

论著·公共卫生

冠心病患者参加门诊心脏康复的障碍水平调研及相关因素分析

刘霞, 温弗乐, 章雅青

上海交通大学护理学院, 上海 200025

[摘要] **目的**·评估冠状动脉粥样硬化性心脏病(冠心病)患者参加门诊心脏康复(cardiac rehabilitation, CR)的障碍水平现状并分析其相关因素。**方法**·采用方便抽样方法,于2017年10月—12月选取上海市杨浦区、虹口区、宝山区及松江区的7所三级甲等综合医院住院或门诊就诊的冠心病患者为研究对象。采用一般资料问卷、心脏康复相关信息知晓度调查问卷(Cardiac Rehabilitation Information Awareness Questionnaire, CRIAQ)及中文版心脏康复障碍量表(Chinese/Mandarin Cardiac Rehabilitation Barriers Scale, CRBS-C/M)进行调查,分析冠心病患者的CR信息知晓情况、CR障碍因素现状及相关因素。**结果**·共发放问卷390份,回收有效问卷342份,问卷有效回收率为87.7%。冠心病患者平均年龄(67.03 ± 10.83)岁,听说过CR的患者为42人(12.3%)。CRBS-C/M的总均分中位数为3.10(2.71, 3.43)分,各维度均分中位数介于3.00~3.50分,其中外部后勤因素障碍评分最高,为3.50(3.00, 4.00)分;前3位的阻碍因素条目分别是“距离”“天气恶劣”和“我不知晓心脏康复”,同意或非常同意的患者比例分别为75.4%(258/342)、69.3%(237/342)和67.8%(232/342)。CRIAQ平均得分为(46.48 \pm 12.54)分。多元线性回归分析结果显示,CRIAQ得分($\beta = -0.242, P = 0.000$)、是否为不稳定型心绞痛($\beta = 0.194, P = 0.000$)、性别($\beta = 0.154, P = 0.002$)及是否参加门诊CR项目($\beta = -0.128, P = 0.016$)是冠心病患者CR障碍水平的相关因素($F = 8.909, P = 0.000$),可解释总变异量的25.9%。**结论**·冠心病患者CR障碍处于中上水平,最大障碍因素是外部后勤因素;患者认为阻碍其参加CR的前3位原因分别是距离远、天气恶劣及不知晓CR。CR信息知晓度高、参加门诊CR项目患者的CR障碍水平较低,不稳定型心绞痛、女性患者的CR障碍的水平较高。

[关键词] 冠状动脉粥样硬化性心脏病(冠心病);心脏康复;心脏康复障碍量表;心脏康复相关信息知晓度调查问卷

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Investigation and related factor analysis of barriers to outpatient cardiac rehabilitation in patients with coronary heart disease

LIU Xia, WEN Fule, ZHANG Yaqing

Shanghai Jiao Tong University School of Nursing, Shanghai 200025, China

[Abstract] **Objective**·To evaluate the current status of barriers to outpatient cardiac rehabilitation (CR) in patients with coronary heart disease (CHD) and analyze related factors. **Methods**·From October to December 2017, the inpatients or outpatients with CHD from seven tertiary general hospitals in Yangpu District, Hongkou District, Baoshan District and Songjiang District of Shanghai were selected as the research objects by convenient sampling method. The general information questionnaire, the Cardiac Rehabilitation Information Awareness Questionnaire (CRIAQ) and the Chinese/Mandarin Cardiac Rehabilitation Barriers Scale (CRBS-C/M) were used to investigate the awareness of CR information, the barriers to CR and related factors in the patients with CHD. **Results**·A total of 390 questionnaires were distributed, and 342 valid questionnaires were recovered, with an effective recovery rate of 87.7%. The average age of the CHD patients was (67.03 ± 10.83) years old. Among them, 42 patients (12.3%) had heard of CR. The overall median score of CRBS-C/M was 3.10 (2.71, 3.43) points, and the median scores of five dimensions ranged from 3.00 to 3.50 points. The median score of external logistical factors was the highest, which was 3.50 (3.00, 4.00) points. The top three barriers were "distance" "severe weather" and "I did not know about cardiac rehabilitation", with 75.4% (258/342), 69.3% (237/342) and 67.8% (232/342) of the patients agreeing or strongly agreeing, respectively. The average score of CRIAQ was (46.48 \pm 12.54) points. Multiple linear regression analysis showed that CRIAQ score ($\beta = -0.242, P = 0.000$), whether diagnosed as unstable

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[作者简介] 刘霞(1978—),女,副主任护师,博士生;电子信箱:liuxia@xinhumed.com.cn。

[通信作者] 章雅青,电子信箱:zhangyqf@shsmu.edu.cn。

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[Corresponding Author] ZHANG Yaqing, E-mail: zhangyqf@shsmu.edu.cn。

angina or not ($\beta=0.194$, $P=0.000$), gender ($\beta=0.154$, $P=0.002$) and whether participating in outpatient CR programs or not ($\beta=-0.128$, $P=0.016$) were the related factors of CR barriers in the patients with CHD ($F=8.909$, $P=0.000$), which explained 25.9% of the total variation. **Conclusion** The CR barrier of the patients with CHD is in the upper middle level, and the biggest barrier factor is the external logistical factor. The top three reasons that patients think hindering their participation in CR are long distance, severe weather and not knowing about CR. The patients with high awareness of CR information, or participating in outpatient CR programs have a low level of CR barriers, while the patients with unstable angina pectoris or the female patients have a high level.

[Key words] coronary heart disease (CHD); cardiac rehabilitation (CR); Cardiac Rehabilitation Barriers Scale (CRBS); Cardiac Rehabilitation Information Awareness Questionnaire (CRIAQ)

冠状动脉粥样硬化性心脏病 (coronary heart disease, CHD), 简称冠心病, 是指冠状动脉粥样硬化导致心肌缺血、缺氧而引起的心脏病, 属于缺血性心脏病^[1]。据推算, 2021年我国心血管疾病患病人数为3.3亿, 其中冠心病患者为1 139万^[2]。心血管病负担日渐加重, 已成为重大的公共卫生问题。心脏康复 (cardiac rehabilitation, CR) 是涉及医学评价、处方运动、心脏危险因素矫正、教育、咨询和行为干预的综合长期干预措施^[3]; CR分为3期, 即院内康复期 (I期)、院外早期康复或门诊康复期 (II期) 和心血管事件1年后的院外长期康复 (III期)^[4]。因目前CHD患者住院时间仅为1周左右, 所以院内康复时间有限, II期康复即门诊康复成为CHD康复的核心阶段: 一般在出院后1~6个月进行, 在CR团队的监护下进行有氧代谢运动、抗阻运动以及柔韧性训练; 推荐运动康复次数为36次, 不低于25次^[4]。研究^[5-6]证明, CR的疗程与长期预后之间存在剂量-效应关系, 即每多参加1次CR治疗, 患者死亡率将下降1%。虽然CR的益处已经得到了循证支持, 但是患者CR的参与率并不理想: 在美国符合参加CR条件的冠心病患者中, 有80%~90%并未接受系统的康复服务^[7]; 在澳大利亚和日本符合CR条件的患者中, 分别仅有29%和21%参与了CR^[8-9]; 国内由于CR发展起步较晚, 尚未形成系统的CR模式, 少量报道的参与率低于10%^[10]。目前国内研究大部分都是基于现有CR指南直接对患者进行干预, 在干预前缺乏识别患者CR参与率低的影响因素^[11-13], 更加缺乏从障碍角度探讨影响患者参加CR的因素。本研究拟采用中文版的心脏康复障碍量表 (Chinese/Mandarin Cardiac Rehabilitation Barriers Scale, CRBS-C/M)^[14] 在上海冠心病患者人群中开展调查, 评估患者参加门诊CR的障碍及其相关因素, 为今后医务人员更好地开展CR干预提供借鉴和参考。

1 对象与方法

1.1 研究对象

采用便利抽样的方法, 选取上海市杨浦区、虹口区、宝山区及松江区7所三级甲等综合医院2017年10月—12月门诊或住院的冠心病患者为研究对象。纳入标准: 经冠状动脉造影确诊为冠心病; 年龄大于18岁; 具有良好的理解和沟通能力。排除标准: 患有CR禁忌证^[15]; 美国纽约心脏病学会 (New York Heart Association, NYHA) 心功能等级IV级; 既往有精神病史以及无法完成问卷调查。

1.2 一般资料收集及研究工具

1.2.1 一般资料 主要收集患者的社会人口学资料 and 一般健康状况资料, 包括性别、婚姻、学历、收入、医保、居住方式、在职情况、民族、户口所在地、病程、合并症、心功能、家族史、照顾者、康复知识获取来源、是否知晓CR、患者吸烟及运动习惯等信息。

1.2.2 CRBS-C/M 英文版心脏康复障碍量表 (Cardiac Rehabilitation Barriers Scale, CRBS) 由加拿大GRACE教授团队编制, 是首个能够多层面测量患者参与门诊CR障碍的量表, 对于参加及未参加CR的患者都可进行评估。各维度及总量表得分均使用均值分进行描述, 范围1~5分, 分值越高, 说明参加和坚持门诊CR计划的阻碍越大^[16]。LIU等^[14] 对其进行汉化, 经过文化调试后, 保留原量表21个条目, 将4个维度修订为5个维度, 分别命名为“外部后勤因素”“时间冲突”“心脏康复需求”“合并症/功能状态”及“心脏康复项目和健康体系层面因素”。各条目采用Likert 5级计分, 从“非常不同意”到“非常同意”, 分别计1~5分。CRBS-C/M总量表的Cronbach's α 系数为0.883, 各维度的Cronbach's α 系数在0.674~0.823之间, 量表的内容效度为0.924^[14]。

本研究中该量表的 Cronbach's α 系数为 0.890, 说明 CRBS-C/M 具有良好的信度。

1.2.3 心脏康复相关信息知晓度调查问卷 心脏康复相关信息知晓度调查问卷 (Cardiac Rehabilitation Information Awareness Questionnaire, CRIAQ) 由李婧^[17]编制而成, 是针对冠心病患者 CR 相关知识的特异性调查问卷, 问卷包括“心脏康复基本信息”“情绪管理”“饮食管理”“体重管理”“运动管理”“冠心病危险因素”等 13 个方面, 共 29 个条目。计分标准: 单选题赋值 1 分, 答对得 1 分, 答错得 0 分; 多选题除“不知道”选项外, 每个选项均赋值 1 分, 选项选对得 1 分, 选错不得分, 如多选题中选择“不知道”选项, 则此多选题计分为 0 分。总分为 93 分, 得分越高说明患者对 CR 相关信息的知晓度越好。该问卷 Cronbach's α 系数为 0.945, 所有条目的平均内容效度指数为 0.82^[17]。本研究中该问卷 Cronbach's α 系数为 0.797。

1.3 资料收集方法

采用横断面调查, 每家医院调研 0.5 d, 调查问卷由经培训后的小组成员统一发放。小组成员需当面告知患者本问卷的主要目的及用途, 在患者签署知情同意书后, 将问卷发放给患者当场填写。填写完毕后, 当场检查有无漏项及错项, 及时返回填补修正。无效问卷剔除原则: ①规律性作答 (如 Z 字形作答或都选“3”等)。②问卷中未答率大于 10%。对于极少量缺失值, 分类变量采用众数法进行插补, 连续性变量采用序列平均值进行插补。

1.4 统计学方法

采用 SPSS 23.0 进行数据处理及分析。定量资料如符合正态分布, 采用 $\bar{x} \pm s$ 描述, 如为非正态分布, 采用 $M (Q_1, Q_3)$ 进行统计描述。定性资料采用频数和百分比描述。2 组间比较时, 如数据呈偏态分布, 采用 Mann-Whitney U 检验; 多组间比较时, 如数据呈偏态分布, 采用 Kruskal-Wallis H 检验进行差异分析; 因 CRBS-C/M 得分数据呈偏态, 故 CRIAQ 与 CRBS-C/M 之间的相关性分析采用 Spearman 相关系数。将单因素分析有统计学意义的变量作为自变量, 以 CRBS-C/M 得分为因变量, 进行多元线性回归分析, 检验水准为 $\alpha=0.05$ 。

2 结果

2.1 冠心病患者参与 CR 的障碍情况

本次共发放问卷 390 份, 回收有效问卷 342 份, 问卷有效回收率为 87.7%。冠心病患者 CRBS-C/M 总均分及各维度均分的中位数在 3.00~3.50 分之间, 处于最大障碍 5 分的中上水平, 外部后勤因素障碍评分最高, 详见表 1。按同意或非常同意的患者比例排序, 前 3 位的阻碍因素分别是“距离” (258/342, 75.4%)、“天气恶劣” (237/342, 69.3%) 和“我不知晓心脏康复” (232/342, 67.8%)。

表 1 冠心病患者 CRBS-C/M 总均分及各维度均分 ($n=342$)

Tab1 Scores of CRBS-C/M and the subscale in the CHD patients ($n=342$)

| CRBS-C/M | Score/point | Maximal/point |
|---|-------------------|---------------|
| Total | 3.10 (2.71, 3.43) | 5 |
| Factor 1: External logistical factors | 3.50 (3.00, 4.00) | 5 |
| Factor 2: Time conflicts | 3.00 (2.00, 3.50) | 5 |
| Factor 3: CR need | 3.00 (2.33, 3.50) | 5 |
| Factor 4: Comorbidities/functional status | 3.00 (2.50, 3.50) | 5 |
| Factor 5: Program and health system-level factors | 3.00 (2.67, 3.67) | 5 |

2.2 冠心病患者 CR 信息知晓度的现状

听说过 CR 的患者为 42 人, 占比 12.3%; 患者的 CRIAQ 总分为 (46.48 \pm 12.54) 分, 处于满分 93 分的中等水平, 与上海市某三甲医院经皮冠状动脉介入治疗 (percutaneous coronary intervention, PCI) 术后患者的 CR 信息知晓水平结果^[18]基本一致。

2.3 冠心病患者社会人口学特征、健康行为及康复知识获取来源与 CR 障碍的相关性

342 例患者年龄为 (67.03 \pm 10.83) 岁; 体质量指数 (body mass index, BMI) 为 (24.34 \pm 3.43) kg/m²。单因素分析结果显示, 不同性别、户口所在地、居住方式、疾病类型、是否听说过 CR、是否积极锻炼、是否参加门诊 CR 及是否通过可以带回家的视频资料/讲座/印刷本/互联网资源获取康复知识的冠心病患者的 CRBS-C/M 总均分之间差异有统计学意义 (均 $P<0.05$), 患者的 CRIAQ 总分与 CRBS-C/M 总均分呈负相关 ($r=-0.268, P=0.000$), 具体信息见表 2。

表2 冠心病患者社会人口学特征、健康行为、康复知识获取来源及CRIAQ总分与CRBS-C/M总均分的相关性 ($n=342$)

Tab 2 Correlations of CRBS-C/M score with sociodemographic characteristics, health behaviors, sources of rehabilitation knowledge, and CRIAQ score in the CHD patients ($n=342$)

| Characteristic variable | $n(\%)$ | Score of CRBS-C/M/point | Statistical value | P value |
|---|------------|-------------------------|-------------------|-----------|
| Gender | | | -2.546 | 0.011 |
| Male | 216 (63.2) | 3.05 (2.67, 3.38) | | |
| Female | 126 (36.8) | 3.19 (2.85, 3.49) | | |
| Age/year | | | -0.653 | 0.514 |
| <60 | 65 (19.0) | 3.14 (2.76, 3.50) | | |
| ≥ 60 | 277 (81.0) | 3.10 (2.71, 3.43) | | |
| BMI/($\text{kg} \cdot \text{m}^{-2}$) | | | 1.272 | 0.529 |
| <18.5 | 11 (3.2) | 3.24 (2.81, 3.33) | | |
| 18.5–23.9 | 150 (43.9) | 3.14 (2.71, 3.48) | | |
| ≥ 24.0 | 181 (52.9) | 3.10 (2.71, 3.39) | | |
| Registered residence | | | -2.599 | 0.009 |
| Town | 324 (94.7) | 3.10 (2.71, 3.43) | | |
| Country | 18 (5.3) | 3.33 (3.12, 3.52) | | |
| Marital status | | | -0.068 | 0.946 |
| Married | 326 (95.3) | 3.10 (2.71, 3.43) | | |
| Single and others | 16 (4.7) | 2.98 (2.81, 3.33) | | |
| Education | | | 3.225 | 0.199 |
| Junior high and below | 157 (45.9) | 3.14 (2.76, 3.43) | | |
| Technical secondary school/senior high school | 133 (38.9) | 3.10 (2.79, 3.48) | | |
| Junior college or above | 52 (15.2) | 2.93 (2.57, 3.29) | | |
| Work | | | -0.596 | 0.551 |
| In service | 54 (15.8) | 3.07 (2.64, 3.43) | | |
| Not in service | 288 (84.2) | 3.10 (2.76, 3.43) | | |
| Living style | | | -2.615 | 0.009 |
| Alone | 58 (17.0) | 3.26 (2.89, 3.63) | | |
| Not alone | 284 (83.0) | 3.10 (2.71, 3.38) | | |
| Primary caregiver | | | 3.905 | 0.142 |
| Self | 152 (44.4) | 3.10 (2.67, 3.43) | | |
| Spouse | 141 (41.2) | 3.10 (2.71, 3.43) | | |
| Children or Nanny | 49 (14.3) | 3.19 (2.90, 3.52) | | |
| Per capita annual income/yuan | | | 7.030 | 0.071 |
| $\leq 20\,000$ | 49 (14.3) | 3.19 (3.00, 3.43) | | |
| 20 001–40 000 | 102 (29.8) | 3.14 (2.76, 3.44) | | |
| 40 001–60 000 | 130 (38.0) | 3.10 (2.57, 3.52) | | |
| $>60\,000$ | 61 (17.8) | 2.95 (2.64, 3.24) | | |
| Payment | | | -0.780 | 0.436 |
| Self-paying | 16 (4.7) | 3.12 (2.95, 3.46) | | |
| Health insurance or public expense | 326 (95.3) | 3.10 (2.71, 3.43) | | |
| Hypertention | | | -1.953 | 0.051 |
| Yes | 244 (71.3) | 3.05 (2.67, 3.42) | | |
| No | 98 (28.7) | 3.14 (2.76, 3.49) | | |
| Diabetes | | | -0.880 | 0.379 |
| Yes | 123 (36.0) | 3.05 (2.67, 3.43) | | |
| No | 219 (64.0) | 3.14 (2.76, 3.43) | | |



Continued Tab

| Characteristic variable | n (%) | Score of CRBS-C/M/point | Statistical value | P value |
|---|------------|-------------------------|-------------------|---------|
| Hyperlipidemia | | | -0.582 | 0.560 |
| Yes | 73 (21.3) | 3.05 (2.76, 3.52) | | |
| No | 269 (78.7) | 3.10 (2.71, 3.40) | | |
| Stroke | | | -0.440 | 0.660 |
| Yes | 19 (5.6) | 3.24 (2.76, 3.43) | | |
| No | 323 (94.4) | 3.10 (2.71, 3.43) | | |
| Renal insufficiency | | | -0.076 | 0.939 |
| Yes | 11 (3.2) | 2.95 (2.67, 3.71) | | |
| No | 331 (96.8) | 3.10 (2.71, 3.43) | | |
| Transient ischemic attack | | | -1.378 | 0.168 |
| Yes | 4 (1.2) | 3.45 (2.92, 3.95) | | |
| No | 338 (98.8) | 3.10 (2.71, 3.43) | | |
| Peripheral vascular disease | | | -1.223 | 0.221 |
| Yes | 6 (1.8) | 2.67 (2.40, 3.31) | | |
| No | 336 (98.2) | 3.10 (2.73, 3.43) | | |
| CHD family history | | | -1.753 | 0.080 |
| Yes | 146 (42.7) | 3.02 (2.67, 3.43) | | |
| No | 196 (57.3) | 3.14 (2.76, 3.43) | | |
| Course of disease/year | | | 0.354 | 0.838 |
| <1 | 128 (37.4) | 3.12 (2.70, 3.49) | | |
| 1-5 | 101 (29.5) | 3.05 (2.57, 3.48) | | |
| >5 | 113 (33.0) | 3.12 (2.76, 3.33) | | |
| NYHA class | | | 4.658 | 0.097 |
| I | 163 (47.7) | 3.05 (2.67, 3.33) | | |
| II | 142 (41.5) | 3.14 (2.76, 3.49) | | |
| III | 37 (10.8) | 3.19 (2.88, 3.57) | | |
| Disease type | | | 31.689 | 0.000 |
| Occult heart disease | 158 (46.2) | 3.00 (2.57, 3.29) | | |
| Stable angina | 15 (4.4) | 3.05 (2.38, 3.52) | | |
| Unstable angina | 36 (10.5) | 3.48 (3.24, 3.71) | | |
| Myocardial infarction | 91 (26.6) | 3.14 (2.76, 3.43) | | |
| Others | 42 (12.3) | 3.17 (2.76, 3.48) | | |
| Tobacco use | | | -1.405 | 0.160 |
| Yes | 67 (19.6) | 3.05 (2.57, 3.38) | | |
| No | 275 (80.4) | 3.14 (2.76, 3.43) | | |
| Active exercise | | | -4.173 | 0.000 |
| Yes | 200 (58.5) | 3.00 (2.62, 3.29) | | |
| No | 142 (41.5) | 3.19 (2.90, 3.57) | | |
| Attending outpatient CR | | | -4.185 | 0.000 |
| Yes | 17 (5.0) | 2.38 (1.98, 2.81) | | |
| No | 325 (95.0) | 3.14 (2.76, 3.43) | | |
| Gaining CR knowledge from health care providers | | | -1.215 | 0.224 |
| Yes | 49 (14.3) | 3.07 (2.67, 3.43) | | |
| No | 293 (85.7) | 3.14 (2.95, 3.43) | | |

Continued Tab

| Characteristic variable | n (%) | Score of CRBS-C/M/point | Statistical value | P value |
|---|------------|-------------------------|-------------------|---------|
| Gaining CR knowledge from videos that can be taken home | | | -3.795 | 0.000 |
| Yes | 84 (24.6) | 2.69 (2.29, 3.42) | | |
| No | 258 (75.4) | 3.14 (2.86, 3.43) | | |
| Gaining CR knowledge from lectures | | | -4.912 | 0.000 |
| Yes | 39 (11.4) | 2.57 (2.19, 3.14) | | |
| No | 303 (88.6) | 3.14 (2.76, 3.48) | | |
| Gaining CR knowledge from printed booklets | | | -2.516 | 0.012 |
| Yes | 62 (18.1) | 2.88 (2.38, 3.40) | | |
| No | 280 (81.9) | 3.14 (2.76, 3.43) | | |
| Gaining CR knowledge from Internet | | | -3.561 | 0.000 |
| Yes | 67 (19.6) | 2.90 (2.29, 3.24) | | |
| No | 275 (80.4) | 3.14 (2.76, 3.48) | | |
| Knowing about CR | | | -3.005 | 0.003 |
| Yes | 42 (12.3) | 2.81 (2.32, 3.29) | | |
| No | 300 (87.7) | 3.14 (2.76, 3.46) | | |
| CRAIQ score | | | -0.268 | 0.000 |

2.4 冠心病患者CR障碍的多因素分析

自变量赋值见表3。以CRBS-C/M总均分为因变量,将单因素分析中有统计学意义的变量作为自变量,引入多元线性回归方程进行多因素分析。回归方程的纳入和剔除标准分别为0.05和0.10,采用“输入”的回归方法。采用容忍度和方差膨胀因素作为共线性诊断的指标。一般认为容忍度小于0.1,方差膨胀因素大于10时,自变量间可能存在共线性问

题^[19]。本方程容忍度在0.576~0.939之间,方差膨胀因素在1.065~1.737之间,不存在共线性问题。最终性别、是否是不稳定型心绞痛、是否参加门诊CR及CRAIQ得分合计4个变量进入回归方程,可共同解释总变异量的25.9%,具体见表4,拟合方程为: $Y=3.638+0.184X_1+0.368X_2-0.338X_3-0.011X_4$,具有统计学意义($F=8.909$, $P=0.000$)。

表3 自变量赋值方法

Tab 3 Assignment of independent variables and dummy variables

| Independent variable | Assignment |
|--|---------------------------------------|
| Gender | Male=0, Female=1 |
| Registered residence | Town=0, Country=1 |
| Living style | Alone=0, Not alone=1 |
| Disease type | |
| Occult heart disease | $Z_1=0$, $Z_2=0$, $Z_3=0$, $Z_4=0$ |
| Stable angina | $Z_1=1$, $Z_2=0$, $Z_3=0$, $Z_4=0$ |
| Unstable angina | $Z_1=0$, $Z_2=1$, $Z_3=0$, $Z_4=0$ |
| Myocardial infarction | $Z_1=0$, $Z_2=0$, $Z_3=1$, $Z_4=0$ |
| Others | $Z_1=0$, $Z_2=0$, $Z_3=0$, $Z_4=1$ |
| Knowing about CR | No=0, Yes=1 |
| Active exercise | No=0, Yes=1 |
| Attending outpatient CR | No=0, Yes=1 |
| Gaining CR knowledge from videos which can be taken home | No=0, Yes=1 |
| Gaining CR knowledge from lectures | No=0, Yes=1 |
| Gaining CR knowledge from printed booklets | No=0, Yes=1 |
| Gaining CR knowledge from Internet | No=0, Yes=1 |
| CRAIQ score | Original data |

表4 冠心病患者CRBS-C/M总均分的多元线性回归结果 (n=342)

Tab 4 Multivariate linear regression analysis of CRBS-C/M score in the CHD patients (n=342)

| Variable | Partial regression coefficient | Standard error | Standardized regression coefficient | t value | P value |
|---|--------------------------------|----------------|-------------------------------------|---------|---------|
| (Constant) | 3.638 | 0.143 | – | 25.448 | 0.000 |
| Gender (X ₁) | 0.184 | 0.060 | 0.154 | 3.097 | 0.002 |
| Registered residence | 0.123 | 0.124 | 0.048 | 0.991 | 0.322 |
| Living style | –0.128 | 0.075 | –0.082 | –1.698 | 0.090 |
| Disease type (occult heart disease regarded as reference) | | | | | |
| Stable angina | –0.006 | 0.139 | –0.002 | –0.046 | 0.963 |
| Unstable angina (X ₂) | 0.368 | 0.096 | 0.194 | 3.847 | 0.000 |
| Myocardial infarction | 0.119 | 0.071 | 0.091 | 1.668 | 0.096 |
| Others | 0.133 | 0.091 | 0.075 | 1.459 | 0.146 |
| Knowing about CR | –0.001 | 0.099 | –0.001 | –0.013 | 0.990 |
| Active exercise | –0.102 | 0.059 | –0.087 | –1.729 | 0.085 |
| Attending outpatient CR (X ₃) | –0.338 | 0.139 | –0.128 | –2.425 | 0.016 |
| Gaining CR knowledge from videos which can be taken home | –0.054 | 0.077 | –0.040 | –0.695 | 0.488 |
| Gaining CR knowledge from lectures | –0.150 | 0.111 | –0.083 | –1.346 | 0.179 |
| Gaining CR knowledge from printed booklets | –0.011 | 0.081 | –0.008 | –0.142 | 0.887 |
| Gaining CR knowledge from Internet | –0.089 | 0.080 | –0.061 | –1.111 | 0.267 |
| CRIAQ score (X ₄) | –0.011 | 0.003 | –0.242 | –4.112 | 0.000 |

Note: R²=0.292, adjusted R²=0.259, P=0.000.

3 讨论

3.1 冠心病患者的CR障碍现状

冠心病患者的CR障碍处于中上水平，外部后勤维度得分最高。本研究中CRBS-C/M总均分中位数为3.10 (2.71, 3.43) 分，高于GRACE教授团队在加拿大安大略省对1 809名住院心脏病患者的一项研究 [(2.03±0.73) 分]^[20]，说明本次调研的冠心病患者参加CR的障碍更大；其中评分最高的维度为外部后勤因素，为3.50 (3.00, 4.00) 分，与加拿大一项关于慢性病老年人及韩国一项关于急性冠脉综合征患者的研究结果基本一致^[21-22]，显示距离、交通、花费及天气这类后勤因素是冠心病患者未注册参与CR的主要障碍。而国内尚无使用CRBS-C/M对冠心病患者进行调研的研究。一项相关的CR障碍因素研究^[23]显示，前3位分别为医保限制 (74.2%)、患者表示没有时间 (64.6%) 及路程遥远 (55.1%)；与本研究排名前3位的障碍因素 (距离、天气恶劣及我不知晓CR) 略有差别。在2项研究中，路程距离均成为首选的障碍因素之一，故建议在开展CR项目时，应积极探索对患者友好的灵活的CR模式，如患者自助式CR、居家CR、虚拟现实CR等，以克服路程、天气

及时间冲突的障碍，促进患者对于CR的依从性^[24-27]。

3.2 冠心病患者CR障碍的相关因素

本研究结果显示，性别、是否是不稳定型心绞痛、是否参加门诊CR及CR信息知晓度 (CRIAQ总分) 是CR障碍的相关因素。

患者对于CR信息知晓度越高，其参加CR的障碍水平就越低。国内一项对急性心肌梗死患者CR障碍因素的研究^[23]也显示康复知识是对阻力条目得分有负向影响的因素；原因可能是患者对疾病有正确的认知和评价，进而对疾病易产生积极的感知及应对，倾向于克服障碍，如调整时间安排、调动家人支持、克服交通问题、积极参与CR。

不稳定型心绞痛患者相对隐匿型冠心病的患者参与CR障碍更大。不稳定型心绞痛是介于稳定型心绞痛与急性心肌梗死或猝死之间的一种中间状态，心绞痛持续的时间较长，疼痛也比较严重，发作频率没有规律可言，对患者的影响较大^[28]，因此患者对于以运动为基础的CR接受度较低。《中国心脏康复与二级预防指南》也指出，所有心脏病患者都是CR适应证人群，但对于不稳定型心绞痛未控制的患者暂时不

适合开始CR,应根据患者的危险评估及不同阶段采取不同的监护及治疗措施,保障康复安全^[4]。

大部分研究均认为女性患者在参与CR的过程中,因为家庭照顾角色及经济支配权利等原因,较男性患者存在更大的CR障碍^[23];而加拿大的一项研究^[29]结果显示,女性参与CR的障碍与男性并无明显区别,但其障碍的性质不同。本研究中女性患者CR障碍水平较高,可能与女性患者承担较多的家务责任,误认为可以通过家务劳动来达到康复训练的目的,并且更担心花费与通勤问题有关。

本研究中,参加门诊CR项目的患者对于CR障碍的评分显著较低,与国外报道类似:对11家医院的1809名心脏病患者进行了1年的随访,结果显示939名(51.9%)患者参加了门诊CR,其参加门诊CR的次数与CR障碍呈负相关,具有统计学意义^[30]。提示参加门诊CR的患者,接受了健康教育指导与康复实践后,对CR障碍的自我感知较小,两者形成良性循环。

3.3 促进冠心病患者CR的建议及对策

提高冠心病患者的CR信息知晓度可降低患者参与CR的障碍水平。本研究中患者的CR信息知晓度仅为中等水平,提示患者的CR信息极度缺乏;而障碍得分的回归方程显示CR信息的标准回归系数为-0.242,位于所有影响CR的障碍因素之首,因此医护人员当务之急应对患者进行CR健康教育。LIU等^[31]引入并本土化“美国居家心脏康复科学声明”推荐的CR健康教育资料,录制系列CR健康教育讲座,将传统的线下讲座模式转为线上视频模式,可通过扫描二维码直接在手机进行观看,以扩大CR讲座的辐射范围,提高患者对于CR的认知及理解,促进其参与CR并积极实践二级预防^[32]。

重点关注女性、不稳定型心绞痛及从未参加门诊康复的这类CR障碍较大的患者:需加强对女性患者的关注,充分评估女性患者的需求与阻碍,针对性地设置对女性患者友好的CR模式,并充分鼓励其家属支持和参与。不稳定型心绞痛虽然发作没有规律,除劳累因素外,在休息的情况也有可能发生;但不能因其疾病性质成为阻碍患者参与CR的因素,待病情控制后,应鼓励患者在门诊监护条件下,安全地进行运动。同时,医护人员应重视临床大量未参加CR的患者,他们缺乏全面接受CR教育的机会,感知CR障

碍较大。建议后续可以对这些从未参加康复的患者进行质性访谈,进一步明确患者不参加CR的原因,寻找针对性的策略最终促进患者参与CR。

3.4 小结

CR是冠心病患者二级预防中的重要措施,但是患者的依从性并不佳。本研究聚焦患者参与CR的障碍因素,使用CRBS-C/M对342名冠心病患者进行调研,发现其参与门诊CR的障碍处于中上水平,外部后勤因素是最突出的障碍,性别、是否是不稳定型心绞痛、是否参加门诊CR项目及CR信息知晓度是冠心病患者CR障碍评估的相关因素。医务人员应从患者角度出发分析CR障碍因素,对于女性、不稳定型心绞痛、从不参加门诊CR及对CR信息知晓度低的患者应重点关注,帮助其克服CR障碍,提高冠心病患者门诊CR的参与度。后续研究应对患者进行心脏康复教育及多元化的心脏康复模式干预,检验其对CR障碍水平及CR依从性的影响,进一步验证本研究的结论。

本研究仍存在一些不足之处。首先,由于本研究是方便采样,抽中的样本代表性可能受偶然因素的影响;其次,本研究仅调查了患者层面的因素对CR障碍评估的影响,对于CR障碍量表中的其他2个层面,如医护人员和健康体系的相关因素未涉及。因此,在今后的研究中可纳入所有层面的因素对CR障碍进行分析。

利益冲突声明/Conflict of Interests

所有作者声明不存在利益冲突。

All authors disclose no relevant conflict of interests.

伦理批准和知情同意/Ethics Approval and Patient Consent

本研究涉及的所有操作均已通过上海交通大学医学院附属新华医院伦理委员会(例)的审核批准(文件号XHEC-D-2015-136)。所有实验过程均遵照《赫尔辛基宣言》的条例进行。受试对象或其亲属已经签署知情同意书。

All the protocols in this study were reviewed and approved by the Ethic Committee of Xinhua Hospital, Shanghai Jiao Tong University School of Medicine (Approval Letter No. XHEC-D-2015-136), and all experimental protocols were carried out by following the guidelines of Declaration of Helsinki. The consent letters have been signed by the research participants or their relatives.

作者贡献/Authors' Contributions

刘霞、温弗乐及章雅青参与了研究设计,刘霞、温弗乐参与了研究实施及数据整理,刘霞、温弗乐及章雅青参与了论文的写作和

修改。所有作者均阅读并同意了最终稿件的提交。

The study was designed by LIU Xia, WEN Fule and ZHANG Yaqing. The research implementation and data analysis were carried out by LIU Xia and WEN Fule. The manuscript was drafted and revised by LIU Xia, WEN Fule and ZHANG Yaqing. All the authors have read

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[本文编辑] 瞿麟平

学术快讯

上海交通大学基础医学院李令杰课题组 开发出准确预测单细胞发育潜能的新工具(FitDevo)

2022年7月,上海交通大学基础医学院组织胚胎学与遗传发育学系李令杰课题组在 *Briefings in Bioinformatics* 杂志发表题为 *FitDevo: accurate inference of single-cell developmental potential using sample-specific gene weight* 的研究论文。研究中开发了一款用于分析单细胞转录组测序(single-cell RNA sequencing, scRNA-seq)数据的新型计算工具(FitDevo),该工具基于样本特异的基因权重来准确预测单细胞的发育潜能。结果表明,FitDevo的效果优于目前已发表的其他工具(CytoTRACE、CCAT、SCENT等)。此外,该研究还发现FitDevo在更广泛的应用场景中也具较高的实用价值,包括单细胞解卷积数据分析、空间转录组数据分析、癌症细胞发育潜能研究等。该研究不但开发出了更加准确且适用广泛的单细胞分析的新工具,并且进一步加深了人们对于细胞发育潜能的认识。