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·论著·

南昌市艾滋病患者合并人芽囊原虫感染情况及危险因素分析

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[摘要] 目的 了解江西省南昌市艾滋病患者人芽囊原虫感染状况及其危险因素。**方法** 2016年5—9月采用横断面调查法对南昌市艾滋病患者进行问卷调查,并采集调查对象粪便,采用PCR法检测粪便基因组中人芽囊原虫DNA以判定感染状况;同时采集调查对象血液样本,检测其中CD4⁺T淋巴细胞数量。采用单因素分析和多因素logistic回归分析对南昌市艾滋病患者人芽囊原虫感染的危险因素进行分析。**结果** 2016年5—9月在南昌市累计调查艾滋病患者505例,人芽囊原虫感染率为4.16%。单因素分析结果显示,与南昌市艾滋病患者感染人芽囊原虫有关的危险因素包括职业($\chi^2 = 8.595, P = 0.049$)、受教育程度($\chi^2 = 14.494, P = 0.001$)、日常饮用水类型($\chi^2 = 10.750, P = 0.020$)、感染HIV途径($\chi^2 = 8.755, P = 0.026$)、是否接受抗HIV治疗($\chi^2 = 23.083, P = 0.001$);多因素logistic回归分析显示,日常直接饮用自来水是南昌市艾滋病患者感染人芽囊原虫的危险因素[比值比(odds ratio, OR) = 7.988, 95%可信区间(confidential interval, CI): (1.160, 55.004)],接受抗HIV病毒治疗是人芽囊原虫感染的保护因素[OR = 0.183, 95% CI: (0.049, 0.685)]。**结论** 南昌市艾滋病患者人芽囊原虫感染率为4.16%。日常直接饮用自来水是南昌市艾滋病患者感染人芽囊原虫的危险因素,接受抗HIV治疗是保护因素。

[关键词] 人芽囊原虫;艾滋病;合并感染;危险因素;南昌市

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Prevalence and risk factors of *Blastocystis hominis* infections among AIDS patients in Nanchang City

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[Abstract] **Objective** To investigate the prevalence and risk factors of *Blastocystis hominis* infections among AIDS patients in Nanchang City. **Methods** A cross-sectional questionnaire survey was conducted among AIDS patients in Nanchang City during the period between May and September, 2016. *B. hominis* infection was detected in patients' stool samples using a PCR as-

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say, and the CD4⁺ T cell count was measured in subjects' blood samples. In addition, the risk factors of *B. hominis* infection in AIDS patients were identified using univariate and multivariate logistic regression analyses. **Results** A survey was conducted in Nanchang City from May to September 2016. A total of 505 AIDS patients were investigated, and the prevalence of *B. hominis* infection was 4.16%. Univariate analysis revealed that *B. hominis* infection correlated with the occupation ($\chi^2 = 8.595, P = 0.049$), education level ($\chi^2 = 14.494, P = 0.001$), type of daily drinking water ($\chi^2 = 10.750, P = 0.020$), root of HIV infections ($\chi^2 = 8.755, P = 0.026$) and receiving anti-HIV therapy ($\chi^2 = 23.083, P = 0.001$) among AIDS patients, and multivariate logistic regression analysis identified daily direct drinking of tap water as a risk factor of *B. hominis* infections [odds ratio (*OR*) = 7.988, 95% confidential interval (*CI*): (1.160, 55.004)] and anti-HIV therapy as a protective factor of *B. hominis* infection [*OR* = 0.183, 95% *CI*: (0.049, 0.685)]. **Conclusions** The prevalence of *B. hominis* is 4.16% among AIDS patients in Nanchang City. Daily direct drinking of tap water is a risk factor, and anti-HIV therapy is a protective factor of *B. hominis* infection among AIDS patients living in Nanchang City.

[Key words] *Blastocystis hominis*; AIDS; Co-infection; Risk factor; Nanchang City

人芽囊原虫(*Blastocystis hominis*)于1911年首次发现,其最早被认为是一种对人体无害的肠道酵母菌,后被列为肠道原虫^[1-3]。人芽囊原虫主要寄生于人和哺乳动物肠道回盲部^[4],此外在鸟类及昆虫体内也有发现^[5]。既往研究表明,人芽囊原虫具有机会致病性,在肿瘤、艾滋病等免疫力低下人群中感染率较高^[6-7],但在免疫功能正常人群中常呈自限性^[8]。人芽囊原虫感染呈世界性分布,且不同地区流行程度存在差异,发展中国家和热带地区感染率较高^[9]。不良生活方式及生活环境卫生状况差等是导致人芽囊原虫感染的主要危险因素^[10]。本研究对南昌市艾滋病患者人芽囊原虫感染状况进行了调查,并对该人群感染人芽囊原虫的危险因素进行分析。

对象与方法

1 调查对象

2016年5—9月,以南昌市各县(区)疾病预防控制中心美沙酮门诊和南昌市传染病医院在册管理的艾滋病患者作为调查对象,调查前均取得调查对象本人或其家属知情同意。

2 调查方法

2.1 问卷调查 自行编制问卷调查表,问卷内容包括姓名、性别、年龄、身高、体质量、职业等基本信息,以及家庭总人口数、家庭厕所类型、日常生活用水类型、日常饮用水类型、是否有腹痛或痢疾、每日排大便次数、是否接受抗HIV治疗等信息。2016年5—9月,经南昌市各县(区)疾病预防控制中心美沙酮门诊、南昌市传染病医院艾滋病防治人员宣传动员,对愿意参与研究且符合纳入标准的艾滋病患者进行编号,采用面对面的方式开展问卷调查。

2.2 粪便检查

2.2.1 粪便采集 2016年5—9月,采用无菌采样杯

采集调查对象粪便标本,粪便量>3 g或3 mL。样本采集后当天送南昌市疾病预防控制中心寄生虫实验室,置于-20℃冷冻保存。

2.2.2 PCR检测 严格按试剂盒说明书提取粪便基因组DNA,每份样本提取两管模板DNA,每管25 μL,冷冻保存于-80℃冰箱。采用PCR法扩增人芽囊原虫核糖体DNA小亚基序列(SSU-rDNA)基因片段,序列长度约570 bp,扩增引物(F:5'-GAGCTTTTAACTG-CAACAAACG-3';R:5'-ATCTGGTTGATCCTGCCAGT-3')^[11]由生工生物工程(上海)股份有限公司合成。PCR反应体系包括上下游引物各1 μL、模板DNA 1 μL、PCR混合液(Mix) 12.5 μL,以ddH₂O补充至25 μL。扩增条件为:95℃预变性5 min;94℃变性45 s,57℃退火1 min,72℃延伸2 min,共35个循环;最后72℃延伸10 min。PCR扩增引物于4℃保存,用于后续琼脂糖凝胶电泳及基因测序。

采用凝胶电泳法检测PCR扩增产物长度,将可疑阳性产物(参照分子标记物,在约570 bp处有条带的样品)送生工生物工程(上海)股份有限公司进行双向基因测序,测序结果通过BLAST软件与GenBank数据库中的参考序列比对,结果为阳性者判定为人芽囊原虫感染。

2.3 血液检查 采集调查对象静脉血2 mL,置于EDTA抗凝管中上下颠倒混匀,20~25℃保存,24 h内送至南昌市疾病预防控制中心重点实验室待检。于绝对计数管(BD公司)中加入20 μL单克隆抗体和50 μL抗凝全血,盖上管盖,涡旋混匀;在室温避光环境下孵育15 min,向绝对计数管中加入450 μL FACS溶血素,盖上管盖,涡旋混匀;在室温避光环境下孵育15 min,采用FACS Calibur流式细胞仪(BD公司)进行自动分析。

3 危险因素分析

本研究涉及的艾滋病患者感染人芽囊原虫危险因素包括性别、职业、居住地、民族、婚姻状况、受教育程度、家庭人口数、未成年子女数、家庭厕所类型、日常生活用水类型、日常饮用水类型、是否饲养宠物、是

否饲养家畜、感染 HIV 途径、是否接受抗 HIV 治疗、CD4⁺T 淋巴细胞数量等。首先采用 χ^2 检验或确切概率法进行单因素分析, 将有统计学意义 ($P < 0.20$) 的变量纳入 logistic 回归模型中, 将多分类变量中赋值为“1”的因素作为哑变量进行多因素分析(表1)。

表1 南昌市艾滋病患者人芽囊原虫感染危险因素变量赋值表

Table 1 Assignment of variables in identification of risk factors of *Blastocystis hominis* infection among AIDS patients in Nanchang City

变量含义 Variable significance	变量代码 Variable code	赋值情况 Assignment
人芽囊原虫感染 <i>B. hominis</i> infection	Y	0 = 阴性, 1 = 阳性 0 = negative, 1 = positive
性别 Gender	X_1	1 = 男, 2 = 女 1 = male, 2 = female
职业 Occupation	X_2	1 = 学生, 2 = 农民, 3 = 工人, 4 = 农民工, 5 = 其他 1 = student, 2 = farmer, 3 = worker, 4 = peasant worker, 5 = others
居住地 Residence	X_3	1 = 农村, 2 = 城镇 1 = village, 2 = township
民族 Nationality	X_4	1 = 汉族, 2 = 回族, 3 = 其他 1 = Han, 2 = Hui, 3 = others
婚姻状况 Marital status	X_5	1 = 未婚, 2 = 已婚, 3 = 已婚独自居住/丧偶, 4 = 离婚 1 = single, 2 = married, 3 = widowed or solitary, 4 = divorce
受教育程度 Education level	X_6	1 = 小学及以下, 2 = 初中, 3 = 高中, 4 = 大专及以上 1 = primary school and below, 2 = middle school, 3 = high school, 4 = college and above
家庭总人口数 No. of family members	X_7	1 = ≤ 3, 2 = > 3
未成年子女数 No. of minor children	X_8	0 = 0, 1 = 1, 2 = ≥ 2
家庭厕所类型 Type of household toilet	X_9	1 = 旱厕, 2 = 粪池, 3 = 水冲厕, 4 = 公共厕所 1 = dry pail latrine, 2 = septic tank, 3 = water closet, 4 = public toilet
日常生活用水类型 Type of daily water use	X_{10}	1 = 自家井水, 2 = 自来水, 3 = 河水, 4 = 其他 1 = well water, 2 = tap water, 3 = river water, 4 = others
日常饮用水 Type of daily drinking water	X_{11}	1 = 开水, 2 = 直饮自来水, 3 = 水井水, 4 = 桶装水, 5 = 其他 1 = boiled water, 2 = drink tap water directly, 3 = well water, 4 = bottled water, 5 = others
是否饲养宠物 Keeping pet or not	X_{12}	0 = 否, 1 = 是 0 = no, 1 = yes
是否饲养家畜 Keeping livestock or not	X_{13}	0 = 否, 1 = 是 0 = no, 1 = yes
感染 HIV 途径 Route of HIV infection	X_{14}	1 = 血液传播, 2 = 注射器传播, 3 = 性传播, 4 = 母婴传播, 5 = 不知道 1 = blood transmission, 2 = injector sharing, 3 = sexual transmission, 4 = mother-to-child transmission, 5 = unknown
是否接受抗病毒治疗 Receiving anti-HIV treatment or not	X_{15}	0 = 否, 1 = 是 0 = no, 1 = yes
CD4 ⁺ T 细胞数量(个/ μ L) CD4 ⁺ T cell count (No./ μ L)	X_{16}	1 = ≤ 400, 2 = > 400

4 伦理学声明

本研究获得中国疾病预防控制中心寄生虫病预防控制所伦理审查委员会批准通过。

5 统计分析

采用EpiData 3.1软件建立数据库,数据采用双人双录入,并进行一致性检验。采用IBM SPSS Statistics 25.0软件进行统计分析。定量资料组间差异比较采用t检验、方差分析或秩和检验,分类资料组间差异比较采用 χ^2 检验或Fisher确切概率法, $P < 0.05$ 为差异有统计学意义。将单因素分析中 $P < 0.20$ 的变量纳入多因素logistic回归分析,采用逐步回归法拟合模型,变量选入及剔除的检验水准分别为sle = 0.05、sls = 0.20。

结 果

1 调查对象基本特征

本次累计调查南昌市艾滋病患者505例,其中男性427例(84.55%)、女性78例(15.45%);汉族475例(94.06%)、回族1例(0.20%),其他民族29例(5.74%,包括彝族20例、维吾尔族8例、壮族1例);受教育程度为初中及以下340例(67.33%)。感染HIV途径为血液传播、注射器传播、性传播的艾滋病患者分别为5(0.99%)、58(11.49%)、401例(79.41%),38例(7.52%)感染途径不详。患者平均年龄40.13岁[95%可信区间(confidential interval, CI):(38.3, 40.9)岁],平均身高168.3 cm[95% CI:(167.7, 168.9) cm],平均体质量61.6 kg[95% CI:(60.8, 62.3) kg],平均家庭人口数3人[95% CI:(3, 4)人],平均CD4⁺T淋巴细胞数量为330个/ μ L[95% CI:(312, 348)个/ μ L]。

2 艾滋病患者人芽囊原虫感染率

PCR检测发现,南昌市艾滋病患者人芽囊原虫感染率为4.16%(21/505),不同性别($\chi^2 = 0.000, P = 1.000$)、婚姻状况($\chi^2 = 5.549, P = 0.099$)、居住地($\chi^2 = 0.001, P = 0.974$)艾滋病患者人芽囊原虫感染率差异无统计学意义。人芽囊原虫感染阳性和阴性者体质(t = -1.196, P = 0.232)、年龄(t = 0.373, P = 0.710)、身高(t = -0.298, P = 0.766)及CD4⁺T淋巴细胞数量(t = 0.078, P = 0.938)差异亦均无统计学意义。不同受教育程度($\chi^2 = 14.494, P = 0.001$)和职业患者($\chi^2 = 8.595, P = 0.049$)人芽囊原虫感染率差异有统计学意义。不同受教育程度患者中,小学及以下者人芽囊原虫感染率最高[9.57%(11/115)];不同职业患者中,以其他职业(包括快递员、退休人员、无业人员、自由职业者、干部人员、公司职员、家政人员、教师、经商人员、营业员、IT职员、临时工)感染率最高[8.02%(13/162)]。

3 艾滋病患者临床表现

505例艾滋病患者中,最常见临床表现是皮肤瘙痒(21.58%),其次是食欲不振(15.45%)、腹胀(13.66%)、肛门瘙痒(10.30%);粪便性状以软便最常见(53.01%),排便次数以每日1~2次最常见(87.52%)。

4 艾滋病患者人芽囊原虫感染危险因素

4.1 单因素分析 与南昌市艾滋病患者感染人芽囊原虫无关的因素包括性别、居住地、未成年子女数、家庭厕所类型、是否饲养宠物、是否饲养家畜、CD4⁺T细胞数量(P 均>0.20),与人芽囊原虫感染有关的因素包括职业、受教育程度、日常饮用水类型、感染HIV途径、是否接受抗HIV治疗(P 均<0.05)(表2)。

表2 南昌市艾滋病患者人芽囊原虫感染影响因素单因素分析

Table 2 Univariate analysis of risk factors of *Blastocystis hominis* infection among AIDS patients in Nanchang City

变量 Variable	人芽囊原虫 感染阴性 Negative <i>B. hominis</i> infection [n (%)]	人芽囊原虫 感染阳性 Positive <i>B. hominis</i> infection [n (%)]	单因素分析 Univariate analysis		
			χ^2 值 χ^2 value	P值 P value	比值比(95%CI) OR (95% CI)
性别 Gender	男 Male (n = 427)	409 (95.78)	18 (4.22)	< 0.001 ⁽²⁾	1.000
	女 Female (n = 78)	75 (96.15)	3 (3.85)		
	学生 Student (n = 22)	21 (95.45)	1 (4.55)		
	农民 Farmer (n = 159)	156 (98.11)	3 (1.89)		
职业 Occupation ⁽¹⁾	工人 Worker (n = 105)	101 (96.19)	4 (3.81)	8.595 ⁽³⁾	0.049
	农民工 Peasant worker (n = 42)	42 (100.00)	0 (0.00)		
	其他 Others (n = 162)	149 (91.98)	13 (8.02)		

续表

变量 Variable	人芽囊原虫 感染阴性 Negative <i>B. hominis</i> infection [n (%)]	人芽囊原虫 感染阳性 Positive <i>B. hominis</i> infection [n (%)]	单因素分析 Univariate analysis			
			χ^2 值 χ^2 value	P值 P value	比值比(95%CI) <i>OR</i> (95% CI)	
居住地 Residence ⁽¹⁾	农村 Village (n = 227)	218 (96.04)	9 (3.96)	0.001	0.974	0.985 (0.393, 2.468)
	城镇 Township (n = 256)	246 (96.09)	10 (3.90)			
民族 Nationality	汉族 Han (n = 475)	458 (96.42)	17 (3.58)			
	回族 Hui (n = 1)	1 (100.00)	0 (0.00)	7.177 ⁽³⁾	0.067	-
	其他 Others (n = 29)	25 (86.21)	4 (13.79)			
	未婚 Single (n = 225)	218 (96.89)	7 (3.11)			
婚姻状况 Marital status ⁽¹⁾	已婚 Married (n = 214)	206 (96.26)	8 (3.74)			
	已婚独自居住/丧偶 Widowed or solitary (n = 27)	25 (92.59)	2 (7.41)	5.549 ⁽³⁾	0.099	-
	其他 Others (n = 24)	21 (87.50)	3 (12.50)			
	小学及以下 Primary school and below (n = 130)	120 (92.30)	10 (7.69)			
受教育程度 Education level ⁽¹⁾	初中 Middle school (n = 210)	208 (99.05)	2 (0.95)	14.494 ⁽³⁾	0.001	-
	高中 High school (n = 77)	76 (98.70)	1 (1.30)			
	大专及以上 College and above (n = 75)	69 (92.00)	6 (8.00)			
	≤ 3 (n = 225)	212 (94.22)	13 (5.78)			
家庭总人口数 No. of family members ⁽¹⁾	> 3 (n = 264)	256 (96.97)	8 (3.03)	2.231	0.135	0.510 (0.207, 1.253)
	未成年子女数 No. of minor children ⁽¹⁾	323 (94.72)	18 (5.27)			
	1 (n = 65)	64 (98.46)	1 (1.54)	1.687 ⁽³⁾	0.430	-
家庭厕所类型 Type of household toilet ⁽¹⁾	≥ 2 (n = 70)	68 (97.14)	2 (2.86)			
	旱厕 Dry pail latrine (n = 7)	6 (85.71)	1 (14.29)			
	粪池 Septic tank (n = 22)	21 (90.91)	1 (4.54)			
	水冲厕 Water closet (n = 462)	443 (95.89)	19 (4.11)	2.562 ⁽³⁾	0.340	-
日常生活 用水类型 Type of daily water use ⁽¹⁾	公共厕所 Public toilet (n = 11)	11 (100.00)	0 (0.00)			
	自家井水 Own well water (n = 78)	75 (96.15)	3 (3.85)			
	自来水 Tap-water (n = 422)	404 (95.73)	18 (4.27)	2.041 ⁽³⁾	1.000	-
	河水 River water (n = 3)	3 (100.00)	0 (0.00)			
日常饮用水类型 Type of daily drinking water ⁽¹⁾	其他 Others (n = 1)	1 (100.00)	0 (0.00)			
	开水 Boiled water (n = 452)	436 (96.46)	16 (3.54)			
	直饮自来水 Drink tap water straight (n = 12)	9 (75.00)	3 (25.00)			
	水井水 Well water (n = 15)	15 (100.00)	0 (0.00)	10.750 ⁽³⁾	0.020	-
饲养宠物 Keeping pet ⁽¹⁾	桶装水 Bottled water (n = 23)	21 (91.30)	2 (8.70)			
	其他 Others (n = 2)	2 (100.00)	0 (0.00)			
饲养家畜 Keeping livestock	是 Yes (n = 57)	55 (96.49)	2 (3.51)	< 0.010 ⁽²⁾	1.000	0.819 (0.186, 3.612)
	否 No (n = 447)	428 (95.75)	19 (4.25)			
饲养家畜 Keeping livestock	是 Yes (n = 65)	62 (95.38)	3 (4.62)	< 0.010 ⁽²⁾	1.000	1.134 (0.325, 3.963)
	否 No (n = 440)	422 (95.48)	18 (4.07)			

续表

变量 Variable	人芽囊原虫 感染阴性 Negative <i>B. hominis</i> infection [n (%)]	人芽囊原虫 感染阳性 Positive <i>B. hominis</i> infection [n (%)]	单因素分析 Univariate analysis		
			χ^2 值 χ^2 value	P值 P value	比值比(95%CI) <i>OR</i> (95% CI)
感染HIV途径 Route of HIV infection ⁽¹⁾	血液传播 Blood transmission (n = 5)	4 (80.00)	1 (20.00)		
	注射器传播 Injector sharing (n = 58)	52 (89.66)	6 (10.34)	8.755 ⁽³⁾	0.026
	性传播 Sexual transmission (n = 401)	388 (96.76)	13 (3.24)		
	不详 Unknown (n = 38)	37 (97.37)	1 (2.63)		
抗HIV病毒治疗 Anti-HIV treatment ⁽¹⁾	是 Yes (n = 403)	394 (97.77)	9 (2.23)	23.083 ⁽²⁾	< 0.010
	否 No (n = 71)	60 (84.51)	11 (14.49)		0.125 (0.050, 0.313)
CD4 ⁺ T细胞 (个/ μ L) CD4 ⁺ T cell count (No./ μ L) ⁽¹⁾	≤ 400 (n = 328)	313 (95.42)	15 (4.57)	0.346	0.557
	> 400 (n = 153)	142 (96.59)	5 (3.40)		0.735 (0.262, 2.061)

注:(1) 变量存在缺失值;(2) 采用连续校正 χ^2 检验;(3) 采用Fisher精确检验法

Note: (1) Variable has missing values; (2) Tested by chi-square test by continuity correction; (3) Tested by Fisher exact test

4.2 多因素分析 将单因素分析中与人芽囊原虫感染有关及可能有关的因素纳入多因素 logistic 回归模型,采用逐步回归法进行分析。结果表明,日常直接饮用自来水是艾滋病患者人芽囊原虫感染的危险因

素 [$OR = 7.988$, 95% CI(1.160, 55.004)], 接受抗HIV治疗是保护因素 [$OR = 0.183$, 95% CI(0.049, 0.685)] (表3)。

表3 南昌市艾滋病患者人芽囊原虫感染多因素logistic回归分析

Table 3 Multivariate logistic regression analysis of risk factors of *Blastocystis hominis* infection among AIDS patients in Nanchang City

变量 Variable	β	标准误 Standard error	Wald χ^2	P值 P value	OR	OR 95% 置信区间 95% CI of OR	
						下限 Lower	上限 Upper
职业 Occupation				0.648	0.958		
农民 Farmer	-0.678	1.361	0.248	0.618	0.508	0.035	7.310
工人 Worker	-0.343	1.254	0.075	0.784	0.710	0.061	8.281
农民工 Peasant worker	-17.585	6 389.714	0.000	0.998	0.000	0.000	-
其他 Other	-0.054	1.249	0.002	0.965	0.947	0.082	10.948
民族 Nationality				0.003	0.999		
回族 Hui	-16.557	40 192.970	0.000	1.000	0.000	0.000	
其他 Others	-0.065	1.232	0.003	0.958	0.937	0.084	10.480
婚姻状况 Marital status				1.715	0.634		
已婚 Married	0.656	0.614	1.144	0.285	1.928	0.579	6.418
已婚独自居住/丧偶 Widowed or solitary	0.909	1.216	0.558	0.455	2.481	0.229	26.890
离婚 Divorce	0.953	0.995	0.918	0.338	2.594	0.369	18.245
教育程度 Education	0.455	0.310	2.151	0.143	1.576	0.858	2.896
家庭总人口 No. of family members	-0.434	0.549	0.625	0.429	0.648	0.221	1.900
日常饮用水 Type of daily drinking water				4.496	0.343		
直接饮用自来水 Tap water	2.078	0.984	4.455	0.035	7.988	1.160	55.004

续表

变量 Variable	β	标准误 Standard error	Wald χ^2	P值 P value	OR	OR 95% 置信区间 95%CI of OR	
						下限 Lower	上限 Upper
水井水 Well water	-17.814	10 042.976	0.000	0.999	0.000	0.000	0.000
桶装水 Bottled water	0.577	1.122	0.264	0.607	1.780	0.198	16.035
其他 Others	-18.222	40 192.970	0.000	1.000	0.000	0.000	0.000
感染 HIV 途径 Route of HIV infection			0.922	0.820			
注射器传播 Injector sharing	-1.125	1.555	0.524	0.469	0.325	0.015	6.835
性传播 Sexual transmission	-1.278	1.332	0.920	0.337	0.279	0.020	3.790
不知道 Unknown	-18.623	6 814.264	0.000	0.998	0.000	0.000	-
接受抗病毒治疗 Anti-HIV treatment	-1.698	0.673	6.355	0.012	0.183	0.049	0.685

讨 论

本次调查结果显示,南昌市艾滋病患者人芽囊原虫感染率为4.16%,低于安徽阜阳(6.78%)^[12]以及广西壮族自治区(20.70%)^[13]相关调查结果,高于马来西亚(3.3%)^[14]和云南省腾冲市(3.7%)相关调查结果^[15]。以上调查结果提示,艾滋病患者人芽囊原虫感染率存在明显地区差异,可能与不同研究所采用的检测方法以及纳入的研究对象不同有关,也可能与个人卫生习惯、生活环境不同有关^[10, 16]。此外,本研究还发现家中是否养宠物及血液中CD4⁺T细胞数量与南昌市艾滋病患者人芽囊原虫感染无显著相关性,与既往研究结果不同^[17-20],提示需进一步开展相关研究进行验证。

本研究发现,接受抗HIV治疗是南昌市艾滋病患者人芽囊原虫感染的保护因素,与Adamu等^[17]研究中非抗逆转录病毒治疗组艾滋病患者人芽囊原虫感染率明显高于抗逆转录病毒治疗组的结果一致。同时,本研究还发现日常直接饮用自来水是南昌市艾滋病患者感染人芽囊原虫的危险因素,与滕雪娇等^[15]在云南省腾冲市调查得出的结论一致,提示加强卫生宣传教育、培养良好的卫生习惯是控制艾滋病患者感染人芽囊原虫的重要措施。

本研究仅为横断面调查研究,结论外推受到诸多限制,今后应适当扩大样本量,进而全面了解不同地区艾滋病患者合并人芽囊原虫感染的情况,为人芽囊原虫病预防和控制提供科学的参考依据。

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