

新冠肺炎疫情期间医务人员焦虑状况的Meta分析

沈强, 张月琴, 江圣洁, 甘露, 尉莹莹

杭州市妇产科医院医务科, 浙江 杭州 310008

摘要: **目的** 系统评价新冠肺炎 (COVID-19) 疫情期间医务人员焦虑发生情况, 为医务人员心理干预提供循证依据。**方法** 检索中国知网、万方数据知识服务平台、维普资讯中文期刊服务平台和PubMed等数据库, 收集2020年1月1日至2021年11月30日国内外公开发表的关于COVID-19疫情期间医务人员焦虑状况调查; 依据美国卫生保健质量和研究机构关于横断面研究的质量标准评价文献质量; 采用Open Meta Analyst 3.0软件对医务人员焦虑检出率进行Meta分析; 采用漏斗图和Begg秩相关检验分析发表偏倚。**结果** 检索文献598篇, 纳入36篇, 包括中文文献33篇和英文文献3篇。高、中等、低质量文献分别为5篇、29篇和2篇。调查均在2020年, 共调查医务人员19 872人, 检出焦虑5 261人, 焦虑检出率为28.8% (95%CI: 24.0%~33.6%)。33篇中文文献的亚组分析显示, 我国西部、中部和东部地区医务人员焦虑检出率分别为31.9% (95%CI: 17.6%~46.2%), 29.6% (95%CI: 17.8%~41.4%) 和25.3% (95%CI: 20.2%~30.3%); 男性和女性医务人员焦虑检出率分别为4.9% (95%CI: 3.3%~6.4%) 和22.9% (95%CI: 17.7%~28.0%); 护士、医生及其他医务人员焦虑检出率分别为21.6% (95%CI: 13.2%~29.9%), 5.2% (95%CI: 2.8%~7.5%) 和4.8% (95%CI: 2.2%~7.4%); 轻度、中度和重度焦虑检出率分别为18.6% (95%CI: 14.0%~23.2%), 5.5% (95%CI: 4.1%~6.8%) 和1.9% (95%CI: 1.3%~2.5%)。漏斗图和Begg秩相关检验显示无发表偏倚。逐一排除文献分析显示, Meta分析结果及异质性检验稳定。**结论** COVID-19疫情期间医务人员焦虑检出率为28.8%, 以轻度焦虑为主; 女性医务人员、护士的焦虑检出率相对较高, 应予以重点关注并及时采取心理干预。

关键词: 新型冠状病毒肺炎; 医务人员; 焦虑; Meta分析

中图分类号: R749.92 文献标识码: A 文章编号: 2096-5087 (2022) 07-0720-07

Prevalence of anxiety among healthcare professionals during the COVID-19 pandemic: a meta-analysis

SHEN Qiang, ZHANG Yueqin, JIANG Shengjie, GAN Lu, WEI Yingying

Department of Medical Administration, Hangzhou Women's Hospital, Hangzhou, Zhejiang 310008, China

Abstract: Objective To systematically investigate the prevalence of anxiety among healthcare professionals during the COVID-19 pandemic, so as to provide the development of evidence-based psychological interventions among healthcare professionals. **Methods** The publications pertaining to the prevalence of anxiety among healthcare professionals during the COVID-19 pandemic were retrieved in national and international electronic databases from January 1, 2020 through November 30, 2021, including CNKI, Wanfang Data, VIP, SinoMed, PubMed and Web of Science. The quality of publications was evaluated using the United States Healthcare Research and Quality (AHRQ) quality assessment of included cross-sectional studies, and the pooled prevalence of anxiety was estimated among healthcare professionals using the software Open Meta Analyst version 3.0. The publication bias were evaluated with funnel plots and Begg rank correlation test. **Results** Totally 598 publications were retrieved, and 36 eligible publications were enrolled in the final analysis, including 33 Chinese publications and 3 English publications. There were 5 high-quality, 29 moderate-quality and 2 low-quality publications. All investigations pertaining to the prevalence of anxiety among healthcare professionals were con-

DOI: 10.19485/j.cnki.issn2096-5087.2022.07.015

作者简介: 沈强, 本科, 副主任技师, 主要从事医疗质量及安全管理等工作

通信作者: 沈强, E-mail: shenq215@163.com

ducted in 2020. Totally 19 872 healthcare professionals were investigated, and the prevalence of anxiety was 28.8% (95%CI: 24.0%–33.6%). Subgroup analysis showed that the prevalence of anxiety was 31.9% (95%CI: 17.6%–46.2%) among healthcare professionals from western China, 29.6% (95%CI: 17.8%–41.4%) from central China, and 25.3% (95%CI: 20.2%–30.3%) from eastern China. The prevalence of anxiety was 4.9% (95%CI: 3.3%–6.4%) among male healthcare professionals and 22.9% (95%CI: 17.7%–28.0%) among female healthcare professionals, and the prevalence of anxiety was 21.6% (95%CI: 13.2%–29.9%) among nurses, 5.2% (95%CI: 2.8%–7.5%) among doctors and 4.8% (95%CI: 2.2%–7.4%) among other healthcare professionals. The prevalence of mild, moderate and severe anxiety was 18.6% (95%CI: 14.0%–23.2%), 5.5% (95%CI: 4.1%–6.8%) and 1.9% (95%CI: 1.3%–2.5%), respectively. No publication bias was detected as revealed by funnel plots and Begg rank correlation test, and stable meta-analysis results and heterogeneity test were observed. **Conclusions** The prevalence of anxiety is 28.8% among healthcare professionals during the COVID-19 pandemic, and mild anxiety is predominant. A high prevalence rate of anxiety is seen female healthcare professionals and nurses, who should be given a high priority and timely psychological interventions

Keywords: COVID-19; healthcare professional; anxiety; meta-analysis

新冠肺炎 (coronavirus disease 2019, COVID-19) 作为一种急性呼吸道传播疾病, 病毒变异速度快、传播能力强, 仍在全球多个国家流行。医务人员在抗击 COVID-19 疫情的一线, 面临较大感染风险, 心理压力加重, 焦虑、抑郁等心理健康问题的检出率明显增加^[1]。国内学者报道, COVID-19 疫情期间, 存在焦虑情绪的医务人员占 9.05%~36.12%^[2-5]。但这些研究大多为横断面调查, 调查对象分散, 且样本量偏小, 不能完全反映医务人员在 COVID-19 疫情期间的焦虑状况。为减少发表偏倚以及小样本研究带来的误差, 本研究收集关于 COVID-19 疫情期间医务人员焦虑状况的研究文献进行 Meta 分析, 归纳医务人员焦虑特征, 为医务人员心理干预提供循证依据。

1 资料与方法

1.1 资料来源 检索中文数据库中国知网、万方数据知识服务平台、维普资讯中文期刊服务平台和中国生物医学数据库, 检索词为“新型冠状病毒肺炎”“2019 冠状病毒病”“新冠病毒”“2019-nCoV 肺炎”“医生”“护士”“医务人员”“焦虑”。检索英文数据库 PubMed 和 Web of Science, 检索词为“novel corona virus pneumonia”“corona virus disease 2019”“COVID-19”“2019-nCoV”“doctor”“nurse”“medical staff”“anxiety”。检索 2020 年 1 月 1 日至 2021 年 11 月 30 日公开发表的关于 COVID-19 疫情期间医务人员焦虑状况的调查研究。

1.2 文献纳入和排除标准 纳入标准: (1) 研究设计为横断面研究, 现场调查或网上在线调查方式; (2) 研究对象为 COVID-19 疫情期间医务人员, 包括医生、护士及医技人员; (3) 结局指标: 焦虑状况。排除标准: (1) 综述或重复发表的研究; (2) 结

局指标不包含焦虑状况。

1.3 文献筛选和数据提取 由 2 名研究人员按照检索策略独立检索, 采用 EndNote 20 软件管理获取的文献。2 名研究人员独立筛选文献, 首先去除重复文献, 然后根据纳入和排除标准, 浏览文献标题和摘要初步筛选文献, 最后通过阅读全文确定纳入的文献。对于存在分歧的检索结果, 由 2 名研究者共同审查, 如无法达成一致意见则由第 3 人审核判定。制定数据提取表, 由 2 名研究者提取纳入研究中的样本量、调查时间、调查地点、调查方法、研究对象性别、职业和焦虑程度等资料。

1.4 文献质量评价 依据美国卫生保健质量和研究机构 (American Agency for Health care Research and Quality, AHRQ) 关于横断面研究的质量标准^[6], 评价纳入文献质量。共 11 项评价条目, 满分 11 分, 总分 ≥ 8 分为高质量, 6~7 分为中等质量, ≤ 5 分为低质量。

1.5 统计分析 采用 Open Meta Analyst 3.0 软件统计分析。合并效应计算结果用森林图表示。 $P < 50\%$ 且 Q 检验 $P \geq 0.1$ 提示研究间异质性不大, 采用固定效应模型; $P > 50\%$ 提示研究间异质性较大, 采用随机效应模型。对 33 篇中文文献按照研究对象性别、所在地区、工作类别和焦虑程度进行亚组分析, 亚组间率的比较采用 χ^2 检验。采用漏斗图定性分析发表偏倚, 采用 Begg 秩相关检验定量分析发表偏倚, $P > 0.05$ 表示无发表偏倚。采用逐个剔除文献法评价研究结果的稳定性。检验水准 $\alpha = 0.05$ 。

2 结果

2.1 纳入研究基本情况 检索获得文献 598 篇, 排除重复文献 72 篇, 通过阅读文献标题和摘要排除

458 篇，通过阅读全文排除 32 篇，最终纳入 36 篇^[2-5, 7-38]，包括中文文献 33 篇和英文文献 3 篇。研究时间均为 2020 年。所用焦虑评估工具为广泛性焦虑量表 (GAD-7) 16 篇，焦虑自评量表 (SAS) 15 篇，抑郁焦虑压力量表 (DASS-21) 2 篇，症状自评量表 (SCL-90)、医院焦虑抑郁量表 (HADS) 和汉密尔顿焦虑量表 (HAMA) 各 1 篇。高、中等、

低质量文献分别为 5 篇、29 篇和 2 篇。

2.2 COVID-19 疫情期间医务人员焦虑情况 Meta 分析结果 异质性检验结果显示， $I^2>90%$ ， $P<0.05$ ，提示研究间存在异质性，因此采用随机效应模型进行总效应分析。2020 年 COVID-19 疫情期间共调查医务人员 19 872 人，检出焦虑 5 261 人，焦虑检出率为 28.8% (95%CI: 24.0%~33.6%)。见图 1。

研究 Studies	焦虑检出率 Prevalence of anxiety (95%CI)	焦虑人数/总 人数 Ev/Tot
刘峥嵘等 ^[2]	0.361 (0.326 ~ 0.397)	255/706
张瑶等 ^[3]	0.191 (0.137 ~ 0.245)	39/204
刘向来等 ^[4]	0.090 (0.053 ~ 0.128)	20/221
吴亚平等 ^[5]	0.237 (0.200 ~ 0.275)	116/489
东保吉等 ^[7]	0.708 (0.617 ~ 0.799)	68/96
周晓平等 ^[8]	0.136 (0.118 ~ 0.154)	194/1 426
邢红叶等 ^[9]	0.336 (0.250 ~ 0.422)	39/116
赵亚军等 ^[10]	0.330 (0.266 ~ 0.394)	69/209
何碧玉等 ^[11]	0.555 (0.498 ~ 0.612)	162/292
张瑶等 ^[12]	0.299 (0.239 ~ 0.359)	67/224
蒲昭谦等 ^[13]	0.289 (0.242 ~ 0.335)	106/367
周芳等 ^[14]	0.182 (0.134 ~ 0.229)	46/253
王珊珊等 ^[15]	0.258 (0.190 ~ 0.326)	41/159
李颖等 ^[16]	0.316 (0.288 ~ 0.344)	332/1 051
雷雨等 ^[17]	0.128 (0.074 ~ 0.182)	19/148
周延等 ^[18]	0.133 (0.060 ~ 0.205)	11/83
孙振晓等 ^[19]	0.587 (0.499 ~ 0.675)	71/121
吴春艳等 ^[20]	0.084 (0.060 ~ 0.108)	43/510
燕银枝等 ^[21]	0.383 (0.343 ~ 0.423)	217/567
潘宁等 ^[22]	0.112 (0.084 ~ 0.140)	54/482
李娟娟等 ^[23]	0.053 (0.024 ~ 0.082)	12/228
梅莉等 ^[24]	0.467 (0.371 ~ 0.562)	49/105
马明芳等 ^[25]	0.680 (0.599 ~ 0.761)	87/128
张宴萍等 ^[26]	0.300 (0.283 ~ 0.317)	823/2 745
戴宁彬等 ^[27]	0.213 (0.191 ~ 0.234)	305/1 435
韦红恩等 ^[28]	0.114 (0.089 ~ 0.140)	67/586
宋婷等 ^[29]	0.149 (0.089 ~ 0.210)	20/134
赵玉荣等 ^[30]	0.317 (0.265 ~ 0.369)	98/309
韩静等 ^[31]	0.195 (0.175 ~ 0.214)	313/1 608
徐薇薇等 ^[32]	0.111 (0.083 ~ 0.138)	56/506
王琳等 ^[33]	0.145 (0.125 ~ 0.164)	187/1 293
张智胜等 ^[34]	0.153 (0.108 ~ 0.197)	38/249
张宁等 ^[35]	0.612 (0.544 ~ 0.680)	120/196
AWANO 等 ^[36]	0.100 (0.080 ~ 0.120)	85/848
AZOLAY 等 ^[37]	0.600 (0.567 ~ 0.633)	507/845
CONTI 等 ^[38]	0.563 (0.531 ~ 0.595)	525/933
合并率 Overall ($I^2=99%$, $P<0.001$)	0.288 (0.240 ~ 0.336)	5 261/19 872

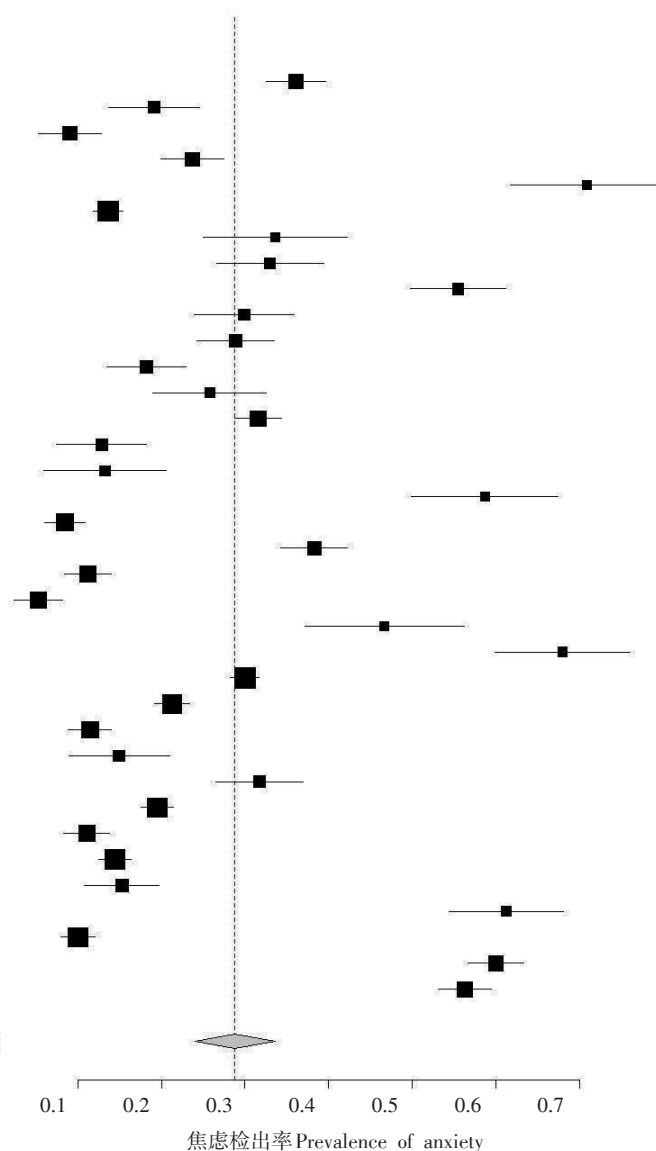


图 1 2020 年 COVID-19 疫情期间医务人员焦虑检出率 Meta 分析森林图

Figure 1 Forest map of prevalence of anxiety among healthcare professionals during the COVID-19 pandemic in 2020

2.3 亚组分析 2020 年 COVID-19 疫情期间，女性医务人员焦虑检出率为 22.9%，高于男性医务人员焦虑检出率 4.9% ($P<0.05$)。不同地区医务人员焦虑检出率差异有统计学意义 ($P<0.05$)，其中西部地区医务人员焦虑检出率较高。不同专业医务人员焦虑

检出率差异有统计学意义 ($P<0.05$)，其中护士焦虑检出率较高。不同程度焦虑检出率差异有统计学意义 ($P<0.05$)，其中轻度焦虑检出率较高。采用 GAD-7 评估的焦虑检出率高于采用 SAS 评估的焦虑检出率 ($P<0.05$)。见表 1。

表 1 2020 年 COVID-19 疫情期间医务人员焦虑检出率的亚组分析

Table 1 Subgroup analysis of prevalence of anxiety among healthcare professionals during the COVID-19 pandemic in 2020

亚组 Subgroup	文献数量 Number of literature	焦虑检出率 Prevalence of anxiety (95%CI) /%	χ^2 值	P值	I^2 值/%
地区 Region			10.352	0.006	
东部 East	19	25.3 (20.2~30.3)			98
中部 Central	7	29.6 (17.8~41.4)			94
西部 West	7	31.9 (17.6~46.2)			98
性别 Gender			891.090	<0.001	
男 Male	14	4.9 (3.3~6.4)			96
女 Female	14	22.9 (17.7~28.0)			99
专业 Profession			475.514	<0.001	
护士 Nurse	8	21.6 (13.2~29.9)			97
医生 Doctor	8	5.2 (2.8~7.5)			99
其他医务人员 Others	8	4.8 (2.2~7.4)			97
焦虑程度 Anxiety level			1 399.576	<0.001	
轻度 Mild	24	18.6 (14.0~23.2)			99
中度 Moderate	24	5.5 (4.1~6.8)			94
重度 Severe	24	1.9 (1.3~2.5)			99
焦虑评估量表 Anxiety assessment scale			141.673	<0.001	
GAD-7	16	31.2 (22.6~39.1)			99
SAS	15	26.3 (20.5~32.1)			97

2.4 敏感性分析及发表偏倚评估结果 先依次排除低质量文献 [7] 和 [18], 合并 Meta 分析医务人员焦虑检出率分别为 27.7% (95%CI: 22.9%~32.4%) 和 29.2% (95%CI: 24.4%~34.1%), I^2 均为 99%, 均 $P < 0.001$; 再逐一排除其他研究文献, 合并 Meta 分析医务人员焦虑检出率、 I^2 值和 P 值与图 1 结果比较, 差异无统计学意义 (均 $P > 0.05$), Meta 分析结果及异质性检验稳定。漏斗图呈分布对称, 无发表偏倚, 见图 2; Begg 秩相关检验结果显示, Kendall's $\tau = -0.020$, $P = 0.890$, 无发表偏倚。

3 讨论

本研究纳入了 36 篇有关 COVID-19 疫情期间医务人员焦虑状况的研究文献, 其中 33 篇为国内研究文献。调查医务人员共计 19 872 人, 其中检出焦虑 5 261 人, 焦虑检出率为 28.8% (95%CI: 24.0%~33.6%), 提示应重视医务人员心理健康, 及时开展心理咨询与干预。

对 33 篇国内研究进行亚组分析, 结果显示, 女性医务人员焦虑检出率高于男性医务人员, 护士焦虑

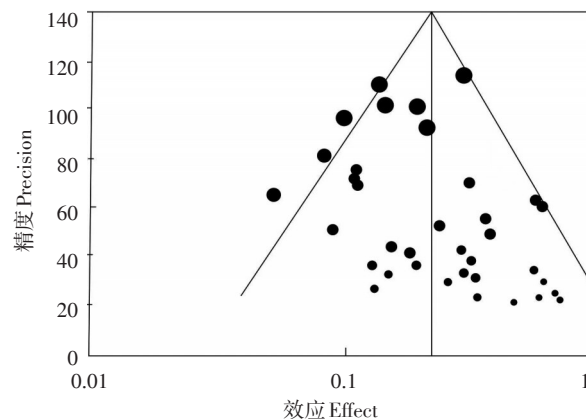


图 2 发表偏倚漏斗图

Figure 2 Funnel plot of publication bias

检出率高于医生及其他医务人员, 其原因可能与工作岗位特性有关 [6]。护士要执行各种治疗及护理操作, 与 COVID-19 患者的接触时间较长, 承受的压力较大, 焦虑发生率较高; 而且国内医院的护士绝大多数为女性, 因此女性医务人员焦虑检出率高于男性医务人员。我国西部地区医务人员焦虑检出率较高, 东部地区相对较低, 可能与资源

配置、COVID-19 防控措施落实程度的地区差异有关。本研究纳入的文献绝大多数采用 GAP-7 和 SAS 量表评估焦虑状况, GAD-7 量表对 COVID-19 疫情期间医务人员的焦虑检出率高于 SAS 量表, 提示评估量表可能是研究间异质性的来源之一。本研究还发现, COVID-19 疫情期间出现焦虑的医务人员以轻度焦虑为主, 应及早给予心理支持和干预, 有利于尽快恢复健康。

本研究纳入的 36 项关于 COVID-19 疫情期间医务人员的焦虑研究文献, 总体质量处于中等水平。各研究之间存在明显的异质性, 可能与研究地区、疫情严重程度、研究性质均为横断面研究等因素有关。因此对于 Meta 合并结果的解释及推广需谨慎对待, 未来需要更多证据的进一步支持。

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- 收稿日期: 2021-12-29 修回日期: 2022-04-22 本文编辑: 徐文璐

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- 收稿日期: 2022-03-09 修回日期: 2022-05-21 本文编辑: 徐文璐