

心血管疾病与勃起功能障碍相关流行病学研究的文献计量学分析

田国祥 刘小平 曾宪涛 苏新军 魏万林 王行环

430071 武汉大学中南医院泌尿外科(田国祥、苏新军、王行环),循证与转化医学中心(刘小平、曾宪涛); 100700 北京,解放军陆军总医院干四科(魏万林)

通信作者:王行环, Email:wangxinghuan1965@163.com; 魏万林, Email: weiwanlin2012@126.com

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【摘要】 目的 分析勃起功能障碍(ED)和心血管疾病(CVD)研究领域的研究现状和发展趋势。**方法** 通过检索Scopus数据库ED与CVD研究领域发表的相关性流行病学原始研究,检索时间段为1957年至2016年10月28日,采用文献计量学分析的方法,分析其发表年份、国家/地区分布、研究机构分布、被引情况、研究者合著关系。**结果** 近60年共计发表412篇ED与CVD相关性的流行病学原始研究,其发文量呈逐年上升趋势,并在过去10年内达到稳定。欧美国家(尤其是美国 and 意大利)在该研究领域处于领先地位,基于ED与CVD的临床研究和流行病学研究是该领域的研究热点,同时该研究领域内的学者多存在较密切的合作关系。**结论** 分析提示,加强学科交叉合作,以临床应用为出发点,是ED与CVD相关领域的研究趋势。

【关键词】 勃起功能障碍; 心血管疾病; 文献计量学分析

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Bibliometric analysis on relations between cardiovascular disease and erectile dysfunction Tian

Guoxiang, Liu Xiaoping, Zeng Xiantao, Su Xinjun, Wei Wanlin, Wang Xinghuan

Department of Urology, (Tian GX, Su XJ, Wang XH), Center for Evidence-Based and Translational Medicine (Liu XP, Zeng XT), Zhongnan Hospital of Wuhan University, Wuhan 430071, China; Department of 4th Cadres Ward, PLA Army General Hospital, Beijing 100700, China (Wei WL)

Corresponding authors: Wang Xinghuan, Email: wangxinghuan1965@163.com; Wei Wanlin, Email: weiwanlin2012@126.com

【Abstract】 Objective To understand the current situation and trend on the relations between erectile dysfunction (ED) and cardiovascular disease (CVD) through analyzing the epidemiologic research data. **Methods** We conducted a literature search on the Scopus for potentially relevant epidemiologic studies on ED and CVD published from 1957 to October, 28, 2016. Age of the article, types, regions, citation, and co-authorship of the documents were recorded. **Results** A total number of 412 pieces of literature were published in the past six decades, with original articles the most common types of ED and CVD. ED and CVD associated epidemiologic topics had an annual increase in number, and remained stable in the past decade, with occident countries as the United States and Italy taking the lead in this area. Clinical and epidemiological studies were the hottest areas, with most authors sharing a co-authorship. **Conclusion** Our results suggested that inter-disciplinary cooperation with emphasize on clinical application were the effective starting points for ED and CVD associated epidemiologic studies.

【Key words】 Erectile dysfunction; Cardiovascular disease; Bibliometric analysis

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勃起功能障碍(ED)是指阴茎不能维持有效的勃起且持续时间>6个月无法获得满意的性生活^[1-2]。有研究报道40~70岁的中老年男性中有52%患有不同程度的ED,其年发病率为12.4%^[3-5]。心血管疾病(CVD)具有高患病率、致残率和死亡率,

严重威胁>50岁中老年人的健康和生活质量^[6-7]。有研究表明,ED与CVD具有相同的危险因素和致病机制,经常伴随发生^[8-9]。通过文献计量学分析方法分析某一领域发表的流行病学研究具有重要意义^[10-11]。本文通过对近60年来在ED与CVD研究领

域发表的相关流行病学原始研究进行文献计量学分析,以了解两者间相关性研究现状和趋势。

资料与方法

1. 文献检索:通过在Scopus数据库(<https://www.scopus.com/>)检索ED与CVD领域发表的相关文献,检索时间为1957年至2016年10月28日。使用的检索式为:TITLE-ABS (“cardiovascular disease”) OR TITLE-ABS (“acute coronary syndrome”) OR TITLE-ABS (“hypertension”) OR TITLE-ABS (“coronary heart disease”) OR TITLE-ABS (“myocardial infarction”) OR TITLE-ABS (“coronary artery disease”) OR TITLE-ABS (“ischemic heart disease”) OR TITLE-ABS (“cardiovascular”) OR TITLE-ABS (“stroke”) OR TITLE-ABS (“myocardial ischaemia”) OR TITLE-ABS (“heart arrest”) OR TITLE-ABS (“sudden cardiac death”) OR TITLE-ABS (“coronary syndrome”) OR TITLE-ABS (“angina pectoris”) OR TITLE-ABS (“coronary disease”) OR TITLE-ABS (“cardiovascular mortality”) OR TITLE-ABS (“cardiac death”) OR TITLE-ABS (“cardiac mortality”) OR TITLE-ABS (“cardiovascular outcome”) OR TITLE-ABS (“cardiovascular death”) OR TITLE-ABS (“high blood pressure”) OR TITLE-ABS (“hyperpiesis”) OR TITLE-ABS (“hypertensive disease”) OR TITLE-ABS (“heart attack”) OR TITLE-ABS (“cardiomyopathy”) OR TITLE-ABS (“heart arrhythmia”) OR TITLE-ABS (“congenital heart disease”) OR TITLE-ABS (“valvular heart disease”) OR TITLE-ABS (“carditis”) OR TITLE-ABS (“aortic aneurysms”) OR TITLE-ABS (“hypertensive heart disease”) OR TITLE-ABS (“venous thrombosis”) AND TITLE-ABS (“erectile dysfunction”) OR TITLE-ABS (“sexual impotence”) OR TITLE-ABS (“impotence”) AND TITLE-ABS-KEY (“diagnostic test”) OR TITLE-ABS-KEY (“behavioral surveillance”) OR TITLE-ABS-KEY (“birth defect surveillance”) OR TITLE-ABS-KEY (“hospital infections surveillance”) OR TITLE-ABS-KEY (“public health surveillance”) OR TITLE-ABS-KEY (“epidemiological surveillance”) OR TITLE-ABS-KEY (“mass screening”) OR TITLE-ABS-KEY (“ecological trend”) OR TITLE-ABS-KEY

(“surveillance of disease”) AND TITLE-ABS-KEY (“case control”) OR TITLE-ABS-KEY (“case parental control”) OR TITLE-ABS-KEY (“nested case control”) OR TITLE-ABS-KEY (“historical prospective”) OR TITLE-ABS-KEY (“epidemiological analysis”) OR TITLE-ABS-KEY [(analytic OR longitudinal OR cohort OR retrospective OR prospective) AND epidemiolog*] OR TITLE-ABS-KEY (“Clinical trial”) OR TITLE-ABS-KEY (“field trial”) OR TITLE-ABS-KEY (“community trial”) OR TITLE-ABS-KEY (“open trial”) OR TITLE-ABS-KEY (“randomized controlled trial”) AND TITLE-ABS-KEY [(Single blind OR double blind OR triple blind) OR epidemiological experiment* OR experimental epidemiolog* OR intervention trial*]。

2. 文献计量学分析:采用GraphPad 5.0软件绘制近60年来的ED与CVD相关研究的发表文献的时间分布和国家/地区分布图,对发表文献的机构、期刊分布及被引情况采用描述性分析,运用VOSviewer 1.6.4软件绘制研究者合著关系网络图^[12]。

结 果

1. 发表文献总览:1957—2016年共发表412篇ED与CVD流行病学原始文献。在近60年有关ED与CVD领域研究以及相关流行病学研究的文献呈逐年上升趋势,并在最近10年达到稳定(图1)。发表ED与CVD相关流行病学研究排名前10的国家依次是美国、意大利、英国、西班牙、德国、巴西、中国、土耳其、加拿大、南非。412篇文献共涉及190种期刊,ED与CVD领域相关流行病学研究发文量排名前9的期刊分别是 *Journal of Sexual Medicine* (71篇), *BJU International* (18篇), *International*

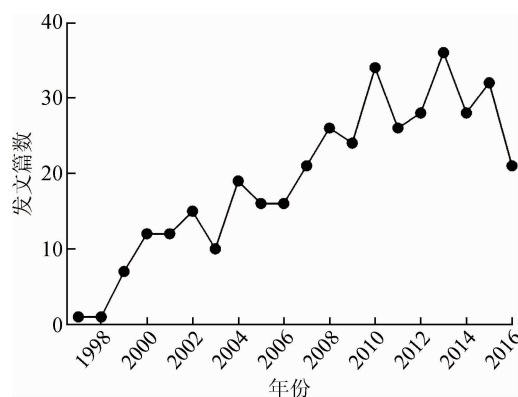
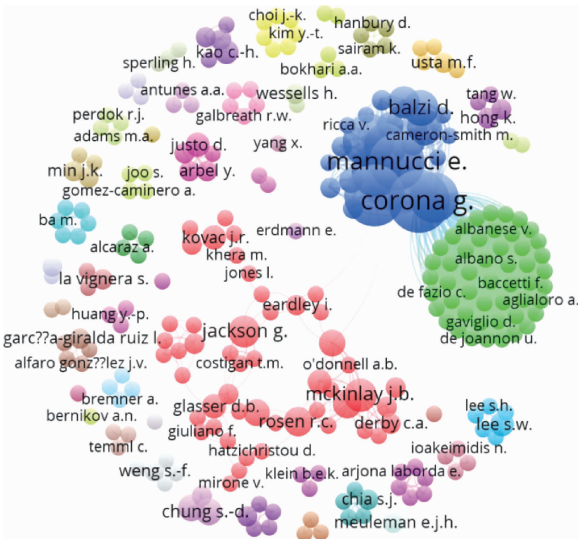


图1 1957—2016年国内外学者在ED与CVD研究领域的发文量情况

Journal of Impotence Research (18 篇), *Journal of Urology*(13 篇), *Urology*(11 篇), *International Journal of Clinical Practice* (9 篇), *American Journal of Cardiology* (8 篇), *European Urology* (7 篇), *Revista Internacional de Andrologia*(6 篇)。

2. 文献被引情况: 412 篇文献中有 348 篇 (84.5%) 被其他研究所引用, 其中 90 篇研究被应用次数 ≥ 3 次。所有被纳入文献的被引用次数为 10 045 次, 平均被引用次数为 24.38 次。348 篇有被引记录研究的年均被引次数为 28.86 次。进一步分析所纳入的研究标题中包含有 ED 和 CVD 文献的被引情况发现, 美国学者 Johannes 等在 *Journal of Urology* 上发表的题为 Incidence of erectile dysfunction in men 40 to 69 years old: longitudinal results from the Massachusetts male aging study, 累计被引频次最高, 达 365 次。近 60 年在 ED 与 CVD 领域被引次数排名前 10 的文献见表 1^[13-22]。对被引频次排名前 10 的文献进一步分析显示, 有 4 篇关于 ED 与 CVD 发病流行病学研究^[13-14, 19, 22], 4 篇关于 ED 与 CVD 相关危险因素的研究^[17-18, 20-21], 另有 2 篇关于 ED 与 CVD 治疗的研究^[15-16]。

3. 研究者及合著网络: 共有 2 151 名作者参与全部文献的发表, 共有 271 名发文数量不低于 2 篇的研究人员构成过去近 60 年在 ED 与 CVD 领域的合作者网络关系图(图 2)。根据研究人员之间的合著关系的密切程度, 进行聚类分析(以不同的颜色显示), 可见在 ED 与 CVD 相关性研究领域, 大部分学者有



注: 每个节点代表一个研究人员, 节点的大小代表其发文量的多少, 节点之间的连线代表研究人员之间的合著关系, 连线越粗代表相应的研究人员之间的合著次数越多

图2 1957—2016 年中外学者在 ED 与 CVD 研究领域合著网络聚类分析

着较为密切的合作关系, 部分学者间联系较少。

讨 论

本研究分析近 60 年来国内外基于 ED 与 CVD 相关流行病学研究发表文献提示, 在 20 世纪 50—80 年代, 文献量相对较少, 此后, 尤其是 90 年代后, 研究的文献量逐年增加, 至 2000 年后维持在每年发表 20~30 篇水平。究其原因可能是随着生活水平的提高、人口的老年化导致 ED 和 CVD 确诊率逐渐增加; 而西地那非被批准应用于临床, 进一步加速了

表1 412篇检索文献标题中包含ED与CVD关键词被引次数排名前10的文献

第一作者	文献标题	发表年份	期刊	被引次数/年	被引频次
Johannes ^[13]	Incidence of erectile dysfunction in men 40 to 69 years old: longitudinal results from the Massachusetts male aging study	2000	<i>Journal of Urology</i>	22.12	365
Rosen ^[14]	The multinational Men's Attitudes to Life Events and Sexuality (MALES) Study: I. prevalence of erectile dysfunction and related health concerns in the general population	2004	<i>Current Medical Research and Opinion</i>	25.52	319
Rendell ^[15]	Sildenafil for treatment of erectile dysfunction in men with diabetes: a randomized controlled trial	1999	<i>Journal of the American Medical Association</i>	16.4	287
Esposito ^[16]	Effect of lifestyle changes on erectile dysfunction in obese men: a randomized controlled trial	2004	<i>Journal of the American Medical Association</i>	22.48	281
Feldman ^[17]	Erectile dysfunction and coronary risk factors: prospective results from the Massachusetts male aging study	2000	<i>Preventive Medicine</i>	16.30	269
Fattovich ^[18]	A survey of adverse events in 11 241 patients with chronic viral hepatitis treated with alfa interferon	1996	<i>Journal of Hepatology</i>	12.97	266
Inman ^[19]	A population-based, longitudinal study of erectile dysfunction and future coronary artery disease	2009	<i>Mayo Clinic Proceedings</i>	25.46	191
Fung ^[20]	Heart disease risk factors predict erectile dysfunction 25 years later: the Rancho Bernardo Study	2004	<i>Journal of the American College of Cardiology</i>	14.32	179
Lewis ^[21]	Epidemiology/risk factors of sexual dysfunction	2004	<i>Journal of Sexual Medicine</i>	13.52	169
Klein ^[22]	Prevalence of self-reported erectile dysfunction in people with long-term IDDM	1996	<i>Diabetes Care</i>	7.85	161

基于ED与CVD的研究^[15]。

在ED与CVD相关研究领域发表的文献中,美国和意大利在该领域的发文量明显高于其他国家。提示两国在该研究领域的领先地位。该研究领域发表文献最多的杂志大多属于泌外科和性学专业杂志(其中以*Journal of Sexual Medicine*发表相关文献最多),专业期刊多经过行业内公认的专家进行同行评议,一般发表相关领域质量较高的论文,说明该研究领域在过去近60年内确实取得了长足进展。文献被引情况是反映该研究的价值及学术影响力的重要指标。ED和CVD具有共因关系(共同的危险因素,包括老年、吸烟、糖尿病、脂代谢紊乱、紧张及抑郁、肥胖等),同时还具有互为因果的关系,如阴茎动脉粥样硬化、心排量减低和使用治疗心血管疾病药物,通常导致ED的发生,而ED导致的焦虑和抑郁,也可致心血管疾病的发生^[21,24]。研究者合著网络关系图提示,该研究领域的学者大多存在比较密切的合作关系,可能提示学科间交叉合作研究是ED与CVD研究的重要方式。

综上所述,本文分析显示近60年来,基于ED与CVD相关的研究以原始论著为主,其发文量呈逐年上升趋势,并在近10年内达到稳定;美国和意大利在该研究领域处于领先地位;基于ED与CVD的临床研究和流行病学研究是该领域的研究热点,研究领域内的学者多存在较为密切的合作关系。

利益冲突 无

参 考 文 献

- [1] Patel CK, Bennett N. Advances in the treatment of erectile dysfunction: what's new and upcoming? [J]. F1000Res, 2016, 5: F1000 Faculty Rev-369. DOI: 10.12688/f1000research.7885.1.
- [2] Dauntan A, Goulding J. Erectile dysfunction in dermatology: it's not as hard as you think [J]. Skinmed, 2016, 14(3): 171-174.
- [3] Son YJ, Jang M, Jun EY. Prevalence of erectile dysfunction and associated factors in Korean older adults with coronary artery disease [J]. J Gerontol Nurs, 2016, 42(10): 32-41. DOI: 10.3928/00989134-20160701-02.
- [4] Benatta M, KaziTani N, Sallami S, et al. Prevalence of erectile dysfunction in patients consulting urological clinics: multicentric survey in the algerian west [J]. Tunis Med, 2016, 94(2): 123-127.
- [5] Huang YP, Chen B, Ping P, et al. Asexuality development among middle aged and older men [J]. PLoS One, 2014, 9(3): e92794. DOI: 10.1371/journal.pone.0092794.
- [6] Anderson TJ, Grégoire J, Pearson GJ, et al. 2016 Canadian Cardiovascular Society Guidelines for the management of dyslipidemia for the prevention of cardiovascular disease in the adult [J]. Can J Cardiol, 2016, 32(11): 1263-1282. DOI: 10.1016/j.cjca.2016.07.510.
- [7] Zhong Y, Rosengren A, Fu M, et al. Secular changes in cardiovascular risk factors in Swedish 50-year-old men over a 50-year period: the study of men born in 1913, 1923, 1933, 1943, 1953 and 1963 [J]. Eur J Prev Cardiol, 2016, 24(6): 612-620. DOI: 10.1177/2047487316676905.
- [8] Omrand T, Randby A, Hrubos-Strøm H, et al. Relation of erectile dysfunction to subclinical myocardial injury [J]. Am J Cardiol, 2016, 118(12): 1821-1825. DOI: 10.1016/j.amjcard.2016.08.070.
- [9] Basu J, Sharma S. Erectile dysfunction heralds onset of cardiovascular disease [J]. Practitioner, 2016, 260(1794): 21-23.
- [10] 沈霞, 李昂, 詹思延. 利用SCI数据库分析流行病学研究现状 [J]. 中华医学科研管理杂志, 2010, 23(2): 125-128. DOI: 10.3760/cma.j.issn.1006-1924.2010.02.020.
- [11] Shen X, Li A, Zhan SY. Research on status of epidemiology by Science Citation Index [J]. Chin J Med Sci Res Manage, 2010, 23(2): 125-128. DOI: 10.3760/cma.j.issn.1006-1924.2010.02.020.
- [12] 沈霞, 李昂, 詹思延. 利用Web of Science数据库分析循证医学的研究现状 [J]. 中华流行病学杂志, 2008, 29(5): 512-514. DOI: 10.3760/j.issn.0254-6450.2008.05.022.
- [13] Shen X, Li Ang, Zhan SY. Using Web of Science database to analyze the current situation of evidence-based medicine. Chin J Epidemiol, 2008, 29(5): 512-514. DOI: 10.3760/j.issn.0254-6450.2008.05.022.
- [14] Jan Van Eck N, Waltman L. Text mining and visualization using VOSviewer [J]. ISSI Newslett, 2011, 7(3): 50-54.
- [15] Johannes CB, Araujo AB, Feldman HA, et al. Incidence of erectile dysfunction in men 40 to 69 years old: longitudinal results from the Massachusetts male aging study [J]. J Urol, 2000, 163(2): 460-463. DOI: 10.1016/S0022-5347(05)67900-1.
- [16] Rosen RC, Fisher WA, Eardley I, et al. The multinational Men's Attitudes to Life Events and Sexuality (MALES) Study: I. prevalence of erectile dysfunction and related health concerns in the general population [J]. Curr Med Res Opin, 2004, 20(5): 607-617. DOI: 10.1185/030079904125003467.
- [17] Rendell MS, Rajfer J, Wicker PA, et al. Sildenafil for treatment of erectile dysfunction in men with diabetes: a randomized controlled trial. Sildenafil Diabetes Study Group [J]. JAMA, 1999, 281(5): 421-426. DOI: 10.1001/jama.281.5.421.
- [18] Esposito K, Giugliano F, Di Palo C, et al. Effect of lifestyle changes on erectile dysfunction in obese men: a randomized controlled trial [J]. JAMA, 2004, 291(24): 2978-2984. DOI: 10.1001/jama.291.24.2978.
- [19] Feldman HA, Johannes CB, Derby CA, et al. Erectile dysfunction and coronary risk factors: prospective results from the Massachusetts male aging study [J]. Prev Med, 2000, 30(4): 328-338. DOI: 10.1006/pmed.2000.0643.
- [20] Fattovich G, Giustina G, Favarato S, et al. A survey of adverse events in 11,241 patients with chronic viral hepatitis treated with alpha interferon [J]. J Hepatol, 1996, 24(1): 38-47. DOI: 10.1016/S0168-8278(96)80184-X.
- [21] Inman BA, Sauver JL, Jacobson DJ, et al. A population-based, longitudinal study of erectile dysfunction and future coronary artery disease [J]. Mayo Clin Proc, 2009, 84(2): 108-113. DOI: 10.4065/84.2.108.
- [22] Fung MM, Bettencourt R, Barrett-Connor E. Heart disease risk factors predict erectile dysfunction 25 years later: the Rancho Bernardo Study [J]. J Am Coll Cardiol, 2004, 43(8): 1405-1411. DOI: 10.1016/j.jacc.2003.11.041.
- [23] Lewis RW, Fugl-Meyer KS, Bosch R, et al. Epidemiology/risk factors of sexual dysfunction [J]. J Sex Med, 2004, 1(1): 35-39. DOI: 10.1111/j.1743-6109.2004.10106.x.
- [24] Klein R, Klein BE, Lee KE, et al. Prevalence of self-reported erectile dysfunction in people with long-term IDDM [J]. Diabetes Care, 1996, 19(2): 135-141. DOI: 10.2337/diacare.19.2.135.

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