

Isolation and characterization of common pathogens isolated in vaginitis in selected hospitals in Abuja.

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Abstract

A total of 4737 high vaginal swab specimens were collected from patients with clinical symptoms of vaginitis, during a six-month period. Standard diagnostic technique was employed to investigate for possible pathogens. A total of 3506 or 74.0 % of the samples had *Candida* species while *Staphylococcus aureus* was 799 or 16.9%. *Streptococcus* species were 170 or 3.5%, while *Neisseria gonorrhoea* was found to be 126 or 2.7%. *Candida* species were further characterized based on sugar utilization and germ tube formation. *Candida albicans* was found to be the predominant yeast with 71.2% occurrence. 12.2% was *Candida tropicalis*, 5.5% and 12.2% were *Candida guillemondi* and *Candida pseudotropicalis* respectively. These *Candida* species were incriminated in candidiasis and one of the sexually transmitted infections (STIs) with varied symptoms depending on the immune status of the patients. *Candida albicans* was highly incriminated in STIs and with social and health complications. Other *Candida* species have less health disturbance. The most prevalent age group was young adults whose age range from 25 to 29 years. Certain environmental factors that are found to facilitate cases of candidiasis include urbanization pressure (high population density with no infra-structure and inadequate accommodation), and general low economic standard. Candidiasis can be curtailed with public sensitization on reproductive health and the indiscriminate use of drugs.

Key word: *Candidiasis*, STIs, Diagnostic techniques, Clinical samples

Introduction

Candida species are frequently encountered aetiological agent of candidiasis and is capable of causing any of the clinical types of candidiasis, (1,2,3,4).

Candida species cause both oral and vaginal thrush, candida perymydia, bronchomycosis, mycotic vulvovaginitis and candidiasis. Systemic candidiasis due to *Candida albicans* has increased by more than 500% during the last decade (5) and represents serious clinical problems. Vaginal candidiasis is seen predominantly in women of child bearing age. It has been estimated that approximately 75 per cent of all women will experience one episode of vaginal candidiasis during their life time and that approximately 40-50 per cent of these will experience one further episode, (6). The major predisposing factors to candida infection include pregnancy, use of oral contraceptives, HIV infections, diabetes mellitus, use of corticosteroid drugs, antibiotics and iron deficiency.(1)

The WHO states that 125 million people in developing nations suffer from sexually transmitted infections (STIs) yearly. Abuja city, Nigeria has been experiencing rapid urbanization, resulting in homelessness, poverty and general poor living standard. These socio-economic pressures have consequently encouraged the increasing numbers of commercial sex workers and consequent spread of STI. This work looks into the predominant pathogens in cases of vaginitis and characterization of the different species. The findings of this work would guide us on challenge and strategies to put in place in order to reduce this public hazard.

Materials and method

Specimen Collection:

A total of 4737 high vaginal swabs (HVS) from patients attending STI clinics Garki Hospital, Wuse General Hospital and NIPRD were collected and screened. The specimens were collected aseptically with sterile swab sticks (7). These specimens were transported in standard transport medium to the laboratory at the National Institute for Pharmaceutical Research and Development (NIPRD) Abuja.

Microbiological Test:

Each high vaginal swab (HVS) was inoculated aseptically into Sabourand dextrose agar (Biotec), two blood agar and MacConkey agar plates. All the plates were incubated at 37°C for 24 hours except one inoculated blood agar which was incubated at CO₂ enriched jar for 24 hours at 37°C. Gram reaction and wet preparation was made from each HVS sample and examined for Gram reactions and the presence of yeasts, red blood and epithelial cells respectively.

Production of germ tubes in serum The method adopted by Baker et al, 1980 was employed. A loopful of yeast colonies in Sabourand dextrose agar was emulsified in 0.5ml human serum and incubated at 37°C for about three hours. The wet preparations were examined microscopically for the production of pseudohyphae.

Results

Identification of Isolates:

Incubation was carried out at 37°C for 24 hours. The colonies were identified on the different culture media (7). Biochemical tests were performed on the identified colonies. *Staphylococcus aureus* was identified by its characteristic Gram positive cocci and positive reactions with catalase and coagulase tests. The *Staphylococcus aureus* also produced yellow colouration in Mannitol Salt Agar.

Streptococcus sp identified produced alpha to beta haemolysis on blood agar plates. Gave Gram positive cocci in long and short chains which did not react with catalase and coagulase test.

The mixed cultures were made up of *Escherichia coli*, *Klebsiella sp* and *Proteus sp*. These bacteria were differentiated based on lactose, urea, citrate and indole utilization. These bacteria also have varied colonial morphology on MacConkey agar.

Neisseria gonorrhoea produced tiny colonies on blood agar which stringed with KOH. The colonies also gave positive oxidase reaction and Gram negative diplococci.

Candida sp gave creamy white colonies in Sabourand dextrose agar plate. These yeasts gave Gram positive oval cells with budding and positive germ tube reaction in some of the species. Test organisms were each inoculated into fermentation tubes containing 1 per cent solution of lactose, maltose, sucrose and galactose respectively into peptone water broth with 0.04 per cent bromothymol blue indicator,(8)(9). Tubes were incubated at 37°C for 24-48 hours and observed daily for colour production.

Table1 shows the distribution of possible pathogens isolate from patients attending STIs clinic from the selected hospitals in Abuja. *Candida sp* was found to be dominant isolates with over 74 per cent, closely followed by *Staphylococcus aureus* with 16.9 per cent. Other

isolates had 3.6 and 2.7 per cent for *Streptococcus Sp* and *Neisseria gonorrhoea* respectively. The mixed flora was 1.5 per cent and were made up of *E. coli*, *Klebsiella* and *Proteus species*. Table 2 shows the frequency of occurrence of pathogens isolated from 4737 patients with vaginitis. *Candida* species occurred more frequently than the other organisms in each of the four hospitals. 3506 isolates of *Candida* species were obtained from the samples. This represents a total of 74.0 per cent occurrence. This was followed by *Staphylococcus aureus* with 799 (16.9%) isolates. *Streptococcus sp* was isolated from 170 (3.6%) cases. Mixed flora and *Neisseria gonorrhoea* had 75 (1.6%) and 126 (2.65%) cases respectively.

TABLE 1: Occurrence (%) of Various Organisms From 4737 HVS Samples.

Organisms	<i>Candida</i> specie	<i>Staph aureus</i>	<i>Neisseria</i> specie	<i>Streptococcus</i> specie	Mixed flora	No significant pathogens
	74.0	16.9	2.7	3.6	1.5	1.3

TABLE 2: Characterization of Isolates From the Various Hospitals.

Source of sample	Number of swabs	<i>Candida</i> Species	<i>Staph aureus</i>	<i>Neisseria gonorrhoea</i>	<i>Strept</i> Species	Mixed Flora	No significant pathogens
GGH	1210	806	300	32	36	23	13
WGH	1891	1486	230	44	70	38	23
NPC	1636	1215	269	50	64	14	24
Total	4737	3506	799	126	170	75	60

KEY GGH: Garki General Hospital. WGH: Wuse General Hospital. NPC: NIPRD Clinic

Table 3 shows the frequency of isolation on further characterization of *Candida* species from cases of candidiasis. *Candida albicans* had 71.2 per cent of the 3506 cases screened. *Candida tropicalis* had 12.2 per cent, while *Candida pseudotropicalis* and *Candida guilliermondii* had 5.5 and 11.1 per cent respectively.

TABLE 3: Percentage of isolates of *Candida* species from three selected hospitals

Source of samples	Number of swabs	<i>Candida albicans</i>	<i>Candida tropicalis</i>	<i>Candida guillemondii</i>	<i>Candida pseudotropicalis</i>
GGH	806	573	99	46	89
WGH	1486	1058	182	82	165
NPC	1215	864	146	67	135
Frequency	3506	2495	427	194	389
Percentage	100	71.2	12.2	5.5	11.1

KEY GGH:

Garki General Hospital

WGH: Wuse General Hospital

NPC: NIPRD Clinic

Table 4 shows the age distribution of patients with candidiasis. The age group of 25 -29 years had the highest isolation of over 80 per cent. The least cases of candidiasis was in the group of 40 years and above with 1.1 per cent.

TABLE 4: Age Distribution of Patients with Vaginal Candidiasis

Age (years)	No of patients	% Occurance
15 -19	80	2.3
20 -24	110	3.1
25 -29	2826	80.6
30 -34	450	12.9
40 - above	40	1.1
Total	3506	100.0

Discussion

This study showed that *Candida* species were frequently isolated with over 74 per cent, followed by *Staphylococcus aureus* and *Streptococcus sp.*. Further characterization of the *Candida* species, showed that *Candida albicans* was the highest single isolate with 71 per cent and other species were less frequently isolated. This finding could be related to the report by (10) that *Candida albicans* was predominantly isolated from women of child bearing age who complained of vaginitis. Furthermore, this study agreed with the conclusion of (5) that candidiasis during the last decade had increased by 500 per cent. With the advent of HIV pandemic, cases of candidiasis had increased many folds (7). *Candida* species other than *Candida albicans* were less isolated in cases of candidiasis and rarely had serious health implications.(11). However, the study showed that *Candida* other than *Candida albicans* were implicated in cases of candidiasis. The study also showed that candidiasis was common among age bracket of 25 to 29 years. Other factors that might favour the variation in the percentage of candidiasis in women of different age include unconsciousness of women as they grow in age, their physical size and nutritional status. Social and moral status, level of hygiene, sensitization, cultural awareness and drug abuse were other factors that had favored the continued rise in reported cases of candidiasis (12)(13).

Sexually transmitted infections have a wide distribution among the age groups, although, young adults were found to engage in commercial sex trade. WHO had attributed this practice to urbanization which concentrates individuals with increased chance of acquiring new sex partners? However, cases investigated, showed individuals in their late twenties had highest cases of candidiasis.

These selected hospitals had a wide distribution of attendance from Abuja, a metropolitan city. The health sector depicts the situation as it affects the populace. *Candidiasis* essentially is one of the STIs and thrived where we have homelessness, presence of commercial sex workers, poverty and general poor living standard. The finding has shown that candidiasis is on the rise in Abuja. Other preventive measures include establishment of reproductive health curriculum in schools, availability of condoms to reduce the epidemiological spread of candidiasis and other agents of sexually transmitted diseases.

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