

儿童青少年多病同防相关因素与协同行动框架

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【摘要】 儿童青少年多病共存问题日益突出,亟需从“单病分治”转向“多病同防”。本研究聚焦儿童青少年近视、抑郁、超重肥胖与脊柱侧弯 4 类常见健康问题,系统综述了社会、环境、家庭和个人行为与常见健康问题共存的关联研究。结果表明,细颗粒物(PM_{2.5})暴露、人工夜间光照、身体活动不足、屏幕时间过长及不健康饮食构成主要的跨维度风险网络。基于此,提出家庭、学校、社会协同的行动框架,强调从上游环境治理到下游行为干预的系统性策略,为儿童青少年多病同防的实践与政策制定提供依据。

【关键词】 共病现象;综合预防;危险因素;儿童;青少年

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Related factors and collaborative action framework of multi-disease co-prevention in children and adolescents

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【Abstract】 The co-occurrence of multi-disease among children and adolescents has become increasingly prominent, necessitating a shift from "single-disease separate treatment" to "multi-disease co-prevention". Focusing on four common health problems in children and adolescents, namely, myopia, depression, overweight/obesity, and spinal abnormalities, the paper systematically reviews the association between four categories of factors, society, environment, family, and individual behavior, and the co-occurrence of the aforementioned health problems. The findings indicate that particulate matter 2.5 exposure, light at night, physical inactivity, excessive screen time, and unhealthy diet constitute the primary cross-dimensional risk network. Based on these findings, the paper proposes a collaborative action framework involving family, school, and society, emphasizing systematic strategies ranging from upstream environmental governance to downstream behavioral intervention, so as to provide evidence for the practice and policy-making of multi-disease co-prevention in children and adolescents.

【Keywords】 Comorbidity; Universal precautions; Risk factors; Child; Adolescent

近年来,我国儿童青少年近视、抑郁、超重肥胖、脊柱侧弯等常见健康问题高发,且呈现显著的共存特征。为此,国家疾病预防控制局发布《学生常见病多病共防技术指南》(以下简称《指南》)^[1],倡导通过行为与环境干预实现多病同防。根据健康社会决定因素理论,个体健康受社会、环境、家庭和个人行为 4 类因素共同塑造。本文梳理此 4 类因素与上述健康问题共存的关联证据,构建家庭、学校、社会协同的行动框架,为儿童青少年多病同防提供参考。

1 儿童青少年多病共存的多维度相关因素

1.1 社会因素 主要通过 3 条路径塑造上述健康问题的共存格局:一是通过交通噪声为代表的物理环境

应激;二是通过社区资源分配;三是以收入不平等和社会经济地位为表征的社会分层。

交通噪声暴露已被证实与肥胖和抑郁风险增加均有关联^[2-3]。但近视的机制涉及视网膜产生多巴胺的信号通路,脊柱侧弯则涉及遗传及生物力学相关的因素^[4-5],因此目前并没有明确假说将环境噪声与近视和脊柱侧弯的发生发展联系起来。

有研究显示,居住在低交通安全性社区的儿童具有更高的体质量指数(body mass index, BMI)^[6]。可能是对于低交通的安全感,使得家长开始约束儿童户外活动,从而增加了肥胖与近视风险。

而在经济指标方面,收入不平等虽未与健康问题共存建立直接关联,但可通过削弱社会凝聚力的中介

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途径间接影响超重肥胖与抑郁症的共患^[7]。近视方面,低社会经济地位(socioeconomic status, SES)地区学生的近视患病率高于中等 SES 地区^[8]。综合来看,社会经济维度的健康效应可归纳为:一是物质资源路径,影响膳食质量;二是社会心理路径,通过社会凝聚力同时削弱肥胖与抑郁风险。在脊柱侧弯方面,女性是脊柱侧弯最一致的关联因素^[9]。然而,地区贫困指数(area deprivation index, ADI)和收入水平不能预测脊柱弯曲严重程度,BMI 和受教育水平才是进展性弯曲的独立相关因素^[10-11],提示其病因更多由遗传和生物力学因素主导,社会因素的作用可能通过营养状况等生物学中介间接体现。

1.2 环境因素 环境因素构成儿童青少年日常暴露的物理背景,其中大气污染和人工夜间光照(artificial light at night, ALAN)是研究集中的两类远端暴露。大气污染方面,长期暴露于细颗粒物(particulate matter 2.5, PM_{2.5})会增加儿童重度肥胖的概率,有机物是影响最显著的成分^[12],且二氧化硫(sulfur dioxide, SO₂)和可吸入颗粒物(particulate matter 10, PM₁₀)同样会增加肥胖风险^[13]。心理健康方面,PM_{2.5}暴露与大学生抑郁风险呈正相关^[14]。在近视方面,PM_{2.5}暴露量的四分位数间距增加与儿童青少年视力下降患病率增加相关,而其他 5 种污染物(PM₁₀、SO₂、一氧化碳、二氧化氮和臭氧)浓度未观察到关联^[15]。综上,PM_{2.5}暴露同时构成儿童青少年超重肥胖、抑郁与近视的风险因素,但其他大气污染因素与上述健康问题共存的关联仍需进一步验证。

在 ALAN 方面,光污染通过扰乱昼夜节律,可能同时影响儿童青少年近视进展、情绪调节和代谢功能。在心理健康领域,患有重度抑郁障碍的青少年表现出夜间更高的 ALAN 暴露^[16]。在肥胖方面,暴露于较高户外光照水平的儿童具有更高的肥胖概率^[17]。在近视方面,户外 ALAN 暴露每增加一个四分位数间距,儿童近视患病率风险增加 8%^[18]。上述证据表明,ALAN 是当前环境因素中唯一同时与儿童青少年近视、抑郁、肥胖三者均呈稳健关联的暴露变量,其可能是上述 4 类健康问题共存的关键环境驱动因子。

在土地覆盖类型方面,建成环境与自然环境的健康效应呈现方向性差异。一项研究显示道路状况和建成密度与儿童青少年较高肥胖风险呈正相关,而归一化植被指数、降雨、草原以及森林则呈负相关^[13]。在绿地与近视方面,发现学校绿色空间与儿童青少年近视发病呈负相关^[19],在 P₂₅~P₇₅ 范围内校园绿地在儿童青少年近视和抑郁症状共存上表现出积极作用^[20]。综合来看,建成环境与自然环境对儿童健康呈

现方向性相反的效应,提示优化社区土地覆盖结构可能同时有益于儿童青少年近视、抑郁、超重肥胖及脊柱侧弯的预防,产生协同效益。

1.3 家庭因素 家庭作为儿童青少年最直接的生活微环境,主要通过 3 条路径塑造共存格局:一是以家庭 SES 为核心的物质资源路径;二是以不良家庭经历和父母态度为表征的心理环境路径;三是以家长知识行为和家庭遗传背景为纽带的行为-遗传交互路径^[21]。

在家庭经济状况方面,生活在贫困线以下的青年与肥胖概率增加显著相关^[22]。SES 与儿童青少年抑郁症状关联结果显示,综合 SES 指标的相关性强于父母教育水平^[23]。上述证据表明,家庭经济劣势同时构成儿童青少年肥胖与抑郁症状的干预因素,以减贫为基础的公共卫生干预可能比针对个体的具体措施更有效。

在家庭心理环境方面,与无不良家庭经历(adverse family experiences, AFEs)者相比,有一种 AFEs 的青少年被诊断为抑郁的概率高 1.6 倍^[24]。家庭心理环境的影响还延伸至形体健康领域。与未患青少年特发性脊柱侧弯(adolescent idiopathic scoliosis, AIS)的家庭相比,AIS 患者家庭表现出更低水平的家庭凝聚力和适应性^[25]。提示将心理教育支持和家庭咨询纳入儿童青少年脊柱侧弯的标准化护理,可能有助于改善治疗效果。

近视和脊柱侧弯受到遗传因素影响,近视高风险生活方式与父母近视均独立增加儿童近视风险。然而,家长在近视预防方面普遍存在“知识欠佳但态度积极”的知行分离现象^[26]。表明将家长的健康意识转化为有效的家庭行为管理,是儿童青少年近视防控的关键环节。类似地,脊柱侧弯与家族病史的独立关联,进一步印证了家庭遗传背景与早期体征识别在“形”的健康中的双重作用^[27]。

1.4 个人行为因素 个人行为因素是连接上游结构性因素与下游健康结局的关键枢纽,也是当前最具可干预性的环节。身体活动方面,荟萃分析显示,体育活动能够有效降低肥胖儿童青少年的抑郁症患病风险^[28]。剂量反应关系结果显示,每日中等强度运动时长与抑郁症状呈现非线性关联,但超重/肥胖会削弱保护效应,表明对于超重/肥胖者来说,体重管理才是首要策略^[29]。并且每天户外活动≥2 h 可使儿童青少年近视发病风险降低约 30%^[30]。关于脊柱侧弯,缺乏体育活动^[4,31]将会是儿童青少年 AIS 的独立危险因素,每周体育活动持续≥3 h 和从事高风险运动与确诊 AIS 相关^[32],提示运动类型和强度对脊柱健康存在双向效应。此外,姿势不良^[32]和读写姿势不正确^[28]

均与儿童青少年 AIS 风险增加相关,正常坐姿和定期更换教室座位则对 AIS 有积极作用^[33]。提示超重肥胖与脊柱侧弯反过来阻碍儿童青少年抑郁与近视的改善,运动和改善坐姿习惯可能同时产生预防近视、肥胖、抑郁与脊柱侧弯的协同效益^[34]。

在屏幕时间方面,12 岁时拥有智能手机的青少年与未拥有者相比,抑郁、肥胖发生风险均升高^[35]。考虑到屏幕时间同时会影响到户外活动、体力活动和面对面社交^[36],推迟青少年智能手机拥有年龄可能产生跨维度的协同预防效益。

在饮食模式方面,频繁食用油炸食品与儿童青少年近视和肥胖共存的风险较高相关^[18]。在心理健康方面,垃圾食品摄入量最高组与最低组相比,抑郁的发生风险显著增加^[37]。地中海饮食依从性良好的大学生抑郁得分更低^[38]。表明饮食模式对儿童青少年近视、抑郁、超重肥胖与脊柱侧弯的影响呈现明确的方向性差异:不健康饮食可能会同时推高多种健康风险,而高质量饮食模式则呈现保护效应^[39]。

1.5 跨维度共同风险因素 上述社会、环境、家庭和个人行为四类因素并非彼此独立,而是通过共同的行为和生理通路交织作用于儿童青少年近视、抑郁、超重肥胖与脊柱侧弯的共存。

互联网使用与久坐行为是跨越儿童青少年个人行为与家庭环境的典型共同风险因素。每天上网时间 ≥ 2 h 者出现身心共病的风险较 < 1 h/d 者高出 45%,中介分析表明睡眠时间、饮食质量和吸烟或饮酒部分介导该关联,提示过度互联网使用通过扰乱睡眠、恶化饮食等行为路径间接推动多病共存^[40]。身体活动不足是另一项跨维度风险因素,研究显示遵循 24 h 运动指南中至少一项建议即与较低共病风险相关^[41]。内蒙古自治区的连续监测同样证实,充足的中高强度身体活动与儿童青少年共病风险降低显著相关^[42]。饮食行为扮演着关键的角色,网络分析研究显示,不吃早餐、肥胖与抑郁症状在行为网络中相互关联,共同构成核心节点^[43],提示改善早餐习惯可能对儿童青少年多种健康问题产生协同效益。行为与环境风险的聚集模式进一步凸显了多维度因素协同干预的必要性,个人行为风险与家庭或学校环境风险的叠加会显著放大共患风险,单一维度的干预难以充分应对^[44]。

特定共存模式的风险因素也值得关注。在肥胖与脊柱侧弯的关联方面,研究证实肥胖青少年中脊柱侧弯患病率约为普通人群的 2 倍^[45];肥胖脊柱侧弯患者术后急性肾损伤等并发症发生率高于非肥胖患者^[46]。在心理健康与脊柱侧弯的关联方面,中度至重

度抑郁风险的脊柱侧弯患者治疗功能评分显著降低^[47],且在早发性脊柱侧弯患者中 23.8% 存在抑郁症状^[48],提示心理健康状况对脊柱侧弯治疗结局具有重要影响。

综上,过度互联网使用与视屏时间过长、身体活动不足、不健康饮食以及家庭和学校环境风险,构成上述儿童青少年 4 类健康问题共存的核心跨维度风险网络。且在脊柱侧弯的防治中,必须建立“身心并重、多病共管”的系统性思维。

2 儿童青少年多病同防的家校社协同行动框架

基于对多层次影响因素及跨维度共同风险网络的系统梳理,单一疾病的传统干预模式已难以为继。必须构建一个以家庭为基础、学校为主阵地、社会为支撑的协同行动框架,以产生跨健康维度的协同效应。

2.1 家庭层面:筑牢健康行为养成的第一道防线 家庭是儿童青少年最直接的生活微环境。首先,家庭应成为体育活动的促进者,家长应以身作则,与孩子共同参与体育活动,确保每天至少 2 h 的户外活动时间^[28-29]。其次,家庭应成为健康屏幕行为和饮食模式的塑造者。家长应严格管理子女的屏幕时间,并确保每日屏幕使用不超过 2 h^[35]。在饮食方面,家庭应建立规律的进餐习惯,尤其要重视早餐^[43]。同时,应减少油炸食品、垃圾食品的摄入^[37]。最后,家长应给予孩子充分的情感支持,培养其正确的身体意象^[22-23]。

2.2 学校层面:打造多病同防的主阵地 学校是儿童青少年度过大部分日间时间的场所。第一,优化校园物理环境。着重增加校园绿色空间面积,保证学校教室采光充足^[19-20],并定期根据学生身高调节课桌椅高度^[33]。第二,落实核心健康行为。保障学生每日充足的户外活动和中等强度体育锻炼时间^[41-42]。同时应建立制度,监督学生养成吃早餐的习惯,引导减少垃圾食品摄入^[43]。针对脊柱健康,学校应推广正确的坐姿和站姿,并定期为学生更换教室座位^[31,33]。第三,建立一体化健康筛查与支持体系。学校应重点识别同时存在多种风险的高危学生,学校心理辅导中心应与体育、卫生工作联动,避免“单病分治”造成的割裂^[45,47]。

2.3 社会层面:营造多病同防的支持性环境 社会因素是影响儿童青少年健康的最远端结构性力量。第一,政府可在各项决策中将儿童青少年的健康纳入考量范围。通过相关措施降低学校和居民区的噪声暴露水平^[2-3],并建设安全的步行和骑行环境^[6]。第二,环境保护部门应强化对大气污染治理^[12,15,49],制定更

严格的夜间照明标准^[16-18]。同时,城市规划应考虑增加绿地、森林等的面积^[13]。第三,政府可将经费用于增加教育投入和改善低收入社区环境资源分配^[7,22],并承担起科普责任,提升公众对学生常见病多病共存风险的认知。

3 核心风险网络与优先干预策略

综上所述,PM_{2.5}暴露、ALAN、身体活动不足、屏幕时间过长及不健康饮食构成儿童青少年近视、抑郁、超重肥胖与脊柱侧弯共存的核心跨维度风险网络,而个人行为风险与家庭/学校环境风险的叠加会显著放大此效应。

基于此,优先干预策略应聚焦于三点:上游环境治理方面为削减 PM_{2.5}与 ALAN 暴露,增加城市与校园绿地面积;中游学校防控方面为保障户外活动与体育锻炼时间,建立多病共管的筛查-支持一体化体系;下游家庭行为干预方面为确保每日≥2 h 户外活动,管理屏幕时间,重视早餐与健康饮食。

利益冲突声明 所有作者声明无利益冲突。

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