

**Ministry of Higher Education
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University of Diyala
College of Medicine**



Oral candidiasis in pediatrics

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Abstract

Candida albicans is a diploid, opportunistic polymorphic pathogen which is part of most humans' normal microbial flora. It has been shown that is borne by 30 to 60 per cent of healthy humans. Diverse locations from which *C. albicans* have been identified including: oral mucosa, vaginal mucosa, gut and skin. The oral cavity, gastrointestinal tract and urinogenic tract was colonized by up to 70% or more of the population. Nevertheless, under some circumstances, this specific mucosa, such as oropharyngeal candidiasis (OPC) or vulvovaginal candidiasis (VVC), can cause superficial infections. Colonization of the human gastrointestinal (GI) tract by opportunistic fungal pathogens such as *Candida albicans* is significant because *C. albicans* infections are believed to arise from commensal organisms. *Candida* pneumonia is seldom documented even in the intensive care unit (ICU). In this survey, we studied the relation between the mode of feeding and the risk of developing complications in infants with oral candidiasis.

Methods: The present study was occurring in Baquba City, the center of Diyala The population of this study includes children less than 2 years from both genders, who come to Al-Batool Teaching Hospital, suffering from oral candidiasis in the period from August 2022 to February 2023. We collected the information by written questionnaire through direct interview with the mothers.

Results: 50 children were enrolled in this study, 56% males and 44% females. 60% of them had gastroenteritis, 26% chest infection and 14% with recurrent seizures. There was significant difference between the mode of feeding and the risk of developing complication ($P < 0.05$).

Conclusion: bottle feeding is associated with more complication of oral candidiasis compared to breastffeding.

Introduction

Fungi are widespread and can develop on the skin and in the mucous membranes, intestinal tracts. They are present in the soil as well as on seeds, trees and other vegetations. While not all the fungi are pathogenic, some can cause serious illness and pose a major risk to public health (1).

The most common yeast infecting humans are the genus *Candida*. *Candida albicans*, which are involved in the major opportunistic yeast infection in the world candidiasis, but continue to be the most common among the species of the genus. While this yeast is responsible for around (50-90) % of human candidiasis (2-3), and rise in the incidence of yeast infections induced by *non-Albicans* including *Candida* such as *C. glabrata*, *C. krusei*, *C. tropicalis* and *C. parapsilosis* was recorded elsewhere (4,5).

Candida albicans is a diploid, opportunistic polymorphic pathogen which is part of most humans' normal microbial flora. It has been shown that is borne by 30 to 60 per cent of healthy humans (6). Diverse locations from which *C. albicans* have been identified including: oral mucosa, vaginal mucosa, gut and skin. The oral cavity, gastrointestinal tract and urinogenic tract was colonized by up to 70% or more of the population. Nevertheless, under some circumstances, this specific mucosa, such as oropharyngeal candidiasis (OPC) or vulvovaginal candidiasis (VVC), can cause superficial infections. In addition (7), capable of increasing cell morphologies in the hyphal, pseudohyphal, opaque, and chlamyospore yeast is capable of blocking hyphal / pseudohyphal (filaments) transitions in the yeast (8).

Among healthy adults, candidiasis is rare in the mouth, throat, or esophagus. People at higher risk of developing candidiasis in the mouth and throat include infants, particularly those younger than 1 month of age, and people with at least

one of these factors. According to numerous studies, oral candidiasis in neonates is estimated to be (0.5–20)% percent (9).

Colonization of the human gastrointestinal (GI) tract by opportunistic fungal pathogens such as *Candida albicans* is significant because *C. albicans* infections are believed to arise from commensal organisms (10). In a recent study that supports this view, Miranda et al (11), recovered *Candida* organisms from the blood of patients with candidiasis and compared those organisms to organisms cultured from the rectum or skin of the same patient. In most cases of *C. albicans* candidemia, the strain identified in a patient's blood sample and the strain identified in the same patient's rectum sample were identical. These findings support the model that commensal organisms residing in the GI tract can escape from this niche and reach the bloodstream. Interestingly, in the same study, *Candida parapsilosis* blood stream isolates did not correspond to isolates detected in rectum or oral samples (11).

Candida pneumonia is seldom documented even in the intensive care unit (ICU). Thus, the common consensus is that anti-*Candida* therapy is rarely necessary in most cases and it should be considered as colonization in which *Candida* spp. are isolated from the respiratory tract (RT) (12).

The co-existence of bacteria and fungi has raised great concern in the last decade. It has been indicated by some studies that *Candida* colonization in the RT might be an independent risk factor that could promote ventilator-associated pneumonia (VAP) and even change the antibiotic resistance patterns of pathogenic bacteria by polymicrobial biofilm formation (13).

Aim of study

To identify the association between oral candidiasis complications and the mode of feeding.

Patients and methods

The present study was occurring in Baquba City, the center of Diyala province, lies about 50 kilometers north of Baghdad the capital of Iraq. The population of this study includes children less than 2 years from both genders, who come to Al-Batool Teaching Hospital, suffering from oral candidiasis in the period from August 2022 to February 2023.

A questionnaire of personal information was prepared for this purpose, The questions include the data of patients and ages , genders , address urban and rural , feeding history , water supply and etc. the privacy of the patients identities was preserved.

All data were statistically analyzed depending on SPSS (Statistical Package for Social Science) version 18 (2009). Chi-square was used to compare between the variable in this study. Statistical results were considered significant when being under or equal to the 0.05.

Results

A sample of 50 infant patients under 2 years was collected with mean age of 6.07 months. 56 % of them were males (28) and 44% were females (22).

Their illnesses are summarized in table 1.

Table 1. The sample illnesses

Diseases	Frequency	Percent%
Gastroenteritis	30	60.0
Chest infection	13	26.0
Seizure	7	14.0
Total	50	100.0

Their mode of feeding is demonstrated in table 2

Table 2. mode of feeding

Type	Frequency	Percent%
Breastfeeding	9	18.0
bottle feeding	39	78.0
Cow milk	2	4.0
Total	50	100.0

Their mother's level of education is demonstrated in table 3.

Table 3. Mother level of education

Level	Frequency	Percent%
none	26	52.0
Primary	9	18.0
Secondary	15	30.0
Total	50	100.0

66% of them are living in urban areas and 33% living in rural areas.

There were strong association between the mode of feeding and the risk of candida infection as in table 4.

Table 4. association between mode of feeding and the illnesses in this study

Disease	Type of feeding			Total	Sig.
	Breastfeedin g	bottle feeding	Cow milk		
Gastroenteritis	3	27	0	30	P = 0.031
Chest infection	3	8	2	13	
Seizure	3	4	0	7	
Total	9	39	2	50	

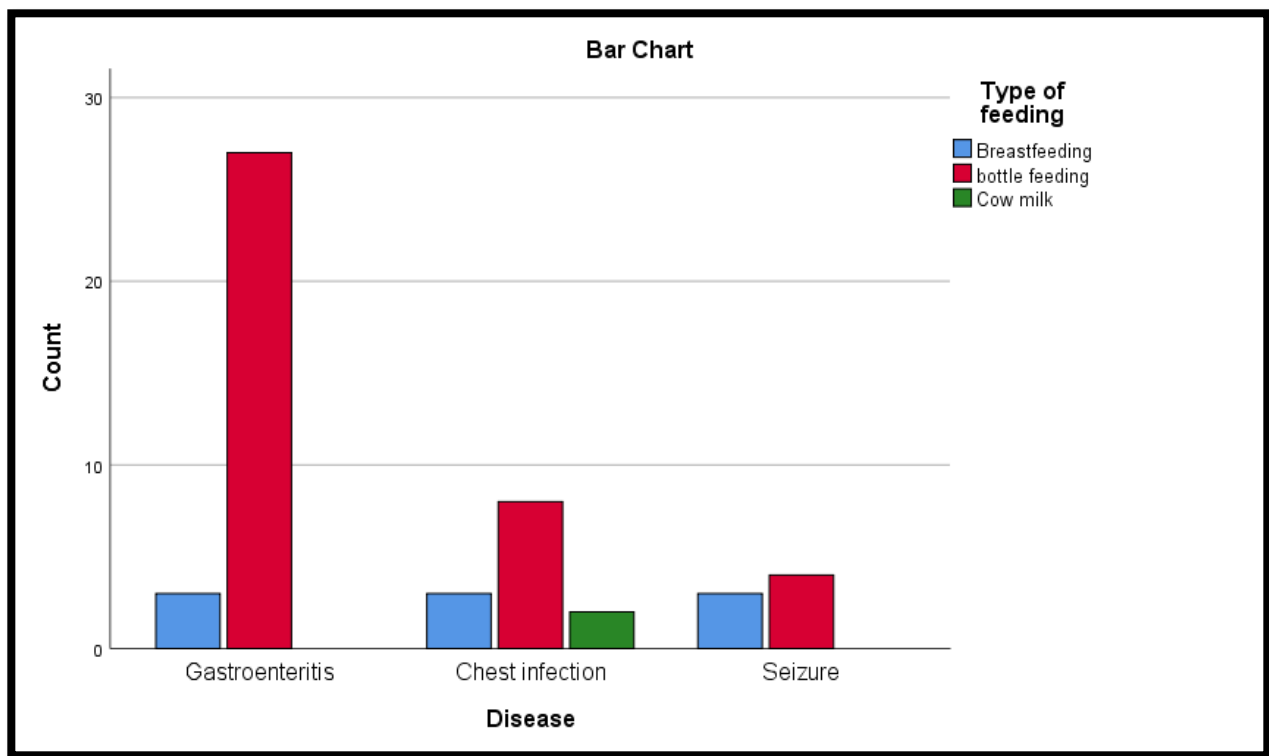


Figure 1. association between type of feeding and candida complications

We found slight elevation in candida complications in urban areas but we found no statistical significance as in table 5.

Table 5

Disease	site		Total	Sig.
	Urbans	Rural		
Gastroenteritis	19	11	30	P = 0.445
Chest infection	8	5	13	
Seizure	6	1	7	
Total	33	17	50	

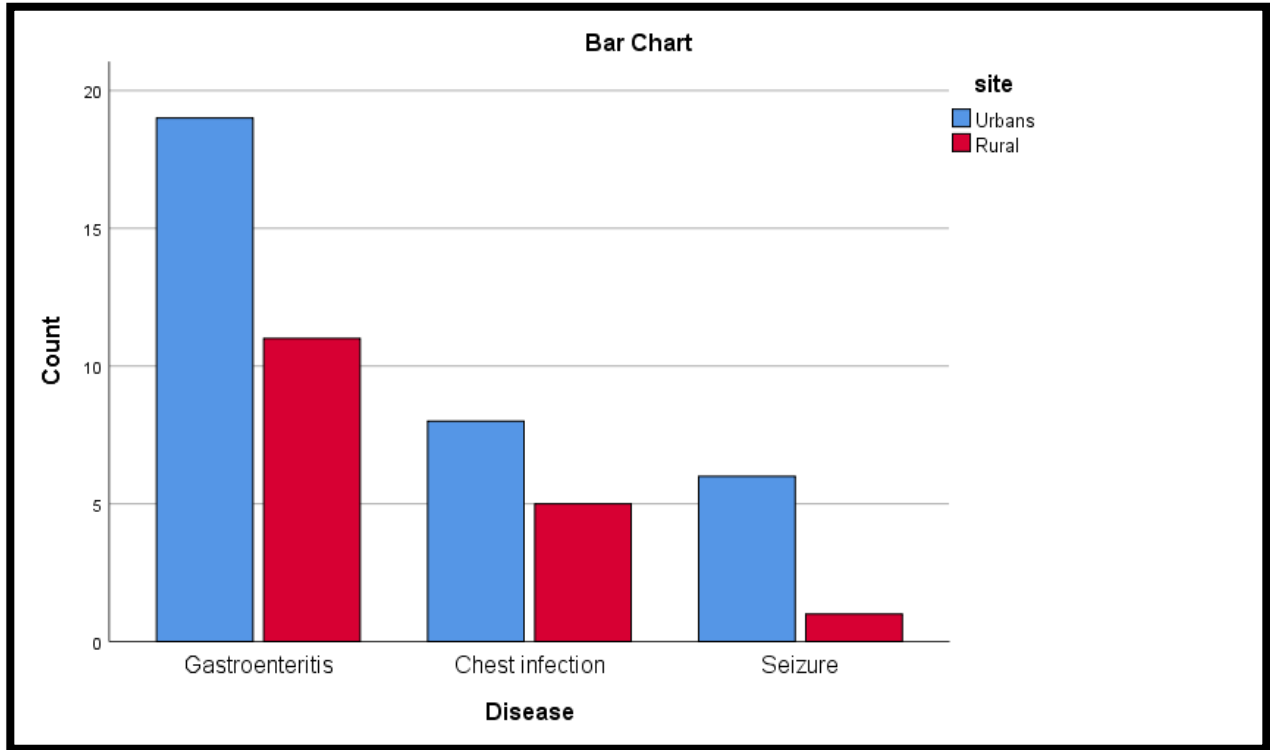


Figure 2. association between oral candida complications and area of living

Discussion

Fungal infections still create a main health problem over all the world and affecting all ages particularly children. Therefore, many studies have been conducted concerning different epidemiological economical, control as well as therapeutic features of this infection (14).

Candida is present as a commensal 'organism' in the oral cavities of up to 40% of healthy individuals. The prevalence of *Candida* species in the oral cavity of immunosuppressed individuals has been found to be higher when compared to the healthy population. Observed that the occurrence of oral yeasts from saliva of hospitalized patients was 55% in patients with advanced cancer, the presence of *Candida* spp. in the oral mucosa reached up to 80% (15).

In our study, 60% of the patients with oral candida had gastroenteritis, 26% had chest infection and 14% had episodes of seizures as a complications of oral candidiasis. And this agrees with the findings of Contaldo et al (16) and Petrocheilou-Paschou et al (17).

We found a strong association between bottle feeding and the increased risk of getting both GIT and respiratory infections ($P < 0.05$). and this is consistent with the findings of Zöllner et al (18). Who found that although there is a significantly larger quantity and larger diversity of candidal species on the breasts of the study lactating women, the fact that an expressively smaller number of breastfed infants had their mouths colonized by this type of yeast confirms the idea of protection provided by resistance factors in mother's milk against the *Candida* genus colonization in the oral cavities of breastfed infants.

Conclusion

We found a strong association between mode of feeding and the risk of developing complication in patients with oral candidiasis particularly in bottle fed infants.

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