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The Occurrence of Oral Thrush Yeasts Among School Children in Onitsha Urban, Anambra State, Nigeria

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A total of 1,000 healthy school children (500 males and 500 females) from 3 primary schools in Onitsha urban area of Anambra State, Nigeria were sampled for the occurrence of oral thrush yeasts using Sabouraud Dextrose Agar (SDA). The children were aged between 6-13 years. Out of the 1,000 school children sampled, 309 (39.0%) were found to be positive. Further examination of the positive cases showed that *Candida albicans* occurred as 257 total positive samples; *C. stellatoidea* as 18 positive samples; *C. parapsilosis* as 19. Other species of *Candida* occurred as 15 positive samples. The occurrence of the oral thrush yeasts within the age brackets of the children were as follows: 6-7 years, 106 positive cases (42.4%); 8-9 years, 83 positive cases (33.3%); 10-11 years, 66 positive cases (26.4%) and 12-13 years, 84 positive cases. The results showed that the infection occurred more in younger children than in older children. There was a significant difference between the occurrence of the thrush yeasts in younger and in older children ($p < 0.05$). There was no significant difference between male and the female pupils in being susceptible to the oral thrush yeasts ($p < 0.05$). The problem posed by oral thrush to the children was highlighted and control measure recommended to reduce incidence and spread.

Key words: Oral thrush yeasts, Nigerian school children, *Candida albicans*, *Candida* species, oral hygiene in children

INTRODUCTION

Oral thrush is a superficial infection of the mucous membrane characterized by white adherent patches of pseudomycelium which frequently involves lesions, sores, fissures and ulcers in the mouth which could either be acute or chronic^[1,2]. It is associated with chronic illness and antibiotic therapy and is known to affect mainly small children and elderly patients^[3]. It is also common in acute HIV/AIDS infections^[4].

Opportunistic pathogens especially various *Candida* species that reside in the human buccal cavity are the most common causes of oral thrush. These include *C. albicans*, *C. tropicalis*, *C. parapsilosis* and other species of *Candida*^[5]. When seen in these places, they live as normal commensals but can cause some infection when there is alteration in their environmental conditions. *Candida* species can also be isolated in good quantity from the mouth of both healthy subjects who have no clinical evidence of *Candida* infection and people who show clinical evidence of some previous oral infections^[6]. In the mouth, the site of *Candida* colonization can vary between subjects and in the same subject from day to day. Thus those patients who were culture-negative on the basis of a single swab might indeed have harboured *Candida*^[7]. However, systemic involvement also occurs and can sometimes be fatal^[8]. Other forms of fungi may be encountered in oral thrush infection including *Aspergillus* sp. and *Cryptococcus neoformans*^[9].

Oral thrush in children or aged people has become virulent in recent years and today, candidiasis is one of the most frequently-occurring mycosis^[1]. Prescott *et al.*^[10] stated that patients with immune compromise and suppression are susceptible to the development of oral candidiasis. Lay and Russel^[11] reported that the prevalence of *Candida albicans* in the mouth of day old babies was 5.7% and increased to 10.7% during the next 3 weeks in hospital.

Thrush occurs more frequently in bottle-fed than in breast-fed babies and the lesions not infrequently spread to the pharynx and even oesophagus^[12]. *Candida* infection may be a complication of antibiotic therapy when sensitive organisms are destroyed, or of corticosteroid therapy when resistance to infection may be diminished^[13].

The aim of this study was to do a survey of oral thrush infection in healthy, primary school children in Onitsha, Anambra State, Nigeria and to determine the percentage occurrence of the infection in these children. This occurrence, if high, will call attention to the oral health of school children in this area of the country.

MATERIALS AND METHODS

The study area was Onitsha, Anambra state in the Eastern part of Nigeria. The area is a cosmopolitan and highly commercial city. The study population was 1,000 school children. The schools from which samples were collected were the most popular in the densely populated area and henceforth designated as schools I II, III.

The samples were obtained by 2 methods. The use of sterile swab sticks and the use of sterile distilled water for oral or mouth wash. A questionnaire was used to obtain information on age, sex of the children and socioeconomic status of the children's parents.

Two types of techniques were used on each child. The sterile swab stick method was done according to the method of Otaviano and Disalvo^[14]. A sterile swab stick was carefully placed in the mouth each of the pupils and the tongue, teeth, soft and hard palate were swabbed. The swab stick was removed and placed in a sterile container.

The mouth wash method was according to the method of Burford-Mason and Willoughby^[15]. Each pupil was required to rinse his mouth with about 20 mL of sterile water for about 15 sec and this mouth content poured out into a sterile universal bottle. Samples were taken to the laboratory within the hour or stored at 40°C and cultured within 12 h of collection.

About 0.1 mL each of the collected sample was inoculated on already prepared Sabouraud Dextrose agar slants contained in test tubes. Each test tube was incubated at 35-37°C for 24-72 h. Organisms that grew on the medium were examined under the microscope using the x40 objective after staining with lactophenol blue. Distinctive colonies had the characteristic yeast smell. Budding yeast cells were observed under the microscope. After 3 days at room temperature, *Candida albicans* appeared as cream-coloured, smooth colonies with pseudomycelium growing into the agar.

The germ tube test to identify *C. albicans* was done according to the method of Cheesbrough^[16]. About 0.5 mL of human blood serum was poured into a small test tube and each isolate inoculated into the tube using a sterile wire loop. Incubation was in a water bath for 2-4 h. A drop of the serum yeast culture was transferred onto a glass slide using a Pasteur pipette and covered with a cover slip. Examination for germ tubes or blastospores was done under the X40 objective. The presence of sprouting yeast cells was a positive identification for *C. albicans*.

Identification for non *C. albicans* yeasts: To identify non *C. albicans* yeasts, differentiation was done using the ability to ferment various sugars and also the carbon assimilation test^[17-19].

Table 1: Occurrence of oral thrush yeasts according to the ages and sexes of the school children

Age	Total No. of males	Positive cases	Total No. of females	Positive cases	Total No. of positive cases	% of positive cases
6-7	125	54	125	52	106	42.4
8-9	125	43	125	40	83	33.3
10-11	125	34	125	32	66	26.4
12-13	125	26	125	28	57	21.4
Total	500	157	500	152	309	30.9

Table 2: The high occurrence of *C. albicans* from oral samples of children in the 3 primary schools in Onitsha, Anambra State

School	No. of samples	Total No. of positive samples	No. of samples positive for:			
			<i>C. albicans</i>	<i>C. stellatoidea</i>	<i>C. parapsilosis</i>	other yeasts
I	336	101	86	5	6	4
II	332	110	90	8	6	6
III	332	98	81	5	7	5
Total	1000	309	257	18	19	15

Table 3: Occurrence of oral thrush yeasts in children of different ages from the 3 primary schools in Onitsha, Anambra State

School	No. of samples examined				Total No. of samples examined	No. of positive cases				Total No. of positive cases	% of positive cases
	6-7	8-9	10-11	12-13		6-7	8-9	10-11	12-13		
I	84	84	84	84	336	33	27	22	19	101	30.0
II	83	83	83	83	332	41	29	22	18	110	33.1
III	83	83	83	83	332	32	27	22	17	98	29.5
Total	250	250	250	250	1000	106	83	66	54	309	30.9

RESULTS AND DISCUSSION

Table 1 shows the occurrence of oral thrush yeasts according to the ages and sexes of the school children. Equal numbers (500 each) of both male female children were sampled and also equal numbers (125) were sampled for each of the age ranges. It was observed that the number of positive cases was more in younger children (age range of 6-7) and decreased with increasing age (12-13). This seemed to show that oral hygiene improved as the children became older more aware of oral hygiene or it may be due to immunodeficiency as observed by Nicolatou *et al.*^[18]. From the Table 1 slight increases in number were noticed between the positive cases in the males and in the females even though this was not of any statistical significance ($p < 0.05$).

Candida albicans appeared to be the principal agent of oral thrush in children in the schools sampled (Table 2). Out of a total of 309 positive samples, the organism occurred in 257 samples. This was followed by *C. parapsilosis* (19); *C. stellatoidea* (18). The other yeasts spp. were found as 15 positive cases. The same trend was observed in the 3 schools. This agreed with the work of Burdford-Mason and Willoughby^[15] who found that this organism was the chief causative agent of oral thrush in children.

Table 3 showed high percentages for the 3 schools indicating poor oral hygiene in the children especially among those between the ages of 6-7.

Thrush poses a big problem in children^[3] and as such its incidence needs to be reduced and the affected

children taken care. Oral hygiene education was one of the things suggested to the teachers for the oral welfare of the children. Care of injury sustained in the mouth either during play or by other causes was also explained to the teachers. In addition, children should be discouraged from the common use of cups and cutlery in schools to avoid cross infection. Then there is the occasional use of mild antiseptic mouthwash. When infected, antifungal medicines e.g. clotrimazole, traconazole or other orally-active azole derivatives should be used to treat the children^[5].

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