

· 疾病监测 ·

# 天台县农村居民土源性线虫病监测结果

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**摘要:** **目的** 了解浙江省天台县农村居民土源性线虫病流行现状, 为完善防治策略提供依据。**方法** 根据《浙江省土源性线虫病和肝吸虫病监测方案》, 于2021年4月在天台县按地理方位随机抽取5个行政村, 以村为单位整群抽取3岁及以上常住居民为调查对象。收集性别、年龄、职业、文化程度和服用驱虫药等资料; 采集粪便标本, 采用改良加藤厚涂片法检测土源性线虫卵, 钩虫卵阳性者采用试管滤纸培养法进行钩虫培养, 鉴定钩虫种类, 以每克粪便虫卵数判定感染程度, 计算感染率。**结果** 调查1 013人, 其中男性495人, 占48.86%; 女性518人, 占51.14%。51~<70岁502人, 占49.56%。农民874人, 占86.28%。小学学历436人, 占43.04%。调查对象均未服用驱虫药。检出钩虫感染39例, 感染率为3.85%, 均为美洲钩虫; 轻、中、重度感染分别检出31、5和3例, 占79.49%、12.82%和7.69%。感染者均为农民。男性和女性钩虫感染率分别为3.84%和3.86%。<41岁居民未检出钩虫感染, ≥41岁居民钩虫感染率随年龄增长呈上升趋势( $\chi^2_{趋势}=24.091, P<0.001$ )。钩虫感染率随文化程度升高呈下降趋势( $\chi^2_{趋势}=19.534, P<0.001$ )。前杨村感染率最高, 为10.95%。**结论** 钩虫病是天台县主要的土源性线虫病, 文化程度较低的中老年农民为重点防治对象。

**关键词:** 土源性线虫; 钩虫病; 感染率**中图分类号:** R383.1 **文献标识码:** A **文章编号:** 2096-5087 (2022) 09-0937-04

## Surveillance of soil-borne nematodiasis among rural populations in Tiantai County

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**Abstract: Objective** To investigate the prevalence of soil-borne nematode infections among rural residents in Tiantai County, Zhejiang Province, so as to provide insights into improving the control strategy. **Methods** According to the Zhejiang Provincial Surveillance Programme on Soil-borne Nematodiasis and Clonorchiasis, 5 administrative villages were randomly selected in Tiantai County according to geographical locations on April, 2021, and all permanent residents at ages of 3 years and older were sampled from each village using a cluster sampling method. Subjects' gender, age, occupation, education level and deworming were collected. Subjects' stool samples were collected, and soil-borne nematode eggs were detected using the modified Kato-Katz technique, and larval culture was performed using a filter-paper culture method among hookworm egg positives for identification of hookworm species. In addition, the intensity of infection was evaluated using hookworm eggs per gram stool sample. **Results** A total of 1 013 residents participated in the survey, including 495 men (48.86%) and 518 women (51.14%), and there were 502 participants at ages of 51 to 70 years (49.56%), 874 farmers (86.28%) and 436 subjects with an education level of primary school (43.04%). However, no subjects received deworming. The prevalence of hookworm infections was 3.85% among the study subjects, and only *Necator americanus* was identified. There were 31 cases with mild infections (79.49%), 5 cases with moderate infections (12.82%) and 3 cases with severe infections (7.69%), and all infections occurred in farmers. The prevalence of hookworm infections was 3.84% among men and 3.86% among women. No hookworm infection was detected among residents

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at ages of <41 years, and the prevalence of hookworm infections appeared a tendency towards a rise with age among residents at ages of 51 years and older ( $\chi^2_{trend}=24.091, P<0.001$ ), while the prevalence of hookworm infections appeared a tendency towards a decline with educational levels among residents ( $\chi^2_{trend}=19.534, P<0.001$ ). The greatest prevalence of hookworm infections was found in Qianyang Village (10.95%). **Conclusions** Hookworm disease is the predominant type of soil-borne nematodiasis in Tiantai County, and the middle-aged and elderly farmers with a low education level are high-risk populations for soil-borne nematodiasis control.

**Keywords:** soil-borne nematode; hookworm disease; prevalence of infection

天台县位于浙江省东中部,属亚热带季风气候区,四季分明,降水丰沛,热量充足,四周山体环绕,中间低平,带有一定的盆地气候特征,适宜钩虫生存。因生产生活需要,20世纪90年代前天台县农村多以未经无害化处理的粪便施肥,土壤受到多种肠道寄生虫卵污染。土源性线虫病是浙江省重要的公共卫生问题之一。2009年浙江省人体土源性线虫病调查显示,天台县居民感染率为1.37%<sup>[1]</sup>。2015年全国人体重点寄生虫病调查显示,浙江省土源性线虫加权感染率为1.38%<sup>[2]</sup>,钩虫、鞭虫和蛔虫感染病例均有发现。为了解天台县农村居民土源性线虫病感染情况,天台县疾病预防控制中心于2021年4月在县域范围内开展土源性线虫病监测工作,现将结果报道如下。

### 1 对象与方法

**1.1 对象** 根据《浙江省土源性线虫病和肝吸虫病监测方案》(浙疾办〔2017〕74号),在天台县按东、西、南、北、中分别随机抽取三合镇、街头镇、南屏乡、白鹤镇和始丰街道5个监测点,每个监测点随机抽取1个村,以村为单位整群抽取3岁及以上常住居民(在当地居住时间>6个月),每个村不少于200人,覆盖各年龄段人群。

**1.2 方法** 采用浙江省疾病预防控制中心设计的调查问卷收集性别、年龄、职业、文化程度和服用驱虫药等资料。采集调查对象新鲜粪便样本>30g,参照WS/T 570—2017《肠道蠕虫检测 改良加藤厚涂片法》<sup>[3]</sup>,采用改良加藤厚涂片法,一粪两检,检测钩虫、蛔虫、鞭虫和蛲虫虫卵;3~9岁儿童加做透明胶纸肛拭法检测蛲虫卵。钩虫卵阳性者再以试管滤纸培养法进行钩蚴培养,鉴定钩虫种类。以每克粪便虫卵数判定感染程度:<2 000为轻度感染;2 000~<4 000为中度感染;≥4 000为重度感染。

**1.3 统计分析** 采用SPSS 19.0软件统计分析。定性资料采用相对数描述,组间比较采用 $\chi^2$ 检验,趋势分析采用趋势 $\chi^2$ 检验。以 $P<0.05$ 为差异有统计学意义。

### 2 结果

**2.1 基本情况** 纳入调查1 013人,其中男性495人,占48.86%;女性518人,占51.14%。51~<70岁502人,占49.56%。农民874人,占86.28%;学生/幼托儿童120人,占11.85%。小学学历436人,占43.04%。调查对象均未服用驱虫药物。

**2.2 钩虫感染情况** 检测粪便样本1 013份,检出钩虫感染39例,感染率为3.85%;未检测到其它虫卵。钩蚴培养阳性31例,阳性率为79.49%,均为美洲钩虫。轻度感染31例,占79.49%;中度感染5例,占12.82%;重度感染3例,占7.69%。

39例钩虫感染者均为农民。男性钩虫感染率为3.84%,女性为3.86%,差异无统计学意义( $P>0.05$ )。<41岁居民未检出钩虫感染,≥41岁居民钩虫感染率随年龄增长呈上升趋势( $P<0.05$ )。钩虫感染率随文化程度升高呈下降趋势( $P<0.05$ )。不同调查点钩虫感染率比较,差异有统计学意义( $P<0.05$ );其中前杨村感染率较高,为10.95%;其次为下蛟村,为6.40%;街一村未发现钩虫感染。见表1。

表1 天台县农村居民钩虫感染率比较

Table 1 The prevalence of hookworm infections among rural populations in Tiantai County

项目 Item	调查人数 Respon- dents	钩虫感 染例数 Hookworm infections	感染率 Preva- lence/%	$\chi^2$ 趋势Trend 值	P值
性别 Gender					<0.001 0.985
男 Male	495	19	3.84		
女 Female	518	20	3.86		
年龄/岁 Age/Year <sup>a</sup>				24.091	<0.001
3~	62	0	0		
11~	60	0	0		
21~	37	0	0		
31~	74	0	0		
41~	72	1	1.39		

表 1 (续) Table 1 (continued)

项目 Item	调查人数 Respon-dents	钩虫感染例数 Hookworm infections	感染率 Prevalence/%	$\chi^2$ / $\chi^2$ 趋势 Trend 值	P 值
51 ~	203	6	2.96		
61 ~	299	11	3.68		
71 ~	172	15	8.72		
≥81	34	6	17.65		
文化程度 Educational level <sup>a</sup>				19.534	<0.001
文盲 Illiteracy	129	14	10.85		
小学 Primary school	436	18	4.13		
初中 Junior high school	254	6	2.36		
高中 High school	180	1	0.56		
大学及以上 University and above	14	0	0		
职业 Occupation				—	—
农民 Farmer	874	39	4.46		
工人 Worker	12	0	0		
学生、幼托儿童 Student/childcare children	120	0	0		
教师、公务员 Teacher/civil servant	4	0	0		
商人 Businessman	2	0	0		
医务人员 Medical worker	1	0	0		
调查点 Investigation site				48.319	<0.001
下蛟村 Xiajiao	203	13	6.40		
街一村 Jieyi	202	0	0		
前杨村 Qianyang	201	22	10.95		
上卢村 Shanglu	201	3	1.49		
官塘张村 Guantangzhang	206	1	0.49		

注: a 表示采用趋势  $\chi^2$  检验。Note: a, using linear-by-linear association in chi-square test.

### 3 讨论

土源性线虫病在我国南方多数省份流行<sup>[4-7]</sup>。近年来,浙江省蛔虫、钩虫、鞭虫和蛲虫等土源性线虫感染水平明显下降,呈低水平感染流行状态,但钩虫感染水平仍较高,成为优势虫种<sup>[7-12]</sup>。天台县 5 个调查点仅发现钩虫感染,检出率为 3.85%,多为轻度感染,与 2002 年天台县土源性线虫调查数据<sup>[12]</sup>比较,处于较低水平;但略高于杭州市(1.25%)<sup>[7]</sup>和

丽水市莲都区(2.13%)<sup>[11]</sup>,低于宁波市宁海县(4.93%)<sup>[5]</sup>和丽水市青田县(5.05%)<sup>[5]</sup>。

钩虫感染人体途径较多,主要为经皮肤感染,如赤足下地接触污染土壤,也可经口直接吞入丝状蚴、生食转续宿主的肉类感染,经胎盘、母乳感染等。本次调查发现,39 例钩虫感染者均为农民,与习惯徒手赤足下地劳动有关。其中文盲感染率较高,为 10.85%。提示应将高龄、低文化程度的农民作为钩虫防治健康教育和行为干预的重点对象。本次调查街一村未发现钩虫感染,可能与该村新农村改厕工作开展较早,居民防病意识较强有关。

钩虫病临床诊断主要依靠粪便虫卵检查,胃镜、肠镜检查也能发现钩虫虫体<sup>[13]</sup>。本次调查发现 1 例 77 岁女性钩虫重度感染者,一直以缺铁性贫血对症输血治疗,未做肠镜、粪便常规等检查,治疗过程中 3 次复查血常规嗜酸性粒细胞均增高。流行病学调查发现该病例常年徒手赤足下地劳动,同时使用未经无害化处理的粪便施肥。该病例具有一定代表性,提示针对不明原因贫血的农民,尤其是小细胞低色素非均一性贫血,如出现铁蛋白减少、转铁饱和度降低、嗜酸性粒细胞增高,应高度怀疑钩虫感染,可进行粪便检查虫卵,采用改良加藤厚涂片法提高检出率。

综上所述,天台县农村土源性线虫病调查发现尚有部分居民感染钩虫病,以轻度感染为主。预防钩虫病需针对文化程度较低的农民开展以健康教育为先导、以控制传染源为主的综合防治措施,实施持续监测和精准防控,卫生和环卫部门应进一步完善改厕工作,做好粪便管理,同时加强临床医生和检验人员寄生虫病专业培训,提高诊断水平<sup>[13-16]</sup>。

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