

Prevalence Rate of Oxyuris Vermicularis and Vulvitis In Children of 2-5 Years of Age in Sari Township Kindergartens, Iran

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Abstract: Oxyuris vermicularis is one of the main hygienic problems causing in the world specially in children under 2 years of age. Over 40 million Americans specially children are infected by Oxyuris vermicularis. One of the complications of parasite is its role in causing vulvitis. Since the parasite is more prevalent in girls than boys, this study was conducted to show the prevalence rate of Oxyuris vermicularis infection and vulvitis in children between 2-5 years of age in Sari township. Samples were collected by scotch tape method from all children of 2-5 years of age. Vulva of the children were examined by a midwife under the supervision of a specialist. Information about itching, edema, erythema and vulvar itching, vaginal excretion, pruritus and bed wetting were recorded in a questionnaire. Other information like age, education, occupation of parents, family members, the number of siblings, the number of children in each class and their baby sitters, cleanliness of nails, beds and their informal habits, bathing, disinfection of fomites and bed sheets, the presence of physicians in kindergarten, hygienic card for baby sitters and the children infected with Oxyuris vermicularis were recorded in a questionnaire and the children infected to Oxyuris vermicularis were examined by scotch tape method. A total of 216 children under study, 64% were infected to Oxyuris vermicularis, 38 people (13.5%) had vulvitis, and 13 of them (6%) had vulvitis along with Oxyuris vermicularis. There was no significant relationship between Oxyuris vermicularis and vulvitis by χ^2 statistical analysis. 34.2% who had vulvitis, were infected to Oxyuris vermicularis too. There were significant relationship between the age and Oxyuris vermicularis infection ($p < 0.001$), between vulvitis and age group ($p < 0.05$), between Oxyuris vermicularis and using fomites ($p < 0.01$), and between vulvitis and itching of anus ($p < 0.05$). Regarding the prevalence of Oxyuris vermicularis infection and its role in vulvitis and the limitation in the studies in this field, it is necessary to have a proper planning for the improvement of health and the agents of causing vulvitis.

Key words: Oxyuris vermicularis, vulvitis, pediatric, kindergarten

INTRODUCTION

During the childhood till menarche, vaginal epithelium is non Esterogenized and lack of local defence mechanism and proximity of rectum to vaginal and contamination of vagina to fecal material and lack of proper hygiene in the prepubert girls, will cause special susceptibility to vulvitis. Vulvitis is one of the most gynecological problems in prepuberal girls^[1,2] and parasitic infections play an important role in vulvitis^[1-3]. Oxyuris vermicularis is one of the most prevalent nematodes specially in man, and children under 12 years of age which are mainly affected^[1,2]. Naturally Oxyuris vermicularis inhabits the large intestine with low pathogenicity, but it is possible that the worm or its ovum leave the rectum and invade vagina or vulva, with the symptoms of erythema or swelling of vagina, itching, vaginal discharge and burning with malaise^[3-6]. 1:5 of the vulvitis cases in children is caused by Oxyuris vermicularis^[7].

O'Brien in the study conducted on vulvovaginitis in children of preschool age, indicated the symptoms such as itching, irritation, burning and having difficulty in urination due to lack of hygiene, Oxyuris vermicularis infection, Beta hemolytic Streptococci, sex abuse and skin diseases Prekop *et al.*,^[9] found an adult female Oxyuris vermicularis in vaginal secretions in a 7 year old girl in Newzeland. Of course in 2 girls 2 and 4 years old with abundant secretions, and distinct vulvovaginitis, their parents do not allow to collect samples with soap^[9]. All infected individuals were treated by Pyrantel pamoate (10 mg kg^{-1}). Gohlleb *et al.*, (1980) showed that 16 of 28 (57%) young girls with UTI had oxyuriasis while only 10% of non UTI girls were infected with Oxyuris vermicularis^[10]. Hammerschlag *et al.*, isolated Oxyuris vermicularis ovum from 5 girls in age group between 3-5 years with incontinence without anal itching and discharge. All of them recovered by antiparasitic treatment^[11]. Studies in different parts of Iran indicated the prevalence rate of oxyuriasis in children from 10 to

92%^[12-13]. Considering low standard of hygiene in some parts of Iran and ease of transmission of *Oxyuris vermicularis* among children and the role of this parasite in causing vulvitis and lack of studies in this regard, special attention for finding the prevalence rate of oxyuriasis and vulvitis in kindergartens is needed.

MATERIALS AND METHODS

This cross sectional Study was performed on 217 female children between 2-5 years of age kept at 4, 7, 11 governmental, private and self runner Kindergartens respectively. The children had complain of uncomfourt and did not use pad. First an agreement with the parents of the children under investigation obtained.

Informations about itching, edema, erythema and vulva itching, vaginal discharge, pruritis and bed wetting was recorded in a questionnaire. Other information like age, education, occupation of parents, family members, the number of siblings, the number of children in each class and their baby sitters, cleanliness of nails and beds, their informal habits, bathing, disinfection of fomities and bed sheets, the presence of physicians in Kindergarten, hygienic card for baby sitters and the children with the help of the Kindergarten masters and the parents was recorded in a questionnaire. Samples were collected by Scotch tape method from all children of 2-5 years of age. Information was given to the parents of the children in groupwise. They were told to prepare sample with the help of clean slide and Scotch tape, from the perianal area in the morning before cleaning and then submit the sample to the Kindergarten administer. Vulva of the children were examined by a midwife under the supervision of gynecologist. In oxyuriasis cases, second smear were prepared from vulvar area.

RESULTS

In this investigation 29.5% (64), 17.5% (38) and 6% (13) had *Oxyuris vermicularis* infection, vulvitis and combined oxyuriasis and vulvitis, respectively. χ^2 test did not show significant relationship between oxyuriasis, and vulvitis (Table 1).

Differences in the rate of oxyuriasis in the different age groups were observed, and there was significant relationship between Oxyuriasis and age ($p < 0.001$), and between vulvitis and age ($p < 0.05$).

According to χ^2 test, there was no significant relationship between oxyuriasis and different factors such as: type of kindergartens, level of parent's education,

Table 1: The rate of *Oxyuris vermicularis* infection in different age groups

Age (in month)	Oxyuriasis (%)	Vulvitis (%)	Healty cases (%)
26-36	15 (6.9)	9 (4.1)	22 (10.1)
37-47	14 (6.5)	8 (3.7)	36 (16.6)
48- 60	35(16.2)	21(9.7)	57 (26.3)
Total	64(29.5)	38(17.5)	115 (53)

Table 2: Distribution pattern of oxyuriasis in relation to different dependant variants

Variants	oxyuriasis %	Non oxyuriasis %
Toys		
- Individual	18.4	81.6
- Group	38.1	71.9
Parasitic drug		
-Consumption	18.2	81.8
-Non consumption	37.5	62.5

Table 3: The relation of vulvitis with different symptoms

Symptoms	Oxyuriasis	Vulvitis (%)	Nonvulvitis (%)
Perianal itching	No	13.9	86.1
	Yes	35.1	64.9
Vaginal discharge	No	16.3	83.7
	Yes	50	50
Pruritis	No	12.5	87.5
	Yes	39	61
Burning	No	14.3	85.7
	Yes	39.3	60.7
Malaise	No	27.8	72.2
	Yes	58.3	41.7
Vulvar itching	No	11.6	88.4
	Yes	40.9	59.1

professional status, the number of family members, number of siblings, number of children, their baby sitters in the class, cleanliness of nails, daily changing of underwear, daily disinfection of fomities, having health identity card, presence of physician at the kindergarten and itching in perianal region. There were significant relationship between oxyuriasis and the way of using fomities and consumption of antiparasitic drugs in less than one month ($p < 0.01$) (Table 2).

Oxyuriasis was observed in 34.2% of the children who had vulvitis. There was significant relationship between vulvitis and symptoms such as vaginal discharge, anal itching, burning during urination, malasia and vulvar itching ($p < 0.05$) (Table 3).

DISCUSSION

In this survey the prevalence rates of oxyuriasis and vulvitis in 217 children in the age of 2-5 years at Sari Kindergartens were 29.5 and 17.5% respectively., 6%^[13] of children had combined oxyuriasis and vulvitis. The rate of oxyuriasis by Scotch tape method in the children in different parts of Iran was estimated 10 to 92%^[12,13]. Anyway the difference in the prevalence rate of oxyuriasis may be due to existing differences in the public crowdness, the hygienic condition of the family and

Kindergartens masters, the ecological conditions, the kind of selecting the cases under study and the diagnostic methods used. Certainly the prevalence rate of oxyuriasis in kindergartens is less than its prevalence in the society. The reason may be due to the high level of parents, and Kindergarten masters, awareness of *Oxyuris vermicularis* infection, using Scotch tape test, providing health card for children and masters, presence of physician, daily disinfection of commonly used fomites and permanent supervision of the kindergartens. In spite of the reduction of *Oxyuris vermicularis* infection in recent years, still low prevalence rate of oxyuriasis in the girls and especially those with improper hygiene is high which may be due to direct transmission of parasite and improper habits of the children. In 1970 the number of cases infected with *Oxyuris vermicularis* was one milliard worldwide and the estimated cases in U.S.A. was 42 millions^[4]. So in regard to high level of oxyuriasis, vulvitis as an outcome of ectopic parasite (mature worm or ovum) is probable in vulvar region.

In this survey 13 out of 64 (6%) children infected with *Oxyuris vermicularis* had vulvitis too. Pena *et al.*,^[7] in a studies on vulvovaginitis in children, showed that 25 out of 197 (12.6%) oxyuriasis patients had vulvitis. The results of our investigation shows the low rate of oxyuriasis and vulvitis in comparison to Pena findings. The reason may be due to improper study of vulvitis in our cases, because for proper investigation of vulvitis, sufficient sample collection and performing proper identification tests are needed but in this study the parents do not allow to collect the sample by swab from their children. There are different research findings indicating the presence of *Oxyuris vermicularis* or its ovum in peritoneal cavity, ovary, fallopian tubes, endometrium, lungs, liver, urinary tract, subcutaneous boils and vagina^[14-16].

In this study 38 (17.5%) of the children had vulvitis and 34.2% of vulvitis cases had oxyuriasis. If the most common causes of vulvovaginitis such as bacterial, viral and fungal agents, trauma, and sex abuse be excluded, parasites are the main causes of vaginitis in children, and also there is statistically significant relationship between vulvitis and symptoms such as anal itching, erythema, edema, and vulvar itching, malaise, vaginal discharge, and burning sensation during micturation ($p < 0.001$). Gohlieb *et al.*,^[10] showed that 16 of 28 (57%) young girls with UTI had oxyuriasis while only 10% of non UTI girls were infected with *Oxyuris vermicularis*. In the study of Prekop *et al.*,^[9] in Zcheslavakia, in 1982 on the girls of 2, 4, and 7 years of age who had vaginal and urethral discharges, erythema and swelling of cervix, showed fertile *Oxyuris vermicularis* in the discharge of a 7 year old girl, in the two

other cases sampling was not allowed. Hammerschlag *et al.* isolated *Oxyuris vermicularis* ovum from 5 girls in age group between 3-5 years with incontinence without anal itching and discharge. All of them recovered by antiparasitic treatment^[11]. Hence considering the lack of defence barrier in the genital tract of prepuberal girls, proximity of rectum to vagina and contamination of vagina by fecal materials along with improper hygiene in above mentioned girls and difficulties in sample collection in such cases, more extensive studies are required to be done regarding vulvovaginitis in children. It is obvious that performing comprehensive research programmes in order to evaluate the health status of the children and to show the causing agents of vulvitis needs further researches.

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