

# Prevalence of Intestinal Parasites among Children in Day-care Centers in Damghan - Iran

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## Abstract

In order to identify the prevalence of parasitic intestinal infections and to determine the impact of some factors, such as age, health houses, education, environmental health etc, on infection, this survey was carried out on 461 stool specimens and scotch tapes obtained from children resident in day-care centers in Damghan city, Semnan province, Iran. The samples were tested using formalin-ether concentration and Graham methods. The analysis of the results showed that at least 68.1 percent of the individuals tested, were infected with one species of pathogen or non-pathogen parasites. The rate of infection for *Enterobius vermicularis*, *Giardia lamblia*, *Entamoeba histolytica*, *Ascaris lumbricoides*, *Hymenolepis nana*, *Entamoeba coli*, *Blastocystis hominis*, *Iodamoeba butschlii* and *Chilomastix mesnili* was 33.8%, 26.2%, 2.4%, 3%, 4.8%, 5.8%, 4.8%, 2.7% and 4% respectively. A significant difference was seen between the rate of infection and parents' education ( $P < 0.005$ ) but was negative regarding age, sex, and health houses. It is concluded that sanitary measurements should be conducted in such centers to decrease the rate of parasitic infection.

**Key words:** Day-care centers, Intestinal Parasites, Iran

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## Introduction

Infection with intestinal parasites is common in developing countries and affects mostly the children (1, 2, 3). Public health specialists are concerned that these infections impair children's growth and development (4, 5, 6). *Enterobius vermicularis* (Oxyure) is the most prevalent parasite, infects up to one third of children worldwide (7, 8). Because children frequently spread the infection, Oxyure is most prevalent in day-care centers and schools (8, 9). Giardiasis, another protozoan disease, is acquired through contaminated water or food (3). Occasionally there are cases of giardiasis outbreaks in day care centers (3, 7). The prevalence of intestinal parasites among children of baby care centers in some regions of Iran has been reported in southeast Tehran, 31.3% (10), and Babol, 44% (8). This study was carried out in order to determine prevalence of intestinal parasites in all day-care centers in Damghan city, Semnan province, Iran.

## Materials and Methods

In this cross sectional study, 461 children from day care centers aged less than 6 years in 4 groups were examined as follows: 318 from Education and Training Office, 49 from Rehabilitation Center, 72 from Islamic Organization, and 22 from a private baby center, called Baharan. Each parent was given a plastic box including a questionnaire, small container, one slide and scotch tape and was asked to provide, on the next visit, a stool sample and slide scotch tape from their children. Each container was marked with the name of the subject who

had been enrolled in the study. At the second visit, the containers were collected and sent to the laboratory at the University of Damghan. One or two additional visits were made in case the container had not been returned. Stool specimens were examined for the parasite eggs, cysts, and larvae using formol-ether concentration method described earlier (11). Amoeba trophozoites were examined in fresh smears. Oxyure eggs were observed in scotch tape slides. The parents completed a short questionnaire that included their children name, age and sex as well as members of the family and level of their education. The sanitary conditions, such as toilet facilities of day-care centers were recorded as well.

**Statistical analysis.** Chi-squared test was performed to associate between the prevalence of intestinal parasitic infection and age, sex, members of family, level of parents' education and the sanitary condition of day-care centers.

## Results

Of 461 children, 54% were male. One or more intestinal parasitic infections were identified in 314 (68.1%) of the children (Table 1). The most prevalent parasites were *Enterobius vermicularis* (33.8%), *Giardia* (26.2%) and *Hymenolepis nana* (4.8%). *Ascaris lumbricoides* and *Entamoeba histolytica* showed a low infection rate as 3% and 2.3% respectively. Non-pathogenic *Entamoeba coli*, *Blastocystis hominis*, *Iodamoeba butschlii* and *Cilomastix mesnili* were detected in 5.8%, 4.7%, 2.7% and 4% of cases respectively. Only one species of parasite was present in 52.4% of cases while 15.4% were

infected by two or more species. There was no significant association between age, sex, and members of family as well as prevalence of intestinal infections. Parasitic infection was more prevalent in children whose parents had no high education (Table 2). A significant difference was seen between infection rate and parents' education ( $P<0.005$ ). The prevalence of infection with *Oxyure* in Qhoran day-care centers, Rehabilitation Center, private center and Education and Training centers was 49%, 51%, 50% & 27% correspondingly, this variation showed

statistically significant relationship ( $P<0.005$ ). No child aged less than 6 months was found infected. The symptom of itch was observed in 46% of cases with oxyuriasis. Toilet facilities were not appropriate in 64% of day-care centers. A high chi-squared value indicated a considerable association between any pair of infections under study. There was conspicuous association between *Giardia intestinalis* and *Enterobius vermicularis* infection.

**Table 1:** Prevalence of intestinal parasites among children in day-care centers in Damgan, Semnan province-Iran.

Infection Day-care center	Number		Oxyure		<i>Giardia lambelia</i>		<i>Hymenolepis nana</i>		<i>Entamoeba histolytica</i>	
	N	%	N	%	N	%	N	%	N	%
Education and Training Office	318	68.98	85	26.72	75	23.58	10	3.14	6	1.8
Rehabilitation Center	49	10.62	25	51.02	16	32.65	3	6.82	2	4
Islamic Organization	72	15.61	35	48.61	24	33.33	7	9.72	2	2.7
Private day- care center	22	4.77	11	50	6	27.27	2	9.09	1	4.54
Total	461	100	156	33.83	121	26.24	22	4.77	11	2.4
			$X^2=23.18$ df=3		$X^2=4.04$ df=3		$X^2=12.74$ df=3		$X^2=1.42$ df=3	

**Table 2:** Prevalence of intestinal parasites among children in day-care centers in Damgan and the level of parents' education.

Prevalence	Number	Percent	Number	Percent	Total No.	Total %
Level of Education						
Illiterate	8	80	2	20	10	2.14
Primary and Junior secondary certificate	151	76.26	47	23.73	198	42.95
Senior secondary certificate	100	64.93	54	35.06	154	33.40
Academic	55	55.55	44	44.44	99	21.47
Total	314	68.11	147	31.88	461	100

## Discussion

This study provides the first estimate of parasite prevalence among children of day-care centers in Damghan city. Compared with the results of related studies on intestinal parasitic infection in day-care centers in Iran (8, 10), the present prevalence is higher. The prevalence of *Entamoeba histolytica* /*dispar*, observed in the present study was low. This result shows close agreement with universal reports as regards infection with parasites in children aged less than 6 years (12). When levels of education, basic sanitary condition and hygiene, were analyzed as the determinants of intestinal parasite infection, it was concluded that greater frequency of intestinal parasite occurred among children whose parents had low level of education. This association showed close agreement with Kalantari's observation (10) and Machado's one (7). It is more likely that parents of children at high level of education provide better sanitation condition for their kids. The prevalence of Oxyure in this study was greater than the data reported by Lotphy (16%), Atayan (28%), Bahman rokh (27%) (8, 13, 2), but equivalent with Kalantari's report as 33.6% (10). Children infected with Oxure scratch themselves; eggs are picked up under their fingernails and then deposited on toys, books, or back into the mouth, if the child is a thumb-sucker or nail-biter (8, 9, 14). A significant difference between frequency of Oxyure and *Hymenolepis nana* and kind of day-care centers was found, and may ascribed to level of parents' health knowledge as well as sanitary condition of the day-care centers. Reduced prevalence of these parasites may be related to better toilet facilities in day-care centers belonging to Education and Training office than other day-care centers. The pair of *Giardia* and *Enterobius* appeared to be strongly associated and it would be challenging to investigate the mechanism(s) responsible for this phenomenon. The prevalence of *Giardia intestinalis* in this study was greater than that of reported by Lotphy (9.3 %), Atayian (20.2%), Bahman Rokh (20%) and Kalantari (14.6%) (8, 13, 2, 10). However, in developing countries, intestinal parasitism is also an indicator of sub- standard sanitation, poor personal hygiene, poor water supply and over crowding. All of these factors therefore, must be considered in developing countries parasite prevention programs (15, 16, 17). Sanitation in diarrhea disease control is more important than better water quality (18). Thus, improvements in the quality of the water supply, will not substantially reduce water-related diseases, such as giardiasis, unless a number of behavioral and sanitation factors are considered (16, 18). Finally, health education and sanitary measures are essential to the control of intestinal parasitic diseases in these day-care centers. As a prophylactic measure, parents should keep their children nail short and clean. Day-care centers must be

provided toilet facilities and the stool and scotch tape examination must be done on a regular basis in day-care centers every year.

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