

论著·临床研究

儿童青少年癌症患者多症状困扰潜在剖面分析及其对体力活动的影响

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[摘要] **目的**·描述儿童和青少年癌症患者多症状困扰及体力活动水平, 并分析其多症状困扰的潜在剖面, 探讨潜在剖面与体力活动的关系。**方法**·采用方便抽样的方法, 选取2021年11月—2023年3月在上海交通大学医学院附属上海儿童医学中心血液/肿瘤科和附属新华医院小儿血液肿瘤科住院治疗或门诊就诊的10~18岁且治疗时间>1个月的儿童及青少年癌症患者。采用一般资料问卷、记忆症状评估量表 (Memorial Symptom Assessment Scale 10-18, MSAS 10-18)、修订版儿童休闲活动调查问卷 (Modified Chinese Version of Children's Leisure Time Activities Study Survey, CLASS-C) 进行资料收集。采用潜在剖面分析识别癌症患儿多症状困扰的水平是否存在人群异质性及其外显特征, 并分析不同潜在症状剖面间体力活动水平是否存在差异。**结果**·共回收有效问卷165份, 有效回收率91.7%。癌症患儿发生率前5位症状的困扰得分依次为缺乏体力1 (1, 2) 分、恶心1 (1, 2) 分、没有食欲2 (2, 3) 分、出汗1 (1, 2) 分、疼痛1 (1, 2) 分。患儿以轻度体力活动为主, 轻度体力活动水平中位数为2 530.00 (1 577.50, 3 721.00) min/周; 中重度体力活动较少, 为70.00 (10.00, 197.50) min/周。癌症患儿多症状困扰可分为2个潜在剖面, “高疲乏-高恶心-高头发减少-高昏昏欲睡”和“高疲乏-低恶心-低呕吐-低昏昏欲睡”, 分别命名为高水平症状困扰 ($n=47$, 30.6%) 和低水平症状困扰 ($n=118$, 69.4%)。多元Logistic回归分析显示, 急性淋巴细胞白血病患儿的归类为高水平症状困扰组的可能性高, 最近一次就诊方式为门诊就诊的患儿归类为低水平症状困扰组的可能性高 (均 $P<0.05$); 进一步分析显示经历高症状困扰患儿轻体力活动更高 ($P<0.05$), 中重度体力活动水平更低, 但差异无统计学意义。**结论**·儿童和青少年癌症患者的多症状困扰水平存在人群异质性, 疾病类型 (急性淋巴细胞白血病) 和最近一次就诊方式 (门诊就诊) 是癌症患儿症状困扰潜在剖面的预测因素; 且经历高水平症状困扰的患儿轻度体力活动水平更高, 中重度体力活动水平可能更低。

[关键词] 症状困扰; 癌症; 儿童; 青少年; 体力活动; 潜在剖面分析

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Latent profile analysis of multiple symptom distress in children and adolescents with cancer and its effect on their physical activity

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[Abstract] **Objective**·To describe the level of multiple symptom distress and physical activity in children and adolescents with cancer, analyze symptom distress profiles, and explicit the relationship between latent profiles and physical activity. **Methods**·From November 2021 to March 2023, the convenient sample method was used to recruit children and adolescents with cancer aged 10—

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18 years old, who had been treated for more than 1 month in the Departments of Hematology/Oncology, Shanghai Children's Medical Center and Xin Hua Hospital, Shanghai Jiao Tong University School of Medicine. The questionnaires, including General Information Questionnaire, Memorial Symptom Assessment Scale 10-18 (MSAS 10-18) and Modified Chinese Version of Children's Leisure Time Activities Study Survey (CLASS-C), were used. Latent profile analysis was used to identify whether the level of multiple symptom distress in children and adolescents with cancer was population heterogeneity and its explicit characteristics. Whether there were differences in physical activity levels among different profiles of symptom distress was also analyzed. **Results**· A total of 165 valid questionnaires were collected, with an effective response rate of 91.7%. The symptom distress scores of the top five occurrence rates of symptoms in children and adolescents with cancer were lack of energy with a median of 1 (1, 2) point, nausea 1 (1, 2) point, lack of appetite 2 (2, 3) points, sweat 1 (1, 2) point, and pain 1 (1, 2) point. The physical activity level of the patients was mainly light, with a median of 2 530.00 (1 577.50, 3 721.00) min/week, and moderate to vigorous physical activity was relatively lower [70.00 (10.00, 197.50) min/week]. The patients with cancer could be divided into two latent profiles: "high fatigue-high nausea-high hair loss-high sleepy" and "high fatigue-low nausea-low vomiting-low sleepy", which were named as high symptom distress ($n=47$, 30.6%) and low symptom distress ($n=118$, 69.4%) separately. Multivariate Logistic regression analysis showed that patients with acute lymphoblastic leukemia were more likely to be classified as high symptom distress group, and outpatients in the latest hospital visit were more likely to be classified as low symptom distress group (both $P<0.05$). In addition, patients with high symptom distress had a higher level of light physical activity ($P<0.05$), and had a lower level of moderate to vigorous physical activity, but the difference was not statistically significant. **Conclusion**· There is population heterogeneity in the multiple symptom distress in children and adolescents with cancer. Disease type (acute leukemia) and the way of the latest hospital visit (through outpatient department) are the predictors of symptoms profiles of patients with cancer. Patients who experience high symptom distress have higher level of light physical activity, and perhaps lower level of moderate to vigorous physical activity.

[Key words] symptom distress; cancer; child; adolescent; physical activity; latent class analysis

近年来儿童癌症的发病率逐年上升,是全球关注的公共卫生问题^[1-2]。世界范围内每年有超过38万的0~19岁儿童和青少年确诊为癌症^[2]。《国家儿童肿瘤监测年报》^[3]显示,2017—2018年我国儿童肿瘤患者出院人次达329 093例。在癌症治疗及康复过程中患儿遭受多种身体、心理困扰,常见的有疼痛、疲乏、恶心、呕吐等躯体症状,以及焦虑、抑郁、易怒等心理症状^[4-5],严重影响患儿疾病治疗进程及健康状态。体力活动在降低癌症患儿生理、心理症状,提高其生活质量和促进其回归社会等方面均具有重要意义^[6-7]。既往研究^[8-10]发现,癌症患儿治疗期间体力活动不足的情况普遍存在,受到疾病与治疗引起的不适、治疗设备限制、传统动静观念等多种因素影响。其中不适感是重要的原因之一。不同患儿因生长发育、认知水平、疾病类型、治疗阶段等的不同,个体所经历的症状体验和体力活动也有所不同。基于个体特征进行症状分析及特征捕捉是实施个体化精准干预的前提。潜在剖面分析(latent profile analysis)是一种“以个体为中心”的统计学方法。该方法通过对多种症状间的关系进行分析,将异质人群分为经历不同症状的同质亚组,再分析经历最严重症状的群体及其特征,为人群的个体化精准干预提供新思路^[11]。基于此,本研究拟对儿童和青少年癌症患者多种症状困扰和体力活动水平进行调查,采用潜在剖面分析探讨患儿不同症状的类别及外显特征,分析经历不同类别

症状的患儿体力活动是否存在差异,进而识别不同症状困扰类别患儿的特征及对体力活动的影响,旨在深入理解患儿体力活动和症状困扰之间的关系,为开展精准化体力活动干预提供借鉴。

1 对象与方法

1.1 研究对象

采用方便抽样选取2021年11月—2023年3月在上海交通大学医学院附属儿童医学中心血液/肿瘤科和附属新华医院小儿血液肿瘤科住院治疗或门诊就诊的儿童和青少年癌症患者。纳入标准:①年龄10~18岁。②治疗时间>1个月。③明确诊断为癌症。④具有一定的识字和理解能力。⑤患儿及其家属均同意参与研究。排除标准:①患儿处于临终阶段(生存期<6周)。②存在影响参与研究的其他并发症或严重疾病(如存在视力、认知障碍等,或正处于移植治疗阶段的患儿等)。

1.2 研究工具

1.2.1 一般资料问卷 由研究者自行设计,包括年龄、性别、居住地、民族、照顾者、家庭月收入、照顾者文化程度、疾病类型、初次确诊时间、危险度、最近一次就诊方式、疾病治疗方式、患儿有无其他相关病史、是否贫血等。其中危险度根据癌症类型、治

疗过程、实体瘤大小、有无转移等多因素综合确定^[12-14],分为低危、中危和高危。以霍奇金淋巴瘤为例,根据《儿童霍奇金淋巴瘤的诊疗建议》^[13]进行危险度分组:低危组为Ⅰ_A、Ⅱ_A期(≤2个淋巴结区受累、无巨大肿块、无肺门浸润),中危组为Ⅲ_A期及其他Ⅰ、Ⅱ期,高危组为Ⅲ_B期和Ⅳ期。

1.2.2 记忆症状评估量表 儿童版记忆症状评估量表(Memorial Symptom Assessment Scale 10-18, MSAS 10-18)由COLLINS等^[15]在成人版量表^[16]基础上进行编制,冯芳茗等^[17]进行汉化,可用于评估10~18岁癌症患儿过去7 d所经历的多种心理、生理的不适症状。汉化后的量表包括生理症状、心理症状、总困扰指数3个维度,共31个条目。其中23个条目评估症状有无发生及发生频率、严重程度、困扰程度(distress),8个条目(如头发减少)仅评估有无发生及严重程度、困扰程度;症状发生用“有”或“无”进行表示,发生频率和严重程度采用1~4分的Likert 4级评分,困扰程度为0~4分的Likert 5级评分。本研究中主要评价症状发生频率和困扰程度(分数越高,患儿症状困扰的程度越高)。本研究中量表Cronbach's α 系数为0.949。

1.2.3 修订版儿童休闲活动调查问卷 儿童休闲活动调查问卷(Children's Leisure Time Activities Study Survey, CLASS)由澳大利亚迪肯大学TELFORD等^[18]于2004年编制。该工具经修订先后应用于中国香港^[19]和内地^[20]健康儿童,评估其体力活动及静坐行为。杨静^[21]根据恶性肿瘤对患儿学习及生活等活动的影响,对该工具进行了修订,形成修订版CLASS(Modified Chinese Version of CLASS, CLASS-C),应用于癌症患儿的重测信度为0.83。修订后的问卷分为2个部分:第一部分用于询问过去一周内进行9种轻度体力活动次数和时间;第二部分用于询问过去一周内参加16种中等强度以上(中重度)体力活动的次数和时间。每一部分的体力活动得分为过去一周内各类活动时间的总和。

1.3 资料收集与质量控制

研究者与医院相关部门沟通后,进入医院开展研究。调查前向研究对象告知研究目的和填写内容,获得患儿口头同意和家长书面知情同意后进行问卷收集。由家长填写一般资料问卷,患儿填写MSAS

10-18和CLASS-C。问卷采用匿名方式,全过程需要10~15 min,由研究者当场回收并审查;如有遗漏,请研究对象及时补充。

1.4 统计学分析

采用Mplus 8.0进行潜在剖面分析^[22]。模型适配指标包括:①赤池信息量准则(Akaike information criteria, AIC)、贝叶斯信息准则(Bayesian information criteria, BIC)和校正BIC(adjusted BIC, aBIC),数值越小表示模型拟合越好。②熵(entropy)值范围为0~1,越接近1表示分类越精确;当Entropy=0.8时,提示分类精确率>90%。③采用LMR似然比检验(Lo-Mendell-Rubin likelihood ratio test, LMRT)、aLMR似然比检验(adjusted Lo-Mendell-Rubin likelihood ratio test, aLMRT)和基于bootstrap的似然比检验(bootstrapped likelihood ratio test, BLRT)用于模型比较。 $P<0.05$ 时表示第K个模型拟合优于第(K-1)个模型。综合上述指标,从单一类别模型开始,逐步增加模型中的类别数目,直至拟合指标达到最佳。

采用SPSS 25.0软件对数据进行分析。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 $M(Q_1, Q_3)$ 进行描述。定性资料采用频数和百分比描述。采用多元Logistic回归分析不同潜在组别的外显特征间差异是否存在统计学意义。在此基础上,根据体力活动水平总分的正态分布情况,选择 t 检验、单因素方差分析或非参数检验Mann-Whitney U 检验、Kruskal-Wallis H 检验进行不同潜在组别患儿体力活动水平比较。全部检验均为双侧, $P<0.05$ 表示差异具有统计学意义。

2 结果

2.1 儿童青少年癌症患者一般资料情况

本研究共发放问卷180份,回收有效问卷165份,有效回收率91.7%。纳入的165例患儿,包括男性108例(65.5%)、女性57例(34.5%);71.5%的患儿由其母亲照顾。其中68例(41.2%)患儿采取化学治疗(化疗)/放射治疗(放疗)/手术手段进行治疗,27例(16.4%)患儿曾采取手术+化疗+放疗进行治疗。本研究中高危患儿47人,占28.5%。同时,32.1%的患儿存在贫血症状,6.7%的患儿曾患有其他健康问题。其

他资料详见表1。

表1 儿童青少年癌症患者人口学及疾病相关资料

Tab 1 Clinical and demographic characteristics of children and adolescents with cancer

Characteristic	n (%)
Gender	
Male	108 (65.5)
Female	57 (34.5)
Age	
10–14 years old	136 (82.4)
15–18 years old	29 (17.6)
Caregiver	
Father	47 (28.5)
Mother	118 (71.5)
Education level of caregiver	
Primary middle school and lower	56 (33.9)
High school/college degree	61 (37.0)
Bachelor degree and above	48 (29.1)
Family monthly income	
<2 000 yuan	13 (7.9)
2 001–5 000 yuan	36 (21.8)
5 001–8 000 yuan	44 (26.7)
8 001–10 000 yuan	34 (20.6)
>10 000 yuan	38 (23.0)
Type of disease	
Acute lymphoblastic leukemia	50 (30.3)
Other leukemia	13 (7.9)
Brain tumor	43 (26.1)
Lymphoma	16 (9.7)
Others	43 (26.1)
Risk group	
Low	40 (24.2)
Middle	78 (47.3)
High	47 (28.5)
Latest visit in hospital	
Outpatient	70 (42.4)
Inpatient	95 (57.6)
Treatment	
Chemotherapy/Radiotherapy/Operation	68 (41.2)
Chemotherapy + Radiotherapy	53 (32.1)
(Chemotherapy/Radiotherapy) + Operation	17 (10.3)
Chemotherapy + Radiotherapy + Operation	27 (16.4)
Other health problem	
No	154 (93.3)
Yes	11 (6.7)
Anemia	
No	112 (67.9)
Yes	53 (32.1)

2.2 儿童青少年癌症患者症状困扰及体力活动水平

患儿发生率>40%的症状及其困扰程度如表2所示，发生率前5位的症状分别为缺乏体力（或活力）、恶心、没有食欲、出汗、疼痛。患儿体力活动水平详见表3。患儿主要以轻度体力活动为主，中位时间为2 530.00（1 577.50，3 721.00）min/周；患儿进行中重度体力活动的中位时间为70.00（10.00，197.50）min/周。

表2 儿童青少年癌症患者症状发生率及困扰程度

Tab 2 Symptoms incidence rates and distress scores of children and adolescents with cancer

Symptom	Number of occurrence	Incidence /%	Distress score/ point
Lack of energy	143	86.7	1 (1, 2)
Nausea	127	77.0	1 (1, 2)
Lack of appetite	116	70.3	2 (2, 3)
Sweat	108	65.5	1 (1, 2)
Pain	107	64.8	1 (1, 2)
Sleepy	90	54.5	1 (1, 2)
Difficuly in concentrating	90	54.5	1 (1, 1)
Hair loss	85	51.5	2 (1, 3)
Cough	83	50.3	1 (1, 2)
Vomiting	81	49.1	1 (1, 2)
Dry mouth	80	48.5	1 (1, 2)
Weight loss	80	48.5	1 (1, 2)

Note: Only symptoms with an incidence greater than 40% are presented.

表3 儿童青少年癌症患者体力活动水平

Tab 3 Physical activity score of children and adolescents with cancer

Item	Physical activity score/ (min·week ⁻¹)	Range/ (min·week ⁻¹)
LPA	2 530.00 (1 577.50, 3 721.00)	330.00–10 570.00
MVPA	70.00 (10.00, 197.50)	0–1 820.00

Note: LPA—light physical activity; MVPA—moderate to vigorous physical activity.

2.3 儿童青少年癌症患者多症状困扰潜在剖面分析及外显特征

2.3.1 多症状困扰潜在剖面分析 根据冯芳茗等^[17]和COLLINS等^[15]研究，将发生率>40%的症状纳入分析，依次建立1~5个潜在剖面（表4）。其中AIC、BIC、aBIC的数值逐渐递减，数值越低说明模型拟合越好。当分为3个剖面时上述3个指标数值较小，但此时的模型LMRT及aLMRT无统计学意义；而分为2个剖面时，LMRT、aLMRT及BLRT均具有统计学意义，且AIC、BIC及aBIC相对较小，熵值为0.828>0.80，表明模型拟合度好、精确度高。综合考虑，模

型选择2个潜在剖面。根据癌症患儿2个潜在剖面的多症状困扰分布及典型症状,剖面1多症状困扰水平较低,将其命名为低水平症状困扰(高疲乏-低恶心-低呕吐-低昏昏欲睡);该组共118例患儿,占总体的69.4%。剖面2多症状困扰水平较高,将其命名为高水平症状困扰(高疲乏-高恶心-高头发减少-高昏昏欲睡);该组共47例患儿,占总体的30.6%。2个组别患儿多症状困扰水平见图1。

表4 儿童青少年癌症患者多症状困扰潜在剖面模型拟合结果
Tab 4 Comparison of different latent profile analysis models of symptoms of children and adolescents with cancer

Model	AIC	BIC	aBIC	P value			Entropy
				LMRT	aLMRT	BLRT	
1	5 187.082	5 261.625	5 185.641	—	—	—	—
2	4 992.976	5 107.896	4 990.754	0.008	0.008	0.000	0.828
3	4 949.732	5 105.030	4 946.729	0.413	0.418	0.000	0.862
4	4 887.739	5 083.413	4 883.955	0.173	0.178	0.000	0.875
5	4 874.649	5 110.701	4 870.085	0.519	0.522	0.040	0.889

Note: — represents not applicable.

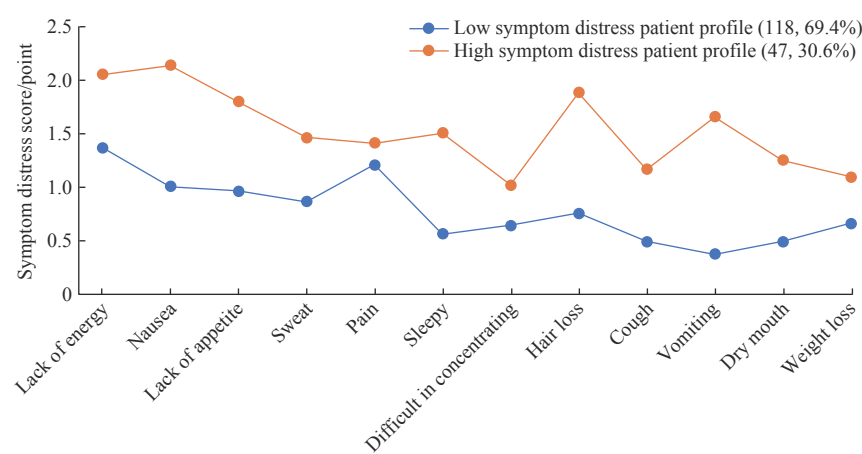


图1 多症状困扰2个潜在剖面症状估计均值得分
Fig 1 Estimated mean scores of 2 latent profile symptoms of multiple symptom distress

2.3.2 多症状困扰潜在组别外显特征分析 将癌症患儿多症状困扰潜在剖面作为因变量,低水平症状困扰组赋值为1,高水平症状困扰组赋值为2,以低水平症状困扰组为参照,纳入性别、年龄、疾病类型、危险度、疾病治疗方式、是否贫血,以及最近一次就诊方式作为自变量进行多元Logistic回归分析。回归结果(表5)显示,急性淋巴细胞白血病患儿的归类为高水平症状困扰组的可能性高($P=0.021$),最近一次就诊方式为门诊就诊的患儿归类为低水平症状困扰组的可能性高($P=0.043$)。

表5 不同症状潜在剖面儿童青少年癌症患者外显特征回归分析
Tab 5 Analysis on individual characteristic predictors of symptom distress profiles in children and adolescents with cancer

Characteristic variable	β	SE	P value	OR	95%CI
Gender					
Female	Ref				
Male	0.540	0.422	0.201	1.716	0.750–3.925
Age					
15–18 years old	Ref				
10–14 years old	–0.380	0.489	0.437	0.684	0.262–1.784
Type of disease					
Others	Ref				
Acute lymphoblastic leukemia	–1.350	0.586	0.021	3.859	1.223–12.178

Continued Tab

Characteristic variable	β	<i>SE</i>	<i>P</i> value	<i>OR</i>	95% <i>CI</i>
Other leukemia	-0.230	0.761	0.763	0.795	0.179-3.529
Brain tumor	0.167	0.502	0.739	1.182	0.442-3.163
Lymphoma	0.093	0.817	0.909	1.098	0.222-5.440
Risk group					
High risk	Ref				
Low risk	-0.353	0.542	0.515	0.703	0.243-2.033
Middle risk	-0.116	0.479	0.809	0.891	0.349-2.275
Anemia					
Yes	Ref				
No	-0.437	0.407	0.283	0.646	0.291-1.435
Treatment					
Chemotherapy + Radiotherapy + Operation	Ref				
Chemotherapy/Radiotherapy/Operation	-0.950	0.680	0.162	0.387	0.102-1.466
Chemotherapy + Radiotherapy	-0.963	0.621	0.121	0.382	0.113-1.290
(Chemotherapy/Radiotherapy) + Operation	0.664	0.955	0.487	1.942	0.299-12.614
Last visit in hospital					
Inpatient	Ref				
Outpatient	-0.937	0.462	0.043	0.392	0.158-0.970

Note: Ref—reference; *SE*—standard error; *OR*—odds ratio; *CI*—confidence interval.

2.4 不同症状困扰组儿童青少年癌症患者体力活动差异分析

对不同症状困扰组患儿的体力活动进行比较(表6),结果显示:与低水平症状困扰组相比,高水

平症状困扰组的患儿轻度体力活动得分更高且差异具有统计学意义($P=0.009$),中重度体力活动得分更低,但差异无统计学意义。

表6 不同症状困扰组儿童青少年癌症患者体力活动水平差异

Tab 6 Physical activity differences between different symptom distress profiles of children and adolescents with cancer

Item	Physical activity score/(min·week ⁻¹)		<i>Z</i> value	<i>P</i> value
	Low symptom distress group (<i>n</i> =118)	High symptom distress group (<i>n</i> =47)		
LPA	2 311.00 (1 491.25, 3 235.00)	2 915.00 (2 205.00, 4 025.00)	-2.628	0.009
MVPA	70.00 (20.00, 196.25)	27.00 (0, 210.00)	-1.391	0.164

3 讨论

3.1 儿童青少年癌症患者多症状困扰严重

癌症患儿的多症状评估及管理一直是临床照护实践与研究的重点和难点。本研究结果显示儿童和青少年癌症患者症状发生率>40%的症状有12种,症状水平略高于冯芳茗等^[17]对治疗各阶段患儿的研究,低于化疗阶段急性白血病患者^[23]。但各研究中发生率>40%的症状类型基本一致,没有食欲、恶心、缺乏体力、疼痛等症状困扰水平平均较高,说明这些症状在癌症患儿治疗的各个阶段具有普遍性。同时本研究显示,患儿受脱发的困扰水平较高,高

于郑渊等^[23]的研究。脱发是癌症放疗、化疗及免疫治疗等带来的自身形象改变的典型症状。本研究中患儿处于10~18岁,自身形象的改变、中心静脉导管的存在以及手术留下的瘢痕等变化让儿童和青少年患者感到不安,难以融入正常同龄人,对自我概念均产生负面影响^[24-27],亟需得到关注和指导。以上结果提示医护人员应关注患儿治疗期间身体及心理症状感受,及时评估及进行针对性的干预,特别需要重视脱发等自我形象紊乱给青春期的患儿带来的心理影响。医护人员可提前对患儿进行健康教育,同时进行心理辅导,协助其正确认识自我,积极面对形象改变。

3.2 儿童青少年癌症患者以轻度体力活动为主

提高体力活动水平是促进儿童青少年癌症患者健康状况的有效策略之一。本研究中癌症患儿治疗期间以轻度体力活动为主,活动水平远高于中重度。这与CHUNG等^[28]和GÖTTE等^[8]的研究结果较为一致。这可能与患儿具体的治疗阶段(如骨髓抑制期)、症状困扰(均经历高疲乏症状)及医疗环境限制(如输液)等相关。GRIMSHAW等^[29]研究指出由于长期未进行体力活动,癌症患儿运动积极性降低,导致体力活动更少,这也可能是中重度体力活动普遍偏低的原因之一。此外受中国文化影响,照顾者认为治疗期间患者应多休息从而有利于治疗和康复,这也是阻碍患者活动的原因之一^[30]。癌症患儿的活动需考虑到患儿身体承受力及治疗阶段,提升策略应根据患儿个体能力及既往活动水平进行个性化活动指导和干预。癌症患儿治疗期间可开展低至中等强度的运动,其频率、持续时间和强度在数周内缓慢增加。例如贫血患儿可以暂缓活动直至贫血缓解;存在严重疲乏的患儿可以先休息,随后每日进行适量轻度体力活动,随着症状缓解,再逐步过渡到中重度体力活动。现有研究^[7, 31]推荐癌症患儿可以每周进行3~5次,每次30~60 min的中重度体力活动。患儿住院期间开展的集体活动干预^[31]、针对父母开展动机性访谈认知干预以及个性化的体力活动支持均可以有效提高患儿体力活动水平^[32]。因此,癌症患儿体力活动水平的提升在研究与实践中均需得到进一步关注和重视。除考虑疾病和个体差异,还可通过改变患儿及其父母的认知、制定患儿可接受的体力活动形式、关注住院及居家环境等相关因素,综合制定个体化体力活动提升策略。

3.3 疾病类型和就诊方式是儿童青少年癌症患者多症状困扰潜在组别的预测因素

采用以个体为中心的潜在剖面分析可以更深入了解患儿经历的多症状潜在组别。本研究确定的最佳模型为高水平症状困扰和低水平症状困扰2个潜在组别,同时也证明了癌症患儿经历的多症状困扰具有人群异质性。WU等^[33]和BUCKNER等^[11]的研究同样证实这一点。WU等^[33]的研究将癌症患儿治疗期疲乏、疼痛等13个症状分为症状轻度困扰、中度困扰和重度困扰3个类别;BUCKNER等^[11]将癌症患儿焦虑、抑郁、疲乏、疼痛及身体功能状态分为4个类别。WANG等^[34]采用儿童患者报告结局测量信息

系统(Patient-Reported Outcomes Measurement Information System, PROMIS)简表评估患儿化疗期间症状及身体功能纵向变化,并将其变化轨迹分为2个类别。现有研究显示,因纳入症状数量和类型的不同,多症状困扰潜在组别存在差异,这需要后续研究进一步探讨。本研究2组患儿困扰水平平均较高的症状包括疲乏、昏昏欲睡等躯体症状,恶心、呕吐、没有食欲等消化道症状以及与自身形象有关的症状(如脱发)等,这一发现与WU等^[33]和AMERINGER等^[35]的研究相一致,提示这些症状均是研究和实践中需要干预的重点。该结果也提示癌症患儿经历的症状困扰存在明显的人群差异性,特别是对高水平症状困扰的患儿需要给予更高频次的评估及精准干预。

本研究结果显示,癌症患儿的疾病类型及最近一次就诊方式是其症状困扰潜在剖面的预测因素。其中急性淋巴细胞白血病患者经历的症状困扰水平高于其他癌症患儿(不包括淋巴瘤、脑肿瘤),可能与该病患者治疗病程长、化疗药物不良反应大有关。研究^[15, 25]发现,白血病患者症状的数量及得分比淋巴瘤、实体瘤患儿低。本研究中淋巴瘤、脑肿瘤和其他肿瘤患儿在2个症状组别上差异无统计学意义,可能与样本量相对较少有关,未来可扩大样本量进一步探讨。就诊方式也是患儿症状困扰的外显特征之一。患儿在疾病长期治疗过程中主要通过住院或门诊治疗、门诊随访等方式进行,其与患儿的治疗方案、身体状态密切相关。本研究中最近一次治疗采用门诊就诊方式的患儿症状困扰水平低于住院患儿,原因可能为门诊就诊的患儿身体状态相对稳定,治疗带来的不良反应及潜在风险相对较小,因此患儿经历的不适症状相对较轻。该结果可为临床开展差异化的症状管理及干预提供参考。本研究中,年龄、性别、是否贫血、疾病治疗方式等对多症状困扰患儿潜在组别无影响,其中年龄、性别的影响与BUCKNER等^[11]的研究结果一致,其他外显特征对患儿多症状困扰潜在组别有无影响有待在后续研究中进一步证实。

3.4 多症状困扰程度高的儿童青少年癌症患者轻度体力活动水平较高

本研究对患儿体力活动的分析显示,高水平症状困扰组患儿与低水平症状困扰组患儿相比,轻度体力活动水平更高。徐艳华^[36]对8~17岁白血病患儿的

状严重程度低患儿的身体功能。相比中重度体力活动,经历高水平症状困扰的患儿更倾向于进行轻度体力活动。OUYANG等^[31]研究显示,集体体力活动的干预方式可以减轻患儿的症状困扰,并减少患儿轻度体力活动(如看电视、听音乐),提升患儿中重度体力活动水平(如上下楼梯)。这与本研究中症状困扰程度轻的患儿轻度体力活动水平更低相一致。有研究^[37]发现体力活动强度和心理困扰之间存在剂量反应关系,与中度和轻度体力活动相比,高强度的体力活动可以减少儿童和青少年心理困扰。这提示在未来研究与实践中可以结合患儿的身体状态及不同治疗时期可能带来的多症状困扰程度合理安排患儿的体力活动水平。对于低水平症状困扰患儿可综合各方面因素制定提升中重度体力活动水平的措施;对于高水平症状困扰的患儿则应在身体承受能力及治疗合理的情况下,保持一定的轻度体力活动,做好进行中重度体力活动的准备,具体方案及内容有待未来研究和实践进一步探索。

本研究存在以下不足:首先,高水平症状困扰组患儿中重度体力活动低于低水平症状困扰组,但差异无统计学意义,可能与方便抽样导致的样本代表性有限有关。其次,关于人群异质性,仅分析了患儿人口学及疾病相关资料,未来需要纳入更多变量,更全面地收集潜在组别人群的特征。第三,体力活动采用自我报告形式评估,结果可能产生偏倚,未来可采用客观评估工具进行收集,从而更深入地探讨体力活动和症状困扰之间的剂量反应关系,为开展精准化干预,提升患儿体力活动水平,缓解症状困扰提供借鉴和参考。

体力活动对癌症患者健康结局的积极影响已成为共识,但癌症患儿体力活动研究相对有限。本研究将癌症患儿经历的多种症状与体力活动相结合,结果显

示癌症患儿受到多症状困扰且存在群体异质性,可以分为高水平症状困扰及低水平症状困扰2个类别;患儿以轻度体力活动为主,高水平症状困扰的患儿轻度体力活动水平显著高于低水平症状困扰患儿。未来根据世界卫生组织(WHO)、儿童肿瘤协作组(Children's Oncology Group, COG)等相关指南标准,结合患儿的治疗时期、经历的多症状困扰程度不同,有针对性地开展提升体力活动水平的干预将是临床实践与研究促进的重点内容。

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

本研究已通过上海交通大学医学院的伦理审查(审批编号: SJUPN-201704)。患儿口头同意,患儿父母已经签署知情同意书。

This study was approved by the Ethic Committee of Shanghai Jiao Tong University School of Medicine (No. SJUPN-201704). The patients gave the verbal consent, and their parent signed informed consent.

作者贡献/Authors' Contributions

刘砚燕、沈南平参与研究设计。何梦雪、张洪燕参与数据收集与整理。刘砚燕、杨田田参与数据整理与分析。刘砚燕、杨田田、沈南平参与论文写作与修改。所有作者均阅读并同意了最终稿件的提交。

The study was designed by LIU Yanyan and SHEN Nanping. The data collection and data collation were carried out by HE Mengxue and ZHANG Hongyan. The data collation and analysis were finished by LIU Yanyan and YANG Tiantian. The manuscript was drafted and revised by LIU Yanyan, YANG Tiantian and SHEN Nanping. All the authors have read the last version of paper and consented for submission.

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