
A study on Candida infection in HIV/AIDS patients in a tertiary care hospital in Kolkata

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Candida infection varies in different individuals based on their age group and sex, socio-economic status, immune status, species differentiation and so on. The purpose of this study was to study the prevalence of Candida infection in HIV/AIDS patients in a tertiary care hospital in Kolkata. In this study, data were collected from 62 patient clinically diagnosed to be cases of oropharyngeal Candida infection mainly, who visited the out patients' department (OPD) in School of Tropical Medicine, Kolkata, West Bengal. Information on socio-economic details of these suspected cases were obtained with the help of a pre-tested questionnaire. Further investigations (smear and culture) were carried with the properly collected specimens from these patients to identify the Candida types following standard techniques. Out of 62 clinically suspected patients 51(82.3%) were found to be suffering from Candidiasis. The rate of prevalence of this infection varied with sex, income and age groups and with occupational types. Two species *C. albicans* and *C. glabrata* were identified as the major causative agents (in 94% cases). *Candida parapsilosis* and *Candida tropicalis* were found as the causative agent in only 2 and 1 samples respectively. Oropharyngeal Candidiasis may be a sentinel event for the detection or progression of HIV diseases, presenting months or years before development of more severe opportunistic infection in these patient groups.

Key words : Candida, HIV, opportunistic infection

INTRODUCTION

Candidiasis is the mycoses caused by the fungal species *Candida* which belongs to the Class Deuteromycotina. Candidiasis may occur in immunocompromised patients as well as in immunocompetent patients worldwide and is mostly considered as an opportunistic infection. Gottlieb *et al.* (1981) and Masur *et al.* (1981) have shown in their study that Oropharyngeal Candidiasis is among the initial manifestations recognized in association with HIV infection. The incidence of Candida infections in HIV infected patients without advanced immunodeficiency has been reported as varying from 7% to 48%. The incidence increases as the CD4+ lymphocyte count decreases, with up to 92% of patients demonstrating evidence of Oropharyngeal Candidiasis at some time as has been shown in a study by Dolin *et al.* (1999). Mucocutaneous Candidiasis typically affects most

people with advanced untreated HIV infection. *Candida* species reside as part of the normal flora of the oral cavity in about 40% of the general population known as carriers. In the event of immune suppression, there is a shift from commensalisms to an exponential increase in colonization, which eventually leads to clinical signs and symptoms of oral Candidiasis (OC). Pseudo membranous Candidiasis or thrush which is the most common presentation of Oropharyngeal Candidiasis (OPC). Thrush is characterized by white, adherent painless, discrete or confluent patches in the mouth, tongue, or esophagus, occasionally with fissuring at the corners of the mouth as has been proved by Chander (2002). The occurrence of thrush in a young, otherwise healthy-appearing person should prompt an investigation for underlying HIV infection. More commonly, thrush is seen as a nonspecific manifestation of severe debilitating illness. As has been proved by Klein *et*

al. (1984), Dodd *et al.* (1991) and Katz *et al.* (1992) that Oropharyngeal Candidiasis may be a sentinel event for the detection or progression of HIV disease, presenting months or years before more severe opportunistic infection. Oropharyngeal Candidiasis may predispose patients to develop more invasive disease, including oesophageal Candidiasis. It has been estimated by Wilcox *et al.* (1995) that Oropharyngeal Candidiasis may have a positive predictive value ($\leq 90\%$) for oesophageal Candidiasis and may be considered as useful diagnostic marker, though asymptomatic cases are many. Historically, up to 90% of patients with advanced untreated HIV infection developed OPC, with 60% having at least one episode per year with frequent recurrences (50%-60%) as has been shown by Wilcox *et al.* (1995). Therefore, the present study has been undertaken to assess the prevalence of *Candida* infection in HIV/AIDS patients in School of Tropical Medicine, Kolkata, West Bengal.

MATERIALS AND METHODS

Study consisted of clinically suspected cases of oral Candidiasis attending OPD (out patients department), in School of Tropical Medicine Kolkata, West Bengal. Out of a total of 273 patients, 62 were found to be clinically positive of oral *Candida* infection. The present study was largely based on finding the prevalence of infection and the species of *Candida* in oral Candidiasis in immunocompromised patients (HIV seropositive subjects).

Before the initiation, the study was properly planned under guidance and was carried out in the stipulated period (from December, 2007 to May, 2008). The records of the cases were registered in the cases proforma sheets and the evaluation, observations, analysis and interpretation of the data were made subsequently. To determine the socio-economic status of the patients, their economic resources were assessed and the study subjects were divided into various income groups on the basis of annual income as follows, Group I: with income of less than Rs. 20,000; Group II: with income of Rs. 20,000–Rs. 40,000 and Group III consisted of patients with an income of more than Rs. 40,000. With the help of a scoop, specimen was collected from the site of visible lesion in the oral cavity and its wet KOH preparation was examined microscopically. Culture

was done on SDA media (in duplicate) and allowed to grow at 25°C for 24-48 hrs in BOD incubator. Suggestive growth on SDA media (mucoid, white oval-shaped colonies) were then confirmed for *Candida* sp. with regular tests like Gram's staining. Lactophenol Cotton Blue staining (LCB mount) and Germ Tube test as given by Chander (2002). Species differentiation was done on Hi-Crome *Candida* Agar medium as per the chart below-*C. albicans*- light green; *C. glabrata*- purple; *C. tropicalis*- blue with pink halo; *C. krusei*- pink (rough, with spreading edges); *C. parapsilosis*- cream colour; *C. kefyr*- pink, purple; *C. guilliermondii*- pale pink, purple; and *C. dubliniensis*- dark green.

RESULTS

The data in Table 1 shows that out of the total 273 patients (serologically) positive for HIV infection), 160 (58.6%) patients were males and 113 (41.4%) were females. Out of 62 patients with clinically suspected oral *Candida* infection, 40 were males and 22 were females that means 64.51% were males and 35.49% were females. In consideration of the annual income of the patients, maximum numbers of patients i.e. 38 (61.29%) out of 62 patients were in Group-I i.e. less than Rs. 20,000/- whereas 14 (22.59%) patients had yearly income of Rs. 20,000-40,000/- (Group-II) and only 10 (16.12%) were in Group-III (more than Rs. 40000/- income per year). It was further found that females were more in the income group of less than Rs. 20,000/- (20 vs. 18) whereas males showed a reverse picture in the higher income groups (22 vs. 2). Analysis of the occupations of the patients showed that out of 62 clinically diagnosed patients, 9 (19.56%) were skilled labourers, unskilled labourers were 7 (15.21%), business men 14 (30.43%), office worker was only 1 (2.17%) and patients in other jobs were 15 (32.60%) which included people working in NGO services, domestic helps in houses, etc. Among these patients majority were males. Most of the females were house makers and only 6 of them were involved in other occupational types. Age and sex wise distribution of the patients showed that out of the total 62 cases, majority (57 out of 62) belonged to the age group of 21-40 years and in this group male patients (36) dominated over the females (21). No patient was found in the age group of above 60 years.

Table 1 : Overall distribution of patients

Patient	Male	Female	Total
No. of seropositive patient	160 (58.60)	113 (41.40)	273 (100)
No. of overt infection	40 (64.51)	22 (35.49)	62 (100)
Annual Income (Rs.)			
<20,000	18 (29.03)	20 (32.25)	38 (61.29)
20,000-40,000	13 (20.97)	1 (1.62)	14 (22.59)
>40,000	9 (14.50)	1 (1.62)	10 (16.12)
Occupational Types			
Skilled Labour	8 (17.39)	1 (2.17)	9 (19.56)
Unskilled Labour	7 (15.21)	-	7 (15.21)
Business	14 (30.43)	-	14 (30.43)
Office Jobs	1 (2.17)	-	1 (2.17)
Others	10 (21.73)	5 (10.86)	15 (32.60)
Age and Sex (Yrs.)			
<20	1 (1.62)	-	1 (1.62)
21-40	36 (58.06)	21 (33.87)	57 (91.93)
41-60	3 (4.83)	1 (1.62)	4 (6.45)
>60	-	-	-

The figures in the parenthesis indicates percentage.

In this study, out of 62 clinically suspected patients 51 were found to be positive for *Candida* infection by various diagnostic procedures such as smear examination, culture isolation, Lacto-phenol cotton blue(LCB) mount, germ tube test etc. Among the 51 cases only 47 patients were both smear and culture positives. Numbers of males (male: female~3 : 1) were found to be predominant group among these 51 culturally positive individuals.

Table 2 : Distribution of isolated species

Name of species	Male	Female
<i>C. albicans</i>	21 (41.17)	8 (5.68)
<i>C. glabrata</i>	15 (29.41)	4 (7.84)
<i>C. parapsilosis</i>	2 (3.92)	0
<i>C. tropicalis</i>	0	1 (1.96)

The Figures in the parenthesis indicates percentage

From Table 2 it was seen that among the total number of positive cases (51), *C. albicans* was found to be the causative agent among 29 cases (56.87%), *C. glabrata* was found to be the causative agent among 19 cases (37.25%), *C. parapsilosis* was found to be the causative agent among 2 cases (3.92%) and *C. tropicalis* was found to be the causative agent in only 1 case (1.96%). *C. albicans* and *C. glabrata* was found to be the causative agent in only 1 case (1.96%). *C. albicans* and *C. glabrata*

was found to be predominant in males representing 21 (41.17%) and 15 (29.41%) respectively.

DISCUSSION

Although human immunodeficiency virus (HIV) infection is endemic in Southeast Asia, data on oral mycotic flora in this disease in Asians are sparse.

The aim of this study was to determine the pattern of *Candida* infections in HIV-infected persons with oral Candidiasis attending School of Tropical Medicine in Kolkata, because of the fact that Oropharyngeal Candidiasis may predispose patients to develop more invasive disease, including oesophageal Candidiasis. The presence of Oropharyngeal or oesophageal Candidiasis can help predict the progression and prognosis of HIV infection. Ten or more years may elapse between the time of seroconversion to HIV and the occurrence of full-blown AIDS as shown by Rutherford *et al.* (1990).

Out of the 62 clinically suspected patients 51 were found to be positive for *Candida* infection by laboratory investigations. Males among this confirmed group dominated over females (3 : 1). Our result also correlated well with the study of Singh *et.*

al. (2003) who found 87% males and 13% females among the infected population.

Patients represented various income groups of which maximum numbers were from the income group-I (<20,000/year) where females dominated, but male patients were maximum in the income groups-II (20,000-40,000/year). These findings showed the higher prevalence of candidal infections among the lower socio-economic groups, which might be due to lack of awareness regarding the gravity of the disease and also the lack of access to treatment. Our findings tallied with those of Singh *et al.* (2003) where they found that most of the patients belonged to lower socio economic status, staying away from family, went in search of job to metropolitan cities mainly to Mumbai.

Maximum number of patients in this study was from the age group of 21-40 years where again males (58.06%) predominated over the females (33.87%). There was not a single patient from the age group above 60 years and only one patient from the age group below 20 years. This showed that majority of the patients belonged to the sexually active age groups like other sexually transmitted diseases. This observation correlated well with the study of Singh *et al.* (2003), where they found 54% (54/100) cases were from the age group of 31-40 years and 38% (38/100) were belonging to 21-30 years and 92/100 (92%) were belonging to 21-40 years of age.

Patients from various occupational types were found in this study. In this small group of patients majority of the males were goldsmith, shop keeper and drivers by profession. This finding establishes well with the distribution of HIV infected individuals among various occupations. Singh *et al.* (2003) showed the similar type of distribution of occupation like hotel waiters, taxi drivers, panwallahs and mechanics among their study subjects.

Out of the 51 *Candida* positive patients, 47 were positive by smear examination whereas all 51 patients were positive by culture. So it may be suggested that cultural confirmation is the standard for the diagnosis of *Candida* infection and should be the method of choice.

In our study, oral candidiasis was clinically detected in 62 out of 273 HIV positive persons. *Candida* spp.

was isolated from fifty one persons. *Candida albicans* was the most common (56.87%), with non-*albicans* species such as *C. glabrata* (37/25%). *C. parapsilosis* (3.92%) and *C. tropicalis* (1.96%) being notable among the total number of positive cases (51). This finding correlated well with the other studies. A study among Cambodian populations by Schmidt-Westhausen *et al.* (2004) has found similar results. A study in a semi-urban town in southern India by Badarinarayanan *et al.* (1999) has shown that out of 933 trialists, 61 were found to have lesions of varied degree of severity. Among these, 56 were positive for fungal pathogen, which was confirmed by germ tube test, cultural characteristics etc., and *Candida albicans* (87.5%) was the most predominant pathogen followed by *C. tropicalis* (8.9%). Men in the age groups of 40 years and above were observed to have higher frequency of *Candida* infections compared to other groups of trialists. A study by Van't Wout, (1996) among non *Candida albicans* species showed more or less similar findings. A study in a Chinese university hospital by Shen *et al.* (2007) showed that *Candida albicans* accounted for 57.4% of fungal pathogens isolated.

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