其他疾病,压疮不再是主要负担。与之相比,女性凭借更强的生存韧性,其健康崩溃临界点与压疮负担高峰均显著延后。

3.3 2022—2035年压疮负担预测及政策建议

预测结果表明,尽管一般人群的ASIR将持续显著上升,但老年人群的ASIR在未来15年预计呈下降趋势,提示我国老年压疮防控措施的成效逐步显现。然而,随着医疗水平的提升和医保政策的完善,带病长期生存人群不断增加,使压疮风险扩散至更广泛的人群。与此同时,2022—2035年间,一般人群和老年人群的ASMR及ASDR预计仍将持续上升,其增速高于全球平均水平[10-11],其中老年人群的增长尤为突出[12]。这一趋势将进一步加重慢性病共病管理及照护人力的负担。这些趋势凸显压疮防控的紧迫性,亟需构建多层次干预体系:(1)制度层面:将压疮发生率纳入养老机构评估和长护险考核,建立国家压疮登记系统,实现医院-社区-居家联动管理。(2)政策层面:立法要求养老机构配备专业伤口护理师,提供护理员补贴,推动数字健康工具(如压力监测App)和多学科协作模式。(3)技术层面:推广风险评估、翻身提醒、减压床垫、营养支持等集束化干预,在农村及养老机构普及低成本智能设备。(4)人力资源:培训基层护士和家庭照护者使用风险评估工具,增加男性照护者比例,减少性别照护障碍。(5)重点人群:对高危老人(如Braden评分≤12分或年龄≥80岁且活动受限)实施定期上门评估,对≥90岁组重点监测感染和败血症,关注农村空巢老人、高龄男性等高危群体。

不同于既往文献的笼统描述[10-12],本研究系统刻画了中国人群压疮负担及其未来发展趋势,重点聚焦≥65岁老年人群,揭示了中国特有的"超速增长""男重女轻"等有别于全球模式的流行特征,并提出"未富先老"与"照护滞后"的本土解释框架。需要指出的是,本研究依赖GBD模型与公开数据库,可能受数据采集不全、报告偏倚及诊断异质性影响。基层养老机构与居家护理数据缺失可能低估实际负担;经济负担与个体风险因素(如慢病状况、护理质量、社会经济水平、照护者性别、独居率)未全面纳入,限制机制分析的深度。

综上所述,中国压疮负担呈"超速增长+男重女轻"双重特征,与全球趋势差异显著。老年人群,尤其男性,是最脆弱且被忽视的群体。未来中国压疮负担持续加重,亟需以制度约束、技术普及、人力优化为核心,构建"防-筛-治-管"一体化防控体系。这不仅有助于压疮防治,也是衡量健康老龄化战略成效的重要指标。

利益冲突 本文所有作者声明不存在利益冲突

参考文献:

[1] MERVIS J S, PHILLIPS T J. Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation[J]. J Am Acad Dermatol, 2019, 81(4): 881-890. DOI: 10.1016/j.jaad.2018.12.069.

[2] HAJHOSSEINI B, LONGAKER M T, GURTNER G C. Pressure injury[J]. Ann Surg, 2020, 271(4): 671-679. DOI: 10.1097/sla.0000000000003567.

[3] KOTTNER J, CUDDIGAN J, CARVILLE K, *et al*. Pressure ulcer/injury classification today: an international perspective[J]. J Tissue Viability, 2020, 29(3): 197-203. DOI: 10.1016/j.jtv.2020.04.003.

[4] CHUNG M L, WIDDEL M, KIRCHHOFF J, *et al*. Risk factors for pressure injuries in adult patients: a narrative synthesis[J]. Int J Environ Res Public Health, 2022, 19(2): 761. DOI: 10.3390/ijerph19020761.

[5] DEMARRÉ L, VAN LANCKER A, VAN HECKE A, *et al*. The cost of prevention and treatment of pressure ulcers: a systematic review[J]. Int J Nurs Stud, 2015, 52(11): 1754-1774. DOI: 10.1016/j.ijnurstu.2015.06.006.

[6] GORECKI C, BROWN J M, NELSON E A, *et al*. Impact of pressure ulcers on quality of life in older patients: a systematic review[J]. J Am Geriatr Soc, 2009, 57(7): 1175-1183. DOI: 10.1111/j.1532-5415.2009.02307.x.

[7] BHATTACHARYA S, MISHRA R K. Pressure ulcers: Current understanding and newer modalities of treatment[J]. Indian J Plast Surg, 2015, 48(1): 4-16. DOI: 10.4103/0970-

0358.155260.

[8] ARMOUR D J, PRESTON-HSU E, TAILOR Y. Management of pressure ulcers and pressure-related injury[J]. Curr Phys Med Rehabil Rep, 2019, 7(2): 170-177. DOI: 10.1007/s40141-019-00222-x.

[9] ZHANG S Y, WEI G X, HAN L, *et al*. Global, regional and national burden of decubitus ulcers in 204 countries and territories from 1990 to 2021: a systematic analysis based on the global burden of disease study 2021[J]. Front Public Health, 2025, 13: 1494229. DOI: 10.3389/fpubh.2025.1494229.

[10] LAN X D, TANG Y, HUANG Z J, *et al*. Global, regional, and national burden of pressure ulcers from 1990 to 2021 and projections over the next decade: results from the 2021 GBD study[J]. Wound Repair Regen, 2025, 33(4): e70064. DOI:10.1111/wrr.70064.

[11] LI R J, YANG X N, CHEN H B, *et al*. Global, regional, and national trends in decubitus ulcer burden from 1990 to 2021 and forecasts to 2040[J]. Front Public Health, 2025, 13: 1603321. DOI:10.3389/fpubh.2025.1603321.

[12] PANG Y S, DU Y B, ZHOU W, *et al*. Trend analysis of pressure ulcers in adults 60 years and older from 1990 to 2021 using jointpoint regression and Bayesian age period cohort models[J]. Sci Rep, 2025, 15(1): 25198. DOI: 10.1038/s41598-025-11027-5.

[13] COWAN L, BRODERICK V, ALDERDEN J G. Pressure injury prevention considerations for older adults[J]. Crit Care Nurs Clin North Am, 2020, 32(4): 601-609. DOI: 10.1016/j.cnc.2020.08.009.

[14] WU W Q, LONG S J, CERDA A A, *et al*. Population ageing and sustainability of healthcare financing in China[J]. Cost Eff Resour Alloc, 2023, 21(1): 97. DOI: 10.1186/s12962-023-00505-0.

[15] Global Burden of Disease 2021 Healthcare Access and Quality Collaborators. Global burden of 288 causes of death and life expectancy decomposition in 204 countries and territories and 811 subnational locations, 1990—2021: a systematic analysis for the Global Burden of Disease Study 2021[J]. Lancet, 2024, 403(10440): 2100-2132. DOI: 10.1016/S0140-6736(24)00367-2.

[16] QIN Y H, TONG X, FAN J H, *et al*. Global burden and trends in incidence, mortality, and disability of stomach cancer from 1990 to 2017[J]. Clin Transl Gastroenterol, 2021, 12(10): e00406. DOI:10.14309/ctg.0000000000000406.

[17] RIEBLER A, HELD L. Projecting the future burden of cancer: Bayesian age-period-cohort analysis with integrated nested Laplace approximations[J]. Biom J, 2017, 59(3): 531-549. DOI:10.1002/bimj.201500263.

[18] 乔晓春. 中国人口老龄化的过去、现在和未来[J]. 社会政策研究, 2024(1): 47-63, 133. DOI:10.19506/j.cnki.cn10-1428/d.2024.01.001.
QIAO X C. Ageing in China: past, present, and future[J]. Soc Policy Res, 2024(1): 47-63, 133. DOI: 10.19506/j.cnki.cn10-1428/d.2024.01.001.

[19] GOULD L J, ALDERDEN J, ASLAM R, *et al*. WHS guidelines for the treatment of pressure ulcers-2023 update[J]. Wound Repair Regen, 2024, 32(1): 6-33. DOI: 10.1111/wrr.13130.

[20] 杜鹏, 纪竞垚. 中国长期照护政策体系建设的进展、挑战与发展方向[J]. 中国卫生政策研究, 2019, 12(1): 29-34. DOI:10.3969/j.issn.1674-2982.2019.01.004.
DU P, JI J Y. Progress, challenges and prospects of long-term care policy in China[J]. Chin J Health Policy, 2019, 12(1): 29-34. DOI:10.3969/j.issn.1674-2982.2019.01.004.

[21] LICHTERFELD-KOTTNER A, LAHMANN N, KOTTNER J. Sex-specific differences in prevention and treatment of institutional-acquired pressure ulcers in hospitals and nursing homes[J]. J Tissue Viability, 2020, 29(3): 204-210. DOI:10.1016/j.jtv.2020.05.001.

[22] 王丽敏, 陈志华, 张梅, 等. 中国老年人群慢性病患病状况和疾病负担研究[J]. 中华流行病学杂志, 2019, 40(3): 277-283. DOI: 10.3760/cma.j.issn.0254-6450.2019.03.005.
WANG L M, CHEN Z H, ZHANG M, *et al*. Study on the prevalence and burden of chronic diseases among the elderly in China[J]. Chin J Epidemiol, 2019, 40(3): 277-283. DOI:10.3760/cma.j.issn.0254-6450.2019.03.005.

[23] WU B B, GU D Z, YU J N, *et al*. Relationship between smoking and pressure injury risk: a systematic review and meta-analysis[J]. Wound Manag Prev, 2021, 67(9): 34-46.

[24] FENG Z L, LIU C, GUAN X P, *et al*. China's rapidly aging population creates policy challenges in shaping a viable long-term care system[J]. Health Aff, 2012, 31(12): 2764-2773. DOI:10.1377/hlthaff.2012.0535.

[25] WANG Q W, MA Y, CHEN J Y, *et al*. Modernizing care for older adults: long-term care policy evolution and challenges in China[J]. J Aging Soc Policy, 2025: 1-17. DOI:10.1080/08959420.2025.2482299.

[26] SEIDLER Z E, BENAKOVIC R, WILSON M J, *et al*. Approaches to engaging men during primary healthcare encounters: a scoping review[J]. Am J Mens Health, 2024, 18(2): 15579883241241090. DOI: 10.1177/15579883241241090.

[27] COURTENAY W H. Constructions of masculinity and their influence on men's well-being: a theory of gender and health[J]. Soc Sci Med, 2000, 50(10): 1385-1401. DOI: 10.1016/s0277-9536(99)00390-1.

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