



养老机构老年人口腔衰弱发生情况及影响因素分析*

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【摘要】 目的 调查养老机构老年人口腔衰弱发生情况及影响因素,为该人群口腔衰弱有效干预方案的制定提供依据。**方法** 采用口腔衰弱主客观结合测量法、一般资料调查表、休闲活动问卷、饮食多样性评分问卷、简化营养食欲问卷、微型营养评估简表、Barthel指数、简易精神状态评价量表、简易老年抑郁量表、广义焦虑障碍量表-2,对成都市3个养老机构348名老年人进行调查,分析口腔衰弱相关影响因素。**结果** 养老机构老年人口腔衰弱发生率为31.0%(108/348)。多因素logistic回归分析显示高龄[比值比(odds ratio, OR)=1.347, 95%置信区间(confidence interval, CI): 1.237~1.496, $P<0.001$]、认知障碍(OR=6.769, 95%CI: 2.628~18.916, $P<0.001$)、抑郁(OR=8.632, 95%CI: 1.931~44.387, $P=0.007$)是养老机构老年人发生口腔衰弱的风险因素,休闲活动评分高(OR=0.883, 95%CI: 0.786~0.986, $P=0.030$)、饮食多样性评分高(OR=0.199, 95%CI: 0.069~0.530, $P=0.002$)是保护老年人免于发生口腔衰弱的因素。**结论** 养老机构老年人口腔衰弱发生率较高,口腔衰弱风险因素包括高龄、认知障碍及抑郁,而提高老年人休闲活动水平和饮食多样性程度可预防口腔衰弱的发生。

【关键词】 口腔衰弱 养老机构 老年人 影响因素

Analysis of the Occurrence and Influencing Factors of Oral Frailty in Elderly Residents of Elderly Care Facilities

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【Abstract】 Objective To investigate the occurrence and influencing factors of oral frailty in elderly residents of elderly care facilities and to provide a basis for the development of effective intervention programs for oral frailty in this population. **Methods** A combination of subjective and objective measurements of oral frailty, a general information questionnaire, a leisure activity questionnaire, the Dietary Variety Score (DVS), the Short Nutritional Assessment Questionnaire (SNAQ), the Short-Form Mini Nutritional Assessment (MNA-SF), Barthel Index (BI), the Mini-Mental State Examination (MMSE), 15-Item Geriatric Depression Scale (GDS-15), and the Generalized Anxiety Disorder Scale-2 (GAD-2) were used to survey 348 elderly residents in three elderly care facilities in Chengdu and to analyze the factors related to oral frailty. **Results** The prevalence of oral frailty in elderly residents of elderly care facilities was 31.0% (108/348). Multivariate logistic regression analysis revealed that advanced age (odds ratio [OR]=1.347, 95% confidence interval [CI]: 1.237-1.496, $P<0.001$), cognitive impairment (OR=6.769, 95% CI: 2.628-18.916, $P<0.001$), and depression (OR=8.632, 95% CI: 1.931-44.387, $P=0.007$) were risk factors for oral frailty in elderly residents of elderly care facilities. High scores in leisure activities (OR=0.883, 95% CI: 0.786-0.986, $P=0.030$), and dietary diversity (OR=0.199, 95% CI: 0.069-0.530, $P=0.002$) were protective factors against oral frailty. **Conclusion** The prevalence of oral frailty is relatively high among elderly residents of elderly care facilities. Risk factors for oral frailty include advanced age, cognitive impairment, and depression, while increased levels of leisure activities and dietary diversity can help prevent the occurrence of oral frailty in elderly individuals.

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“十四五”规划指出我国已进入中度老龄化社会, 老龄危机成为当前社会亟需解决的重大问题。随着家庭规模的缩小, 家庭照护功能的弱化, 社会养老服务迅速发展^[1-2], 中国老年人的健康老龄化主战场正逐渐由家庭、社区向养老机构倾斜。口腔健康是整体健康的重要组成部分, 研究显示养老机构老年人口腔问题发生率较高, 口腔健康关注度较低^[3], 该群体口腔健康问题日益凸显。口腔衰弱是增龄导致的口腔不良状况的累积, 在预测不良健康结局方面有重要作用, 若能及时识别和干预, 可为养老机构老年人群健康老龄化实现提供新的切入点。目前国内口腔衰弱相关研究尚处于起步阶段, 研究对象多集中于社区老年人和农村地区老年人, 针对养老机构老年人的调查尚缺乏^[4-13]。本研究对我国养老机构老年人口腔衰弱现状进行观察性研究, 系统了解该人群口腔衰弱的发生率及影响因素, 旨在提升养老机构管理者、照护人员及老年群体对口腔衰弱的认知和理解, 聚焦相关风险因素, 早期制定有效、系统、实用的口腔健康管理方案, 预防口腔衰弱的发生, 促进养老机构老年人健康老龄化的实现。

1 资料与方法

1.1 研究对象

采用便利抽样的方法, 于2021年4-6月选取2个城区的3个养老机构的老年人作为研究对象。纳入标准: ①年龄 ≥ 60 周岁; ②在养老机构连续居住 ≥ 6 个月; ③知情同意并自愿参与本研究。排除标准: ①无法经口进食者; ②严重视力、听力障碍无法完成调查者; ③调查期间不在养老机构者。根据多因素分析研究样本量估算要求, 样本量为研究变量的10倍以上, 最小样本量为270例, 本研究有效调查348例。本研究经四川大学华西医院生物医学伦理委员会审查批准(2021年审279号)。

1.2 调查方法及工具

1.2.1 口腔衰弱测量方法

口腔衰弱主客观结合测量法由TANAKA等^[6]学者制定, 是目前应用最为广泛的口腔衰弱测量方法。包括4项客观指标: ①自然牙齿数量减少, < 20 颗; ②咀嚼能力下降[老年人咀嚼功能水平采用咀嚼前后口香糖(咀嚼性能评估木糖醇口香糖, 日本乐天有限公司)的红绿色差值大小表示, 口香糖红绿色值用色差计(CR-20小型色差计, 日本柯尼卡美能达)进行测定], 男性 < 14.2 , 女性 < 10.8 ; ③舌压降低[老年人舌压大小采用舌压计(TPS100舌压计, 韩国

赛博医疗有限公司)进行测量], 男性 < 27.4 kPa, 女性 < 26.5 kPa; ④舌唇运动功能减退[老年人舌唇运动功能使用口腔功能测量仪(TKK-3 351口腔功能测量仪, 日本武井科学仪器有限公司)进行测量], 男性 < 5.2 次/s, 女性 < 5.4 次/s。2项主观指标: ①主观感知咀嚼困难, 对问题“与6个月前相比, 您吃较坚硬的食物是否比较困难?”回答“是”; ②主观感知吞咽困难, 对问题“您是否有喝茶或汤时呛咳的情况?”回答“是”。6项指标中3项及以上指标阳性则存在口腔衰弱^[14]。

1.2.2 一般资料调查表

由研究者自行设计, 内容包括调查对象年龄、性别、体质量指数(body mass index, BMI)、文化程度、婚姻状况、户口类型、年收入水平、吸烟情况、饮酒情况、患病情况(高血压、糖尿病、视力障碍、听力障碍、帕金森病)、多病共存、服药数量、社交状况、独自进食情况、牙科检查情况。

1.2.3 休闲活动问卷

该问卷由高洁^[15]编制, 用于评估养老机构老年人休闲活动情况。共包括看电视/听广播/听戏、阅读书籍/报纸/杂志、唱歌/乐器演奏、书法/绘画、打牌/打麻将/下棋、与其他老人聊家常、身体锻炼活动、参加宗教信仰社会活动及个人户外活动等9类休闲活动, 9类活动采用李克特五级评分法进行评分, 1~5分, 分别为不参加、不是每月但有时、不是每周但每月 ≥ 1 次、不是每天但每周 ≥ 1 次、几乎每天, 总分范围为9~45分。得分越高, 老年人参与休闲活动的积极性越高。该问卷参考中国老年健康影响因素跟踪调查(Chinese Longitudinal Healthy Longevity Survey, CLHLS)编制, 涵盖了养老机构老年人在日常生活中所参与的绝大部分的休闲活动, 并且容易让老年人理解。

1.2.4 饮食多样性评分问卷

饮食多样性评分问卷(The Dietary Variety Score, DVS)由KUMAGAI等^[16]编制, 包括鱼/贝类、鸡蛋、牛奶、大豆/大豆制品、绿色/黄色蔬菜等10种食物, 每种食物若为每天摄入则计“1”分, 若非每天摄入则计“0”分, 总分范围为0~10分, 根据得分可划分为3个等级: 饮食多样性低(0~2分)、中等饮食多样性(3~5分)和饮食多样性高(≥ 6 分)。

1.2.5 简化营养食欲问卷

简化营养食欲问卷(Short Nutritional Assessment Questionnaire, SNAQ)量表由WILSON等^[17]编制, 包括食欲情况、进餐及饱腹情况、食物口味和平均每天进餐次

数4项,每项分为5个等级,依次赋值1~5分,总分范围为4~20分,得分 ≤ 14 分的老年人被定义为食欲下降,该量表在中国老年人群中克隆巴赫系数为0.658^[18]。

1.2.6 微型营养评估简表

微型营养评估简表(Short-Form Mini Nutritional Assessment, MNA-SF)由GUIGOZ等^[19]编制,包括3个月内食量变化情况、体质量变化情况、活动情况、应激或急性疾病情况、神经精神疾病情况和小腿围/BMI数值等6个方面,总分范围为0~14分,根据得分可分为3个等级:营养不良(0~7分)、有营养不良的风险(8~11分)和正常营养状态(12~14分)。MNA-SF量表的准确度为87.5%,敏感度为85.7%,特异度为96.0%,MNA-SF操作简便,适用于养老机构老年人营养状况筛查^[20-21]。

1.2.7 Barthel指数

Barthel指数(Barthel index, BI)量表由MAHONEY等^[22]编制,包括进食、洗澡、修饰、穿衣、控制大便、控制小便、如厕、床椅转移、平地行走及上下楼梯等10个项目,总分范围为0~100分,根据得分划分为4个等级:自理能力完好(100分)、自理能力轻度受损(61~99分)、自理能力中度受损(41~60分)和自理能力重度受损(0~40分)。中文版Barthel指数量表的克隆巴赫系数为0.916,且具有较好的结构效度和预测效度^[23]。

1.2.8 简易精神状态评价量表

简易精神状态评价量表(Mini-Mental State Examination, MMSE)由FOLSTEIN等^[24]编制,包括定向力、记忆力、注意力和计算力、回忆力、命名、复述、阅读、三步指令、书写、结构能力等维度,总分范围为0~30分,不同教育程度的人被判定为“认知功能障碍”的临界值为:文盲 ≤ 22 分,小学 ≤ 23 分,中学 ≤ 24 分,大学 ≤ 26 分^[25]。该量表克隆巴赫系数为0.89,适用于我国老年人群^[26]。

1.2.9 简易老年抑郁量表

简易老年抑郁量表(15-item geriatric depression scale, GDS-15)由YESAVAGE和SHEIKH^[27]在老年抑郁量表的基础上简化而来,包括15个条目,若最近一周符合条目所描述的情况则计“1”分,否则计“0”分,其中1、5、7、11、13为反向条目,总分范围为0~15分,得分为5分及以上的老年人被定义为抑郁^[28],得分越高,表示抑郁状态越严重。该量表的灵敏度为72.0%~97.0%,特异度为65.0%~95.0%^[29],本研究采用的中文版量表在中国老年人群中的克隆巴赫系数为0.793,重测信度为0.728^[30]。

1.2.10 广义焦虑障碍量表-2

广义焦虑障碍量表-2(generalized anxiety disorder scale-2, GAD-2)由WILD等^[31]在美国老年人群中进行验

证,包括两个核心症状:过去两周感到紧张、焦虑或不安和过去两周控制不住的担心,总分为0~6分,得分为3分及以上的老年人被定义为焦虑^[32-33]。该量表在中国人群中的敏感度为0.865,特异度为0.980^[33]。

1.3 资料收集

调查小组由1名护理研究生和2名公共卫生本科生组成。问卷调查内容由3名调查员共同完成,口腔衰弱测量由护理研究生1人全部完成,保证口腔衰弱测量结果的一致性。调查前对所有调查员进行统一培训、统一指导,以保证调查中的准确性。口腔衰弱测量仪器的使用方法由相应仪器厂家专门培训,调查员熟练掌握后方进行调查。调查前向老年人说明调查目的和意义,征得老年人同意并签署知情同意后,调查员将问卷内容逐一口述,根据回答协助老年人填写问卷,每份问卷平均完成时间为25~30 min。所有问卷均在现场发放并回收,逐一编码,采用epidata软件录入,确保资料准确。共发放问卷355份,回收有效问卷348份,有效回收率为98.0%。

1.4 统计学方法

本研究所有数据分析过程均在R-4.2.2环境下完成,使用“tableone”程序包进行数据描述,符合正态分布的计量资料以均数和标准差表示,采用 t 检验,非正态分布的计量资料以中位数和四分位数表示,采用Mann-Whitney U 检验;分类变量以频数和百分比表示,采用卡方检验;使用“corrplot”包进行相关性分析及可视化;使用“stats”包进行logistic回归分析和逐步回归分析,采用向后逐步剔除法筛选建立logistic回归模型;使用“forestploter”包绘制森林图。 $\alpha=0.05$ 。

2 结果

2.1 养老机构老年人一般特征

348例调查对象中,口腔衰弱108例(31.0%),平均年龄(77.11 \pm 9.65)岁,其中男性179例(51.4%),BMI为(22.99 \pm 3.58) kg/m²,文盲及小学学历者占比超50%,绝大部分无伴侣(85.1%),户口类型以城镇户口居多(79.3%),大部分年收入水平低于居民年平均消费水平(74.4%),目前仍吸烟(8.3%)和饮酒(11.2%)的较少,多病共存者241例(69.3%),服药5种及以上者139例(39.9%),休闲活动评分为(26.74 \pm 4.90)分,饮食多样性评分中等及以上者211例(60.7%),食欲下降者151例(43.4%),无营养不良者175例(50.3%),自理能力完好者180例(51.7%),有认知障碍者114例(32.8%),较少老年人存在抑郁症状(16.7%)或焦虑症状(7.8%),过去2年内从未接受过牙科检查者212例(60.9%)。

2.2 养老机构老年人口腔衰弱发生风险与其他因素的相关性分析

计算Spearman相关性系数以及相关系数的显著性(P值),探究不同影响因素与口腔衰弱之间的相关性强

弱,并以相关系数热图的形式进行可视化呈现。结果显示,年龄与口腔衰弱正相关系数最大($r=0.670, P<0.001$),休闲活动与口腔衰弱负相关系数最大($r=-0.426, P<0.001$)。见图1。

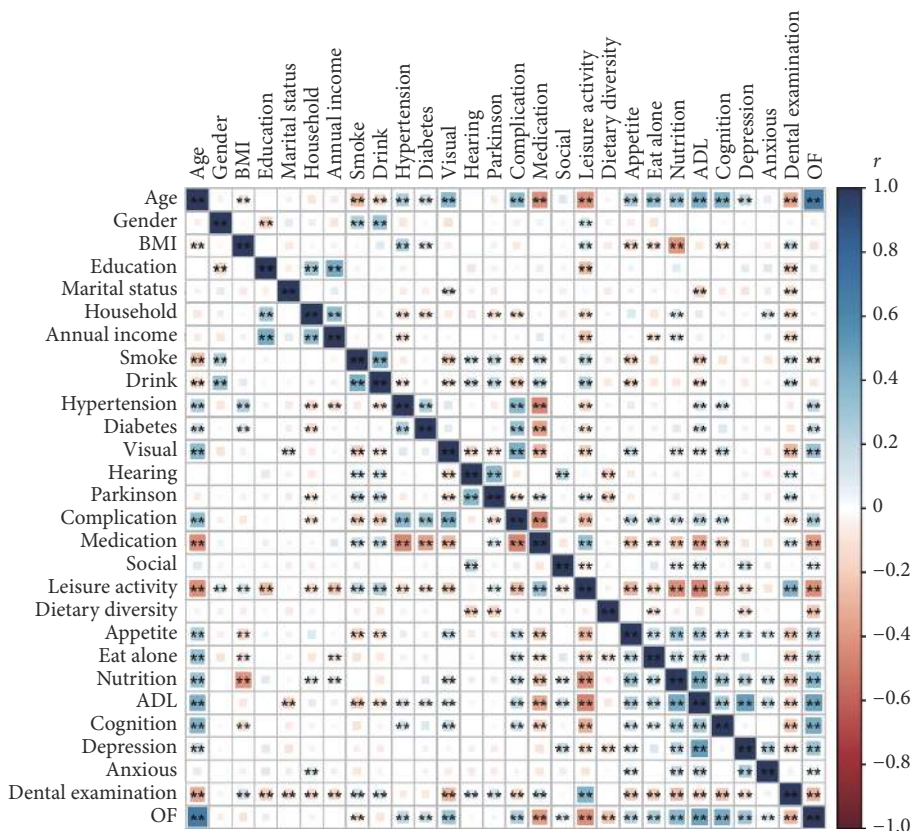


图 1 相关性热图

Fig 1 Correlation heatmap

BMI: body mass index; ADL: activities of daily living; OF: oral frailty. Blue represents positive correlation and red represents negative correlation, the darker the color the stronger the correlation. Significant correlations are indicated by **.

2.3 养老机构老年人口腔衰弱发生风险的单因素分析

年龄、高血压、糖尿病、视力情况、多病共存、服药数量、休闲活动评分、饮食多样性评分、食欲状况、独自进食情况、营养状况、生活自理能力、认知状况、抑郁状况和牙科检查情况是影响养老机构老年人口腔衰弱发生的因素($P<0.05$)。见表1。

2.4 养老机构老年人口腔衰弱发生风险的多因素分析

经向后逐步剔除法筛选建立的logistic回归模型分析得,高龄[比值比(odds ratio, OR)= 1.347, 95%置信区间(confidence interval, CI): 1.237 ~ 1.496, $P<0.001$]、认知障碍($OR=6.769, 95\%CI: 2.628 \sim 18.916, P<0.001$)、抑郁($OR=8.632, 95\%CI: 1.931 \sim 44.387, P=0.007$)是养老机构老年人发生口腔衰弱的风险因素,休闲活动评分高($OR=0.883, 95\%CI: 0.786 \sim 0.986, P=0.030$)、饮食多样性评分高($OR=0.199, 95\%CI: 0.069 \sim 0.530, P=0.002$)是保

护老年人免于发生口腔衰弱的因素。见表2、图2。

3 讨论

本研究中,348名养老机构老年人中有108人存在口腔衰弱,发生率为31.0%。与HILTUNEN等^[10](17.8%)、PURANEN等^[11](18.0%)、JULKUNEN等^[12](53.0%)和焦凌梅等^[13](25.19%)在长期照护机构和养老院中开展的研究结果相比存在一定的差异性,分析原因,主要与测量方法的差异性有关。目前口腔衰弱诊断方法尚无共识^[11],国外学者提出的口腔衰弱测量方法,主要包括口腔衰弱主客观结合测量法^[6]、口腔衰弱六指标评估法^[10]、口腔衰弱指数-5^[34]、口腔衰弱指数-8^[35]、口腔和颌面衰弱指数^[36]、口腔衰弱问卷^[37]等。国内学者陈宗梅等^[38]对口腔衰弱指数-8进行了汉化,国内尚未见本土化测量方法及工具的报道。目前最常用的测量工具和方法为口腔衰弱指数-8和

表 1 养老机构老年人口腔衰弱发生风险的单因素分析

Table 1 Univariate analysis of risk factors for oral frailty in elderly residents of elderly care facilities

Factor	Non-OF group (n=240)	OF group (n=108)	P
Age/yr., mean (standard deviation)	72.80 (7.70)	86.69 (5.96)	<0.001
Man/case (%)	127 (52.9)	52 (48.1)	0.479
Body mass index/(kg/m ²), mean (standard deviation)	23.23 (3.28)	22.47 (4.14)	0.069
Education attainment/case (%)			0.532
Illiteracy	60 (25.0)	22 (20.4)	
Primary school	77 (32.1)	31 (28.7)	
Secondary school	45 (18.8)	26 (24.1)	
College	58 (24.2)	29 (26.9)	
Single/case (%)	205 (85.4)	91 (84.3)	0.906
Rural household/case (%)	52 (21.7)	20 (18.5)	0.598
High level of annual income/case (%)	61 (25.4)	28 (25.9)	1.000
Smoking/case (%)	25 (10.4)	4 (3.7)	0.059
Drinking/case (%)	31 (12.9)	8 (7.4)	0.186
Hypertension/case (%)	93 (38.8)	66 (61.1)	<0.001
Diabetes mellitus/case (%)	48 (20.0)	38 (35.2)	0.004
Visual impairment/case (%)	133 (55.4)	95 (88.0)	<0.001
Hearing impairment/case (%)	27 (11.2)	14 (13.0)	0.780
Parkinson's disease/case (%)	10 (4.2)	6 (5.6)	0.767
Complication/case (%)	147 (61.3)	94 (87.0)	<0.001
Medications/case (%)			<0.001
Medication=0	13 (5.4)	21 (19.4)	
Medication=1	26 (10.8)	32 (29.6)	
Medication=2	34 (14.2)	22 (20.4)	
Medication=3	45 (18.8)	16 (14.8)	
Medication=4	56 (23.3)	7 (6.5)	
Medication ≥ 5	66 (27.5)	10 (9.3)	
Socially isolated/case (%)	5 (2.1)	7 (6.5)	0.078
Leisure activities score (mean [standard deviation])	28.18 (4.00)	23.56 (5.24)	<0.001
Dietary diversity/case (%)			<0.001
Low	75 (31.3)	62 (57.4)	
Medium	38 (15.8)	12 (11.1)	
High	127 (52.9)	34 (31.5)	
Poor appetite/case (%)	86 (35.8)	65 (60.2)	<0.001
Eat alone/case (%)	23 (9.6)	32 (29.6)	<0.001
Nutrition status/case (%)			<0.001
Normal nutritional status	145 (60.4)	30 (27.8)	
At risk of malnutrition	82 (34.2)	40 (37.0)	
Malnourishment	13 (5.4)	38 (35.2)	
Activities of daily living/case (%)			<0.001
Complete self-care ability	157 (65.4)	23 (21.3)	
Slightly impaired self-care ability	48 (20.0)	31 (28.7)	
Moderate impairment self-care ability	31 (12.9)	18 (16.7)	
Severely impaired self-care ability	4 (1.7)	36 (33.3)	
Cognitive impairment/case (%)	46 (19.2)	68 (63.0)	<0.001
Depression/case (%)	22 (9.2)	36 (33.3)	<0.001
Anxiety/case (%)	14 (5.8)	13 (12.0)	0.074
Dental checks (last 2 years)/case (%)			<0.001
Never	125 (52.1)	87 (80.6)	
1-2 times	81 (33.8)	19 (17.6)	
≥ 3 times	34 (14.2)	2 (1.9)	

表 2 养老机构老年人口腔衰弱发生风险的多因素分析 (n=348)

Table 2 Multivariate logistic regression analysis results of risk factors for oral frailty in elderly residents of elderly care facilities (n=348)

Factor	Beta	SE	Wald	OR (95% CI)	P
Intercept	-23.392	3.993	28.969	0 (0-0)	<0.001
Age	0.298	0.053	38.577	1.347 (1.237-1.496)	<0.001
Education attainment					
Primary school (2)	-0.746	0.642	1.32	0.474 (0.128-1.670)	0.251
Secondary school (3)	1.142	0.644	3.341	3.134 (0.941-11.083)	0.068
College (4)	0.536	0.752	0.524	1.709 (0.400-7.463)	0.469
Hypertension	0.703	0.49	2.167	2.019 (0.799-5.273)	0.141
Visual impairment	1.055	0.62	3.226	2.873 (0.944-9.677)	0.072
Leisure activities score	-0.125	0.057	4.693	0.883 (0.786-0.986)	0.030
Dietary diversity					
Medium (2)	-1.291	0.804	2.423	0.275 (0.050-1.330)	0.120
High (3)	-1.616	0.501	9.787	0.199 (0.069-0.530)	0.002
Activities of daily living					
Slightly impaired self-care ability (2)	-0.293	0.585	0.246	0.746 (0.228-2.347)	0.620
Moderately impaired self-care ability (3)	-0.579	0.724	0.618	0.560 (0.126-2.316)	0.432
Severely impaired self-care ability (4)	1.865	1.079	3.675	6.456 (1.086-53.534)	0.055
Cognitive impairment	1.912	0.524	14.658	6.769 (2.628-18.916)	<0.001
Depression	2.155	0.835	7.384	8.632 (1.931-44.387)	0.007

SE: standard error; OR: odds ratio; CI: confidence interval. AIC=167.38, R²=0.80.

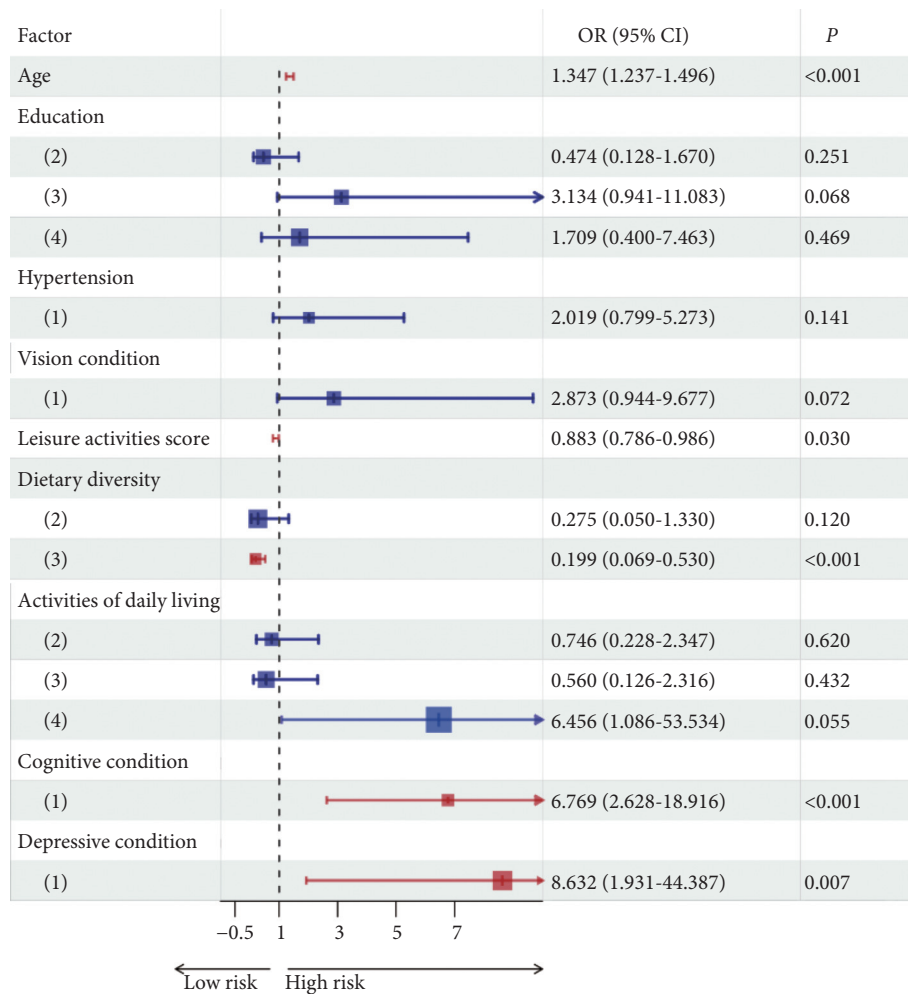


图 2 Logistic回归分析结果森林图

Fig 2 Forest plot of logistic regression analysis results

口腔衰弱主客观结合测量法。其中口腔衰弱指数-8因国内学者汉化推广,在国内研究中广泛使用^[8,13,39-40],具有条目简单,便于快速高效大样本筛查等优势。口腔衰弱主客观结合测量法在国外研究中使用最多,最为广泛,评价结果能够很好地预测不良结局,本研究采用了此测量方法。由于国家、民族等的差异,其他国家开发的量表或设定的测量指标阈值是否适用于我国老年人,尚有待进一步的探究和阐明,测量工具是帮助老年人和临床医护人员识别口腔衰弱和进一步研究的基础,因此,未来亟须开发我国本土化的老年人口腔衰弱测量工具和诊断标准。

本研究发现,年龄越大的老年人发生口腔衰弱的风险越高($OR=1.347, P<0.001$)。此研究结果与之前研究中报告的结果一致,HIRONAKA等^[41]报道年龄与口腔衰弱显著相关($OR=1.075, P<0.001$),年龄越大,口腔衰弱患病率越高。HIHARA等^[42]研究指出老年人口腔衰弱问卷得分与年龄呈正相关, ≥ 85 岁年龄组得分显著高于65~69岁年龄组($P<0.001$)和70~74岁年龄组($P<0.001$)。除此之外,KUGIMIYA等^[43]、TANAKA等^[6]、HU等^[44]、焦玲梅等^[13]、王琳等^[39]、屠杭佳等^[40]学者也有报告相似的结果。唾液分泌是由正常咀嚼功能引起的,随着年龄增长,老年人咀嚼效率下降,导致唾液腺萎缩,唾液合成和分泌减少,使口腔自净能力和口腔抵抗力下降,从而增加口腔衰弱发生风险^[39]。同时既往研究指出老年人口腔健康素养会随年龄的增长逐渐降低^[45],而口腔健康素养低下与更严重的牙周炎、较高的牙菌斑指数和更严重的牙齿脱落情况密切相关^[46],这可能也是高龄老年人更易发生口腔衰弱的另一原因。

研究表明存在认知障碍的老年人发生口腔衰弱的风险更高($OR=6.769, P<0.001$)。此研究结果与既往研究结果一致^[11,47-49]。认知障碍与口腔衰弱可能存在双向关联。首先,有口腔衰弱老年人存在咀嚼功能下降的表现,咀嚼肌和口周肌力量减弱会导致咀嚼效率降低,可通过降低信号传导导致相应脑区受损,降低脑血流量引起大脑功能损伤,引发慢性氧化应激反应损伤海马,引起锥体细胞减少^[50]等途径引发认知障碍^[51]。其次,存在认知功能受损的老年人,常常忽视或遗忘口腔清洁,也存在规律寻求高质量牙科护理的障碍^[48],导致较高的口腔细菌负荷和炎症水平,较高的口腔内细菌负荷一方面增加了蛀牙和牙齿脱落的风险^[52],增加口腔衰弱风险;另一方面,口腔微生物群或炎症因子可能通过循环或神经通路进入大脑来增加阿尔茨海默病等的患病风险^[53-54],形成恶性循环。此外,口腔衰弱的老年人自然牙齿数量更少,限制食物选择,造成营养不良,营养不良也是认知障碍公认的危

险因素之一^[49]。因而认知障碍和口腔衰弱之间可能是相互影响、互为因果的关系。

本研究发现,存在抑郁的老年人发生口腔衰弱的风险更高($OR=8.632, P=0.007$)。此研究结果与HU等^[44]结果一致,该研究指出存在抑郁症状的老年人发生口腔衰弱的风险增加4.89倍。既往研究指出,抑郁症状与吞咽障碍、牙齿缺失等口腔衰弱症状密切相关^[55-57]。此外,药物性口干是抗抑郁药物的常见副作用,口干会导致口腔自洁力下降,口腔卫生状况更差,口腔卫生不良是牙周炎的常见危险因素,严重的牙周炎是导致老年人牙齿脱落的常见原因,因此,存在抑郁症状尤其是需要服用抗抑郁药物的老年人发生口腔衰弱的风险更高^[58]。

本研究发现,休闲活动评分越高的老年人发生口腔衰弱的风险越低($OR=0.883, P=0.030$)。在本研究中,休闲活动包括打牌、下棋、与其他老年人聊天等社交活动,得分越高,表明老年人的社会参与程度越高。HIRONAKA等^[41]研究指出社交衰弱是口腔衰弱的风险因素,其认为社交衰弱可能引起口腔健康素养的降低,使老年人健康护理和自我管理的能力下降,进而导致龋齿、牙周炎等口腔疾病的恶化,增加口腔衰弱的发生风险。休闲活动与口腔衰弱之间可能存在双向影响。一方面,休闲活动参与状况通过影响老年人的认知状况,间接影响口腔衰弱发生状况。社会孤立、社会脱节与整体认知功能存在正相关关系^[59],休闲活动越频繁,社交网络越发达,老年人发生认知障碍的可能性就越低,从而降低老年人口腔衰弱发生风险。同时,休闲活动参与情况可直接影响口腔功能,参加休闲活动更频繁的老年人,沟通交流更多,口腔肌群活动更频繁,可以预防口腔功能的下降^[60],降低口腔衰弱发生风险。另一方面,严重的口腔功能障碍会限制老年人的休闲活动参与,如严重的牙齿脱落会导致面部畸形,影响语言、社会形象和自尊,限制老年人的社会互动和社会参与^[61-62],从而影响休闲活动状况^[63]。可见,休闲活动情况与口腔衰弱之间可能存在着相互作用的影响关系。

本研究亦发现,饮食多样性高的老年人与饮食多样性低的老年人相比,发生口腔衰弱的风险更低($OR=0.199, P<0.001$);中等饮食多样性的老年人与饮食多样性低的老年人相比,发生口腔衰弱的风险无显著差异。此结果与HOSHINO等^[64]报道一致。食物摄入的种类会影响老年人口腔健康状况,OHARA等^[5]研究发现,饮食中牛奶($P=0.033$)和绿叶蔬菜($P<0.001$)的摄入量与口腔衰弱的程度显著相关。牛奶和绿叶蔬菜的摄入减少,导致相应的钙、维生素B、维生素C、维生素E、 β -胡萝卜素等矿物质和维生素缺乏,增加了老年人罹患牙周疾病的风险,

牙齿更容易脱落,从而增加其口腔衰弱发生风险^[65]。同时,口腔衰弱的存在也会影响老年人对食物种类的选择,国内外学者^[64, 66-67]研究发现,有口腔衰弱症状的老年人由于牙齿数量减少、咀嚼困难等,更倾向于增加软的、能量密度更高的食物的摄入,减少硬食物(某些水果、钙和蛋白质)的摄入,进一步降低了老年人饮食的多样性。

综上,养老机构老年人口腔衰弱发生率较高,高龄、抑郁和认知障碍是养老机构老年人发生口腔衰弱的风险因素,休闲活动丰富和饮食多样性程度高可保护养老机构老年人减轻口腔衰弱,研究结果可为养老机构老年人口腔衰弱防治策略的制定提供一定的参考,但以上三个风险因素和两个保护因素对口腔衰弱发生的影响程度和作用路径仍需进一步地探究。目前国内尚无统一的口腔衰弱测量工具和方法,大部分研究采用口腔衰弱指数-8进行测量,虽方便快捷但仅可用于筛查,本研究采用主客观结合测量法进行口腔衰弱的测量,对口腔衰弱的诊断更为准确,建议今后可继续尝试开发我国本土化口腔衰弱测评量表及诊断方法,为口腔衰弱相关科学研究在我国的深耕开路。

* * *

作者贡献声明 韦靖怡负责论文构思、数据审编、正式分析、调查研究、研究方法、初稿写作和审读与编辑写作,赵秋艳负责经费获取、监督指导和审读与编辑写作,黄维负责数据审编、正式分析和审读与编辑写作,刘星负责经费获取和审读与编辑写作,张雪梅负责论文构思、经费获取、研究方法、研究项目管理、提供资源、监督指导和审读与编辑写作。所有作者已经同意将文章提交给本刊,且对将要发表的版本进行最终定稿,并同意对工作的所有方面负责。

Author Contribution WEI Jingyi is responsible for conceptualization, data curation, formal analysis, investigation, methodology, writing--original draft, and writing--review and editing. ZHAO Qiuyan is responsible for funding acquisition, supervision, and writing--review and editing. HUANG Wei is responsible for data curation, formal analysis, and writing--review and editing. LIU Xing is responsible for funding acquisition and writing--review and editing. ZHANG Xuemei is responsible for conceptualization, funding acquisition, methodology, project administration, resources, supervision, and writing--review and editing. All authors consented to the submission of the article to the Journal. All authors approved the final version to be published and agreed to take responsibility for all aspects of the work.

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参 考 文 献

- [1] 中华人民共和国民政部. 2016年社会服务发展统计公报 (2017-08-03)[2024-02-25]. <http://www.mca.gov.cn/article/sj/tjgb/201708/20170815005382.shtml>.
- [2] 中华人民共和国民政部. 2022年民政事业发展统计公报 (2023-10-13)[2024-02-25]. <https://www.mca.gov.cn/n156/n2679/c166200499979995221/attr/306352.pdf>.
- [3] 常乐,徐静晨,王翔宇,等. 太原市养老机构老年人口腔健康状况的调查分析. *华西口腔医学杂志*, 2021, 39(2): 175-181. doi: 10.7518/hxkq.2021.02.008.
- [4] 刘雪莲,张雪梅. 老年人口腔衰弱与衰弱的相关性研究进展. *四川医学*, 2021, 42(8): 851-854. doi: 10.16252/j.cnki.issn1004-0501-2021.08.020.
- [5] OHARA Y, MOTOKAWA K, WATANABE Y, *et al.* Association of eating alone with oral frailty among community-dwelling older adults in Japan. *Arch Gerontol Geriatr*, 2020, 87: 104014. doi: 10.1016/j.archger.2020.104014.
- [6] TANAKA T, TAKAHASHI K, HIRANO H, *et al.* Oral frailty as a risk factor for physical frailty and mortality in community-dwelling elderly. *J Gerontol A Biol Sci Med Sci*, 2018, 73(12): 1661-1667. doi: 10.1093/gerona/glx225.
- [7] NISHIMOTO M, TANAKA T, TAKAHASHI K, *et al.* Oral frailty is associated with food satisfaction in community-dwelling older adults. *Nihon Ronen Igakkai Zasshi*, 2020, 57(3): 273-281. doi: 10.3143/geriatrics.57.273.
- [8] 唐吉,唐小艳,曾黎,等. 贵州省农村地区老年人口腔衰弱的流行现状及影响因素分析. *中国慢性病预防与控制*, 2023, 31(5): 327-331. doi: 10.16386/j.cjpcd.issn.1004-6194.2023.05.002.
- [9] 陶阳,郭洪花,伊焕英,等. 老年人口腔衰弱与身体衰弱的相关性分析. *中国慢性病预防与控制*, 2022, 30(12): 957-960. doi: 10.16386/j.cjpcd.issn.1004-6194.2022.12.017.
- [10] TAO Y, GUO H H, YI H Y, *et al.* Correlation analysis between oral frailty and physical frailty in elderly people. *Chin J Prev Control Chronic Non-Commun Dis*, 2022, 30(12): 957-960. doi: 10.16386/j.cjpcd.issn.1004-6194.2022.12.017.
- [11] HILTUNEN K, SAARELA R K T, KAUTIAINEN H, *et al.* Relationship

- between Fried's frailty phenotype and oral frailty in long-term care residents. *Age Ageing*, 2021, 50(6): 2133–2139. doi: [10.1093/ageing/afab177](https://doi.org/10.1093/ageing/afab177).
- [11] PURANEN T, HILTUNEN K, KAUTIAINEN H, *et al.* Relationship between oral frailty, health-related quality of life, and survival among long-term care residents. *Eur Geriatr Med*, 2023, 14(6): 1307–1315. doi: [10.1007/s41999-023-00859-x](https://doi.org/10.1007/s41999-023-00859-x).
- [12] JULKUNEN L, SAARELA R, ROITTO H M, *et al.* Oral frailty among dentate and edentate older adults in long-term care. *BMC Geriatr*, 2024, 24(1): 48. doi: [10.1186/s12877-023-04605-7](https://doi.org/10.1186/s12877-023-04605-7).
- [13] 焦凌梅, 李文, 李萍, 等. 机构养老者口腔衰弱现状及影响因素研究. *中国老年保健医学*, 2023, 21(6): 47–50. doi: [10.3969/j.issn.1672-2671.2023.06.009](https://doi.org/10.3969/j.issn.1672-2671.2023.06.009).
- JIAO L M, LI W, LI P, *et al.* Research on the current situation and influencing factors of oral frailty among the elderly in nursing home institutions. *Chin J Geriatr Care*, 2023, 21(6): 47–50. doi: [10.3969/j.issn.1672-2671.2023.06.009](https://doi.org/10.3969/j.issn.1672-2671.2023.06.009).
- [14] 韦靖怡, 王玲玲, 张雪梅. 老年人口腔衰弱与营养不良相关性的研究进展. *四川医学*, 2021, 42(7): 737–740. doi: [10.16252/j.cnki.issn1004-0501-2021.07.018](https://doi.org/10.16252/j.cnki.issn1004-0501-2021.07.018).
- WEI J Y, WANG L L, ZHANG X M. Research progress on the correlation between oral frailty and malnutrition in the elderly. *Sichuan Med J*, 2021, 42(7): 737–740. doi: [10.16252/j.cnki.issn1004-0501-2021.07.018](https://doi.org/10.16252/j.cnki.issn1004-0501-2021.07.018).
- [15] 高洁. 养老机构老年人生活质量及其影响因素研究. 青岛: 山东大学, 2017.
- GAO J. Research on the Quality of Life of the Elderly in Nursing Home Institutions and Its Influencing Factors. Qingdao: Shandong University, 2017.
- [16] KUMAGAI S, WATANABE S, SHIBATA H, *et al.* Effects of dietary variety on declines in high-level functional capacity in elderly people living in a community. *Jpn J Public Health*, 2003, 50(12): 1117–1124.
- [17] WILSON M M, THOMAS D R, RUBENSTEIN L Z, *et al.* Appetite assessment: simple appetite questionnaire predicts weight loss in community-dwelling adults and nursing home residents. *Am J Clin Nutr*, 2005, 82(5): 1074–1081. doi: [10.1093/ajcn/82.5.1074](https://doi.org/10.1093/ajcn/82.5.1074).
- [18] 孔令燕, 巢健茜, 胡婕, 等. 南京市社区老年人营养不良和减重风险对生命质量的影响. *环境与职业医学*, 2019, 36(9): 841–846. doi: [10.13213/j.cnki.jeom.2019.19117](https://doi.org/10.13213/j.cnki.jeom.2019.19117).
- SUN L Y, CHAO J Q, HU J, *et al.* Effects of malnutrition and weight loss risk on quality of life of elderly group in Nanjing communities. *J Environ Occupational Med*, 2019, 36(9): 841–846. doi: [10.13213/j.cnki.jeom.2019.19117](https://doi.org/10.13213/j.cnki.jeom.2019.19117).
- [19] GUIGOZ Y, LAUQUE S, VELLAS B J. Identifying the elderly at risk for malnutrition. The mini nutritional assessment. *Clin Geriatr Med*, 2002, 18(4): 737–757. doi: [10.1016/s0749-0690\(02\)00059-9](https://doi.org/10.1016/s0749-0690(02)00059-9).
- [20] RUBENSTEIN L Z, HARKER J O, SALVÀ A, *et al.* Screening for undernutrition in geriatric practice: developing the short-form mini-nutritional assessment (MNA-SF). *J Gerontol A Biol Sci Med Sci*, 2001, 56(6): M366–372. doi: [10.1093/gerona/56.6.m366](https://doi.org/10.1093/gerona/56.6.m366).
- [21] MONTEJANO LOZOYA R, MARTÍNEZ-ALZAMORA N, CLEMENTE MARÍN G, *et al.* Predictive ability of the mini nutritional assessment short form (MNA-SF) in a free-living elderly population: a cross-sectional study. *PeerJ*, 2017, 5: e3345. doi: [10.7717/peerj.3345](https://doi.org/10.7717/peerj.3345).
- [22] MAHONEY F I. Functional evaluation: the Barthel index. *Md State Med J*, 1965, 14(2): 61–65.
- [23] 侯东哲, 张颖, 巫嘉陵, 等. 中文版Barthel指数的信度与效度研究. *临床荟萃*, 2012, 27(3): 219–221. doi: [10.3760/cma.j.issn.0254-1424.2012.05.013](https://doi.org/10.3760/cma.j.issn.0254-1424.2012.05.013).
- HOU D Z, ZHANG Y, WU J X, *et al.* Study on reliability and validity of Chinese version of Barthel Index. *Clin Focus*, 2012, 27(3): 219–221. doi: [10.3760/cma.j.issn.0254-1424.2012.05.013](https://doi.org/10.3760/cma.j.issn.0254-1424.2012.05.013).
- [24] FOLSTEIN M F, FOLSTEIN S E, MCHUGH P R. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatric Res*, 1975, 12(3): 189–198. doi: [10.1016/0022-3956\(75\)90026-6](https://doi.org/10.1016/0022-3956(75)90026-6).
- [25] 田金洲, 解恒革, 秦斌, 等. 中国简短认知测试在痴呆诊断中的应用指南. *中华医学杂志*, 2016, 96(37): 15. doi: [10.3760/cma.j.issn.0376-2491.2016.37.001](https://doi.org/10.3760/cma.j.issn.0376-2491.2016.37.001).
- TIAN J Z, YU B C, ZHANG S Z, *et al.* Guidelines for the application of Chinese short cognitive test in the diagnosis of dementia. *Natl Med J China*, 2016, 96(37): 15. doi: [10.3760/cma.j.issn.0376-2491.2016.37.001](https://doi.org/10.3760/cma.j.issn.0376-2491.2016.37.001).
- [26] 丁华, 王堃, 赵忻怡, 等. 老年人认知功能状况的相关因素. *中国心理卫生杂志*, 2022, 36(3): 197–203. doi: [10.3969/j.issn.1000-6729.2022.03.003](https://doi.org/10.3969/j.issn.1000-6729.2022.03.003).
- DING H, WANG K, ZHAO X Y, *et al.* Cognitive function status and related factors among older adults. *Chin Ment Health J*, 2022, 36(3): 197–203. doi: [10.3969/j.issn.1000-6729.2022.03.003](https://doi.org/10.3969/j.issn.1000-6729.2022.03.003).
- [27] YESAVAGE J A, SHEIKH J I. Geriatric depression scale (GDS) recent evidence and development of a shorter version. *Clin Gerontol*, 1986, 5(1/2): 165–173. doi: [10.1300/J018v05n01_09](https://doi.org/10.1300/J018v05n01_09).
- [28] BOEY K W. The use of GDS-15 among the older adults in Beijing. *Clin Gerontologist*, 2000, 21(2): 49–60. doi: [10.1300/J018v21n02_05](https://doi.org/10.1300/J018v21n02_05).
- [29] NYUNT M S, FONES C, NITI M, *et al.* Criterion-based validity and reliability of the geriatric depression screening scale (GDS-15) in a large validation sample of community-living Asian older adults. *Aging Ment Health*, 2009, 13(3): 376–382. doi: [10.1080/13607860902861027](https://doi.org/10.1080/13607860902861027).
- [30] 唐丹. 简版老年抑郁量表(GDS-15)在中国老年人中的使用. *中国临床心理学杂志*, 2013, 21(3): 402–405. doi: [10.16128/j.cnki.1005-3611.2013.03.036](https://doi.org/10.16128/j.cnki.1005-3611.2013.03.036).
- TANG D. Application of short form geriatric depression scale (GDS-15) in Chinese elderly. *Chin J Clin Psychology*, 2013, 21(3): 402–405. doi: [10.16128/j.cnki.1005-3611.2013.03.036](https://doi.org/10.16128/j.cnki.1005-3611.2013.03.036).
- [31] WILD B, ECKL A, HERZOG W, *et al.* Assessing generalized anxiety disorder in elderly people using the GAD-7 and GAD-2 scales: results of a validation study. *Am J Geriatr Psychiatry*, 2014, 22(10): 1029–1038. doi: [10.1016/j.jagp.2013.01.076](https://doi.org/10.1016/j.jagp.2013.01.076).
- [32] DONKER T, Van STRATEN A, MARKS I, *et al.* Quick and easy self-rating of generalized anxiety disorder: validity of the Dutch web-based GAD-7, GAD-2 and GAD-SI. *Psychiatry Res*, 2011, 188(1): 58–64. doi: [10.1016/j.psychres.2010.12.011](https://doi.org/10.1016/j.psychres.2010.12.011).

- 1016/j.psychres.2011.01.016.
- [33] LUO Z, LI Y, HOU Y, *et al.* Adaptation of the two-item generalized anxiety disorder scale (GAD-2) to Chinese rural population: a validation study and meta-analysis. *Gen Hosp Psychiatry*, 2019, 60: 50–56. doi: 10.1016/j.genhosppsy.2019.07.008.
- [34] TANAKA T, HIRANO H, IKEBE K, *et al.* Oral frailty five-item checklist to predict adverse health outcomes in community-dwelling older adults: a Kashiwa cohort study. *Geriatr Gerontol Int*, 2023, 23(9): 651–659. doi: 10.1111/ggi.14634.
- [35] TANAKA T, HIRANO H, OHARA Y, *et al.* Oral frailty index-8 in the risk assessment of new-onset oral frailty and functional disability among community-dwelling older adults. *Arch Gerontol Geriatr*, 2021, 94: 104340. doi: 10.1016/j.archger.2021.104340.
- [36] CHOI J H, KANG J H, KOH S B, *et al.* Development of an oral and maxillofacial frailty index: a preliminary study. *J Oral Rehabil*, 2020, 47(2): 187–195. doi: 10.1111/joor.12890.
- [37] HIHARA T, GOTO T, ICHIKAWA T. Investigating eating behaviors and symptoms of oral frailty using questionnaires. *Dent J*, 2019, 7(3): 66. doi: 10.3390/dj7030066.
- [38] 陈宗梅, 谭莹, 梁远俊, 等. 老年人口腔衰弱筛查量表的汉化及信效度检验. *护理研究*, 2023, 37(21): 3808–3812. doi: 10.12102/j.issn.1009-6493.2023.21.003.
- CHEN Z M, TAN Y, LIANG Y J, *et al.* Chinesization of the oral frailty index -8 and its reliability and validity test. *Chin Nurs Res*, 2023, 37(21): 3808–3812. doi: 10.12102/j.issn.1009-6493.2023.21.003.
- [39] 王琳, 鞠梅, 王婷, 等. 社区老年人口腔衰弱风险现状及影响因素分析. *护理学杂志*, 2023, 38(18): 112–116. doi: 10.3870/j.issn.1001-4152.2023.18.112.
- WANG L, JU M, WANG T, *et al.* Oral frailty risk and its influencing factors in community-dwelling elderly population. *J Nurs Sci*, 2023, 38(18): 112–116. doi: 10.3870/j.issn.1001-4152.2023.18.112.
- [40] 屠杭佳, 张书怡, 方雨慧, 等. 社区老年人口腔衰弱现状及影响因素分析. *中华护理杂志*, 2023, 58(11): 1351–1356. doi: 10.3761/j.issn.0254-1769.2023.11.011.
- TU H J, ZHANG S Y, FANG Y H, *et al.* Current situation and influencing factors of oral frailty in the community elderly. *Chin J Nurs*, 2023, 58(11): 1351–1356. doi: 10.3761/j.issn.0254-1769.2023.11.011.
- [41] HIRONAKA S, KUGIMIYA Y, WATANABE Y, *et al.* Association between oral, social, and physical frailty in community-dwelling older adults. *Arch Gerontol Geriatr*, 2020, 89: 104105. doi: 10.1016/j.archger.2020.104105.
- [42] HIHARA T, GOTO T, YANAGISAWA S, *et al.* The symptoms of oral frailty and physical frailty in every age group: an investigation by questionnaire. *J Gerodontology*, 2017, 32(1): 33–47. doi: 10.11259/jsg.32.33.
- [43] KUGIMIYA Y, WATANABE Y, UEDA T, *et al.* Rate of oral frailty and oral hypofunction in rural community-dwelling older Japanese individuals. *Gerodontology*, 2020, 37(4): 342–352. doi: 10.1111/ger.12468.
- [44] HU S, LI X. An analysis of influencing factors of oral frailty in the elderly in the community. *BMC Oral Health*, 2024, 24(1): 260. doi: 10.1186/s12903-024-03946-y.
- [45] SERMSUTI-ANUWAT N, PIYAKHUNAKORN P. Association between oral health literacy and number of remaining teeth among the Thai elderly: a cross-sectional study. *Clin Cosmet Investig Dent*, 2021, 13: 113–119. doi: 10.2147/ccide.S306110.
- [46] 杨晶晶, 廖圣恺. 阜阳市居民口腔健康素养现状及影响因素分析. *中华全科医学*, 2024, 22(1): 97–100. doi: 10.16766/j.cnki.issn.1674-4152.003340.
- YANG J J, LIAO S K. Investigation on the current state of oral health literacy and the influencing factors among residents in Fuyang city. *Chin J Gen Pract*, 2024, 22(1): 97–100. doi: 10.16766/j.cnki.issn.1674-4152.003340.
- [47] NAGATANI M, TANAKA T, SON B K, *et al.* Oral frailty as a risk factor for mild cognitive impairment in community-dwelling older adults: Kashiwa study. *Exp Gerontol*, 2023, 172: 112075. doi: 10.1016/j.exger.2022.112075.
- [48] TAN L F, CHAN Y H, MERCHANT R A. Association between dentition and frailty and cognitive function in community-dwelling older adults. *BMC Geriatr*, 2022, 22(1): 614. doi: 10.1186/s12877-022-03305-y.
- [49] ZHANG X M, WU X, CHEN W. The association between number of teeth and cognitive frailty in older adults: a cross-sectional study. *J Nutr Health Aging*, 2022, 26(5): 430–438. doi: 10.1007/s12603-022-1783-y.
- [50] 王晓梦, 胡慧, 王再超, 等. 老年人口腔衰弱与认知障碍关系的研究进展. *实用心脑血管病杂志*, 2023, 31(11): 124–128. doi: 10.12114/j.issn.1008-5971.2023.00.286.
- WANG X M, HU H, WANG Z C, *et al.* Research progress on the relationship between oral frailty and cognition disorders in the elderly. *Pract J Card Cereb Pneumal Vasc Dis*, 2023, 31(11): 124–128. doi: 10.12114/j.issn.1008-5971.2023.00.286.
- [51] NAKAMURA T, ZOU K, SHIBUYA Y, *et al.* Oral dysfunctions and cognitive impairment/dementia. *J Neurosci Res*, 2021, 99(2): 518–528. doi: 10.1002/jnr.24745.
- [52] HAMZA S A, ASIF S, BOKHARI S A H. Oral health of individuals with dementia and Alzheimer's disease: a review. *J Indian Soc Periodontol*, 2021, 25(2): 96–101. doi: 10.4103/jisp.jisp_287_20.
- [53] DIBELLO V, LOZUPONE M, MANFREDINI D, *et al.* Oral frailty and neurodegeneration in Alzheimer's disease. *Neural Regen Res*, 2021, 16(11): 2149–2153. doi: 10.4103/1673-5374.310672.
- [54] 周陆军, 陈柏延, 李雨霖, 等. 口腔微生物与全身系统性疾病的关系. *四川大学学报(医学版)*, 2023, 54(1): 1–6. doi: 10.12182/20230160504.
- ZHOU L J, CHEN B Y, LI Y L, *et al.* Oral microbiome and systemic diseases. *J Sichuan Univ (Med Sci)*, 2023, 54(1): 1–6. doi: 10.12182/20230160504.
- [55] 徐苏, 蔡文玮, 李晨奕, 等. 社区老年人吞咽障碍现状及其影响因素: 一项横断面研究. *中国全科医学*, 2024, 27(17): 2083–2090. doi: 10.12114/j.issn.1007-9572.2023.0832.
- XU S, CAI W W, LI C Y, *et al.* Current status and influencing factors of dysphagia among the elderly in communities: a cross-sectional study. *Chin Gen Pract*, 2024, 27(17): 2083–2090. doi: 10.12114/j.issn.1007-9572.

- 2023.0832.
- [56] AHMED A F, NASER R J, GUL S S, *et al.* Association between self-reported oral disease/conditions and symptoms of depression among Iraqi individuals. *Spec Care Dentist*, 2022, 42(5): 503–508. doi: [10.1111/scd.12698](https://doi.org/10.1111/scd.12698).
- [57] KUNRATH I, SILVA A E R. Oral health and depressive symptoms among older adults: longitudinal study. *Ageing Ment Health*, 2021, 25(12): 2265–2271. doi: [10.1080/13607863.2020.1855104](https://doi.org/10.1080/13607863.2020.1855104).
- [58] THOMSON W M, FERGUSON C A, JANSSENS B E, *et al.* Xerostomia and polypharmacy among dependent older New Zealanders: a national survey. *Age Ageing*, 2021, 50(1): 248–251. doi: [10.1093/ageing/afaa099](https://doi.org/10.1093/ageing/afaa099).
- [59] 冯钰惠, 李珊珊, 陶剑文, 等. 老年人认知功能障碍调查及其影响因素研究. *中国全科医学*, 2024, 27(26): 3297–3303. doi: [10.12114/j.issn.1007-9572.2024.0087](https://doi.org/10.12114/j.issn.1007-9572.2024.0087).
- FENG Y H, LI S S, TAO J W, *et al.* Cognitive impairment in the elderly: a survey and analysis of influencing factors. *Chin Gen Pract*, 2024, 27(26): 3297–3303. doi: [10.12114/j.issn.1007-9572.2024.0087](https://doi.org/10.12114/j.issn.1007-9572.2024.0087).
- [60] DIBELLO V, ZUPO R, SARDONE R, *et al.* Oral frailty and its determinants in older age: a systematic review. *Lancet Healthy Longev*, 2021, 2(8): e507–e520. doi: [10.1016/s2666-7568\(21\)00143-4](https://doi.org/10.1016/s2666-7568(21)00143-4).
- [61] KOYAMA S, SAITO M, CABLE N, *et al.* Examining the associations between oral health and social isolation: a cross-national comparative study between Japan and England. *Soc Sci Med (1982)*, 2021, 277: 113895. doi: [10.1016/j.socscimed.2021.113895](https://doi.org/10.1016/j.socscimed.2021.113895).
- [62] QI X, PEI Y, WANG K, *et al.* Social isolation, loneliness and accelerated tooth loss among Chinese older adults: a longitudinal study. *Community Dent Oral Epidemiol*, 2023, 51(2): 201–210. doi: [10.1111/cdoe.12727](https://doi.org/10.1111/cdoe.12727).
- [63] YIN Z, YANG J, HUANG C, *et al.* Eating and communication difficulties as mediators of the relationship between tooth loss and functional disability in middle-aged and older adults. *J Dent*, 2020, 96: 103331. doi: [10.1016/j.jdent.2020.103331](https://doi.org/10.1016/j.jdent.2020.103331).
- [64] HOSHINO D, HIRANO H, EDAHIRO A, *et al.* Association between oral frailty and dietary variety among community-dwelling older persons: a cross-sectional study. *J Nutr Health Aging*, 2021, 25(3): 361–368. doi: [10.1007/s12603-020-1538-6](https://doi.org/10.1007/s12603-020-1538-6).
- [65] O'CONNOR J P, MILLEDGE K L, O'LEARY F, *et al.* Poor dietary intake of nutrients and food groups are associated with increased risk of periodontal disease among community-dwelling older adults: a systematic literature review. *Nutr Rev*, 2020, 78(2): 175–188. doi: [10.1093/nutrit/nuz035](https://doi.org/10.1093/nutrit/nuz035).
- [66] BASSIM C, MAYHEW A J, MA J, *et al.* Oral health, diet, and frailty at baseline of the Canadian longitudinal study on aging. *J Am Geriatr Soc*, 2020, 68(5): 959–966. doi: [10.1111/jgs.16377](https://doi.org/10.1111/jgs.16377).
- [67] ZHAO D, NING J, ZHAO Y, *et al.* Associations of dietary and drinking water habits with number of natural teeth: a longitudinal study in the Chinese elderly population. *BMC Geriatr*, 2021, 21(1): 525. doi: [10.1186/s12877-021-02473-7](https://doi.org/10.1186/s12877-021-02473-7).

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